

January 31, 2017

Mr. Neal Holdridge Trammell Crow Company 3501 Jamboree Road, Suite 230 Newport Beach, CA 92660

SUBJECT: KNOX BUSINESS PARK SUPPLEMENTAL ANALYSIS

Dear Mr. Neal Holdridge:

This letter serves as a supplement to the *Knox Business Park Traffic Impact Analysis* (dated June 8, 2015) (referred to as "2015 Traffic Study"). The 2015 Traffic Study evaluated a total of 1,259,050 square feet (sf) of high-cube warehouse / distribution center use within 2 buildings. However, the Project has recently been updated to include the development of a total of 1,114,022 sf of high-cube warehouse / distribution center use within 2 buildings, which results in a net reduction of 145,028 sf from the Project evaluated in the 2015 Traffic Study.

#### **SUMMARY OF FINDINGS**

Based on the results of this analysis, no additional impacts are anticipated with the proposed changes to the Project from those previously disclosed in the 2015 Traffic Study.

#### PROJECT OVERVIEW

Building D located on the southeast corner of Decker Road and Oleander Avenue was proposed to consist of 703,040 sf of high-cube warehouse / distribution center use and is proposed to remain unchanged. However, Building E was previously assumed to consist of 556,010 sf of high-cube warehouse / distribution center use and has since been reduced to 410,982 sf. Exhibit 1 shows the proposed Building E. Access to Building E would be provided via two proposed driveways on Oleander Avenue. The western driveway would provide access to passenger cars only and the eastern driveway would provide access to trucks only. It is our understanding that a 3<sup>rd</sup> driveway may potentially provide access to passenger cars only and would be located approximately mid-point between the western and eastern driveways for Building E.

#### 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. The trip generation rates used for this assessment are based upon information collected by the Institute of Transportation Engineers (ITE) as provided in their <u>Trip</u>



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<u>Generation</u> manual (9<sup>th</sup> Edition, 2012). The ITE <u>Trip Generation</u> manual is a nationally recognized source for estimating site specific trip generation.

Consistent with the 2015 Traffic Study, the ITE High-Cube Warehouse / Distribution Center land use (ITE Land Use Code 152) has been utilized for the purposes of this supplemental analysis. The trip generation for the proposed Project is shown in Table 1. The proposed Project is anticipated to generate a net total of approximately 2,936 passenger car equivalent (PCE) based trip-ends per day with 172 PCE AM peak hour trips and 200 PCE PM peak hour trips. This results in a reduction in trip generation from the Project previously evaluated in the 2015 Traffic Study. The proposed Project is anticipated to generate 382 fewer PCE trip-ends per day with 23 fewer PCE AM peak hour trips and 25 fewer PCE PM peak hour trips.

Table 1: Project Trip Generation Summary (in PCE)

			AN	1 Peak Ho	our	PΝ	/I Peak Ho	our	
Land Use	Quantity	Units <sup>1</sup>	In	Out	Total	In	Out	Total	Daily
Building D	703.040	TSF							
Passenger Cars:			39	17	56	17	39	56	731
Truck Trips:									
2-axle:			5	2	7	3	6	9	148
3-axle:			5	2	7	3	7	10	159
4+-axle:			26	12	38	16	35	51	814
- Net Truck Trips (PCE) <sup>2</sup>			36	16	52	22	48	70	1,122
BUILDING D TOTAL NET TRIPS (PCE) <sup>3</sup>		•	75	34	108	39	87	126	1,853
Building E	410.982	TSF							
Passenger Cars:			23	10	33	10	23	33	427
Truck Trips:									
2-axle:			3	1	4	2	4	5	87
3-axle:			3	1	4	2	4	6	93
4+-axle:			15	7	22	9	20	30	476
- Net Truck Trips (PCE) <sup>2</sup>			21	10	31	13	28	41	656
BUILDING E TOTAL NET TRIPS (PCE) <sup>3</sup>		44	20	64	23	51	74	1,083	
то	TAL (Revised	Project):	119	53	172	62	138	200	2,936
тоты	TOTAL (From Traffic Study):		135	60	195	70	156	225	3,319
	тот	AL (PCE):	-15	-7	-23	-8	-18	-25	-382

 $<sup>^{1}</sup>$  TSF = thousand square feet



<sup>&</sup>lt;sup>2</sup> Vehicle Mix Source: Total truck percentage source from ITE <u>Trip Generation</u> manual. Truck mix (by axle type) source from SCAQMD.

<sup>&</sup>lt;sup>3</sup> TOTAL NET TRIPS (PCE) = Passenger Cars + Net Truck Trips (PCE).

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#### **FINDINGS**

No additional analysis is necessary as the proposed Project is anticipated to generate fewer trips than the Project evaluated in the 2015 Traffic Study. Building E previously included 3 points of access along Oleander Avenue. It is anticipated that although the Project is proposing to provide 2 points of access to Building E, the peak hour operations at these driveways would continue to operate at acceptable levels of service (LOS) during the peak hours. The driveways for Building E were found to operate at LOS A or LOS B during the peak hours for Horizon Year (2035) traffic conditions.

The 2015 Traffic Study previously identified 2 impacted intersections that were subject to fair share contributions from the Project. These intersections are Decker Road at Oleander Avenue and Harvill Avenue at Harley Knox Boulevard. Based on the revised overall Project trip generation, the fair share percentage for each of these cumulatively impacted intersections is shown in Table 2. Consistent with the 2015 Traffic Study, the fair share percentage is provided in bold text and represents the most deficient peak hour.

**TABLE 2: PROJECT FAIR SHARE CALCULATIONS** 

#	Intersection	Existing	Project	2035 WP Volume	Total New Traffic	Project % of New Traffic
4	Decker Rd. / Oleander Av.					
	AN	l: 5	64	1,727	1,722	5.6%
	PN	l: 8	74	2,073	2,065	5.5%
8	Harvill Av. / Harley Knox Bl.					
	AN	l: 718	150	2,288	1,570	10.8%
	PN	l: 829	177	4,856	4,027	5.0%

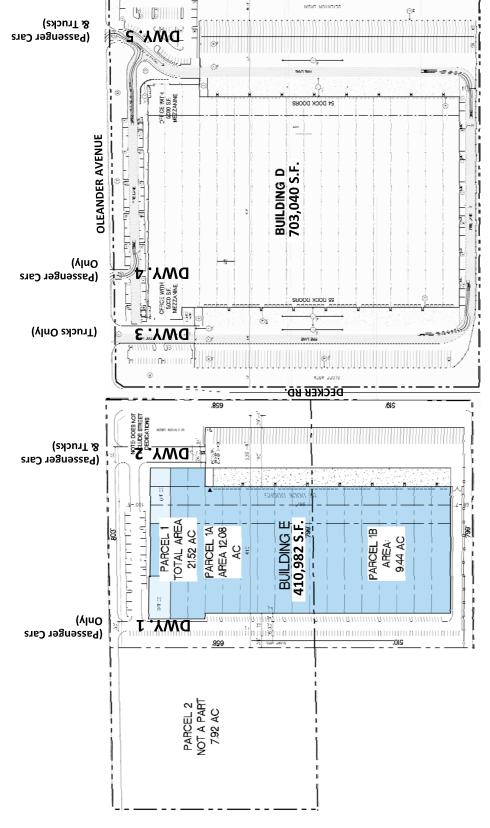
**BOLD** = Denotes highest deficient peak hour.

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

Respectfully submitted,

URBAN CROSSROADS, INC.

Charlene So, PE Senior Associate





# **Knox Business Park**

# TRAFFIC IMPACT ANALYSIS COUNTY OF RIVERSIDE

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JUNE 8, 2015

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#### LIST OF ABBREVIATED TERMS

(1) Reference

ADT Average Daily Traffic

Caltrans California Department of Transportation
CEQA California Environmental Quality Act
CMP Congestion Management Program

DIF Development Impact Fee

E+P Existing Plus Project

EAP Existing Plus Ambient Growth Plus Project

EAPC Existing Plus Ambient Growth Plus Project Plus Cumulative

FHWA Federal Highway Administration

HCM Highway Capacity Manual HOV High Occupancy Vehicle

ITE Institute of Transportation Engineers

LOS Level of Service

MUTCD Manual on Uniform Traffic Control Devices

NCHRP National Cooperative Highway Research Program

NP No Project (or Without Project)
PCE Passenger Car Equivalents

PeMS Caltrans Performance Measurement System

PHF Peak Hour Factor
Project Knox Business Park

RivTAM Riverside County Transportation Analysis Model

RTA Riverside Transit Authority
RTP Regional Transportation Plan

SCAG Southern California Association of Governments
SCAQMD South Coast Air Quality Management District

SHS State Highway System

sf Square Feet

TIA Traffic Impact Analysis

TUMF Transportation Uniform Mitigation Fee

WP With Project

WRCOG Western Riverside Council of Governments



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#### 1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed Knox Business Park ("Project") located south of Oleander Avenue and on either side of Decker Road in the County of Riverside as shown on Exhibit 1-1.

The purpose of this traffic impact analysis is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to achieve acceptable circulation system operational conditions. As directed by County of Riverside staff, this traffic study has been prepared in accordance with the County of Riverside's *Traffic Impact Analysis Preparation Guide* (August 2008), the California Department of Transportation (Caltrans) *Guide for the Preparation of Traffic Impact Studies* (December 2002), and consultation with County of Riverside staff during the scoping process. (1) (2) The approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TIA.

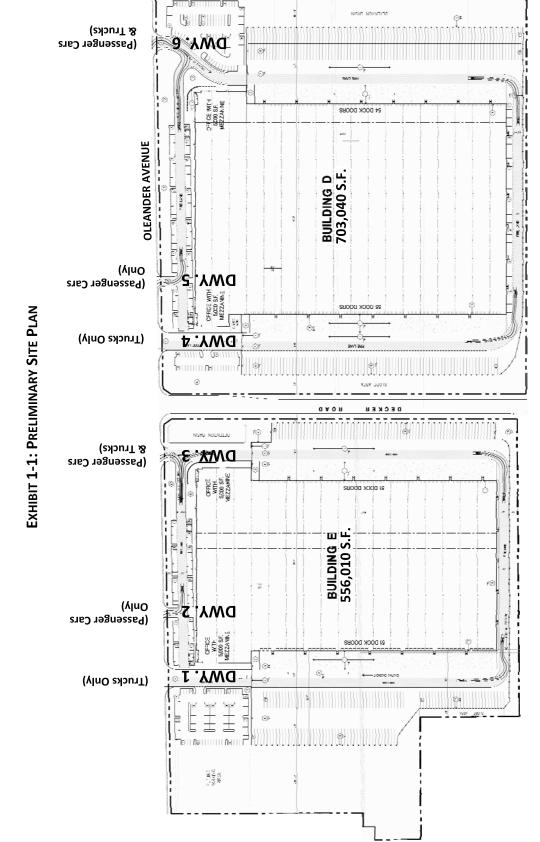
#### 1.1 PROJECT OVERVIEW

The Project is proposed to consist of a total of 1,259,050 square feet (sf) of high-cube warehouse use/distribution center within two buildings. Building D located on the southeast corner of Decker Road and Oleander Avenue is proposed to consist of 703,040 sf of high-cube warehouse/distribution center use and Building E, located on the southwest corner of Decker Road and Oleander Avenue, is proposed to consist of 556,010 sf of high-cube warehouse/distribution center use. The Project is anticipated to be constructed and occupied by Year 2017.

The Project is proposed to have access on Oleander Avenue via Driveways 1 through 6. All Project access points are assumed to allow full-access. Driveways 1 and 4 are proposed for truck access only, Driveways 2 and 5 are proposed for passenger car access only, and Driveways 3 and 6 are proposed to allow access for both trucks and passenger cars. Regional access to the project site is provided via the I-215 Freeway at Harley Knox Boulevard interchange.

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*, 9<sup>th</sup> Edition, 2012. (3) The Project is estimated to generate a net total of 3,319 passenger-car-equivalent (PCE) trip-ends per day on a typical weekday with approximately 195 net AM PCE peak hour trips and 226 net PM PCE 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.





09347 - locmap.dwg

High-cube warehouse/distribution centers are a unique land use type within the larger, more generalized industrial land use category. ITE's most recent edition of the Trip Generation manual (ITE 9th Edition), published in 2012, defines "high-cube warehouses" being "...used for storage of materials, goods and merchandise prior to their distribution to retail outlets, distribution centers or other warehouses. These facilities are typically characterized by ceiling heights of at least 24 feet with small employment counts due to a high level of mechanization." (3) This definition is widely accepted by other engineering and planning disciplines. Over the years, the proliferation of high-cube warehouse/distribution center buildings throughout Southern California, and most notably the Inland Empire, has prompted both the public and private sectors to conduct numerous studies to understand the trip generation characteristics of these unique buildings, and their associated impacts on the transportation system.

#### 1.2 ANALYSIS SCENARIOS

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

- Existing (2015) (1 scenario)
- Existing plus Project (1 scenario)
- Existing plus Ambient Growth plus Project (EAP) (2017) (1 scenario)
- Existing plus Ambient Growth plus Project plus Cumulative (EAPC) (2017) (1 scenario)
- Horizon Year (2035), Without and With Project (2 scenarios)

#### 1.2.1 Existing (2015) Conditions

Information for Existing (2015) 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 in the scenario of the Project being placed upon Existing conditions. The E+P scenario has been provided for information purposes.

#### 1.2.3 EXISTING PLUS AMBIENT GROWTH PLUS PROJECT (2017) CONDITIONS

The Existing plus Ambient Growth plus Project (EAP) (2017) conditions analysis determines the significant traffic impacts based on a comparison of the EAP traffic conditions to Existing conditions (i.e., baseline conditions). To account for background traffic growth, an ambient growth from Existing conditions of 4.04% (2 percent per year over 2 years, compounded annually) is included for EAP traffic conditions. Cumulative development projects are not included as part of the EAP analysis. For the purposes of this traffic analysis, the EAP scenario has been utilized to discern significant Project impacts consistent with the County of Riverside traffic study guidelines.



#### 1.2.4 Existing plus Ambient Growth plus Project plus Cumulative (2017) Conditions

The Existing plus Ambient Growth plus Project plus Cumulative (2017) (EAPC) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the Transportation Uniform Mitigation Fee (TUMF) and County Development Impact Fee (DIF) programs, or other approved funding mechanism can accommodate the near-term cumulative traffic at the target level of service (LOS) identified in the County of Riverside General Plan. (4) If the "funded" improvements can provide the target LOS, then the Project's payment into TUMF and/or DIF will be considered as near-term cumulative mitigation through the conditions of approval. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF facilities) are identified as such. To account for background traffic, other known cumulative development projects in the study area were included in addition to 4.04% of ambient growth for EAPC traffic conditions in conjunction with traffic associated with the proposed Project. Although it is unlikely that these cumulative projects would be fully built and occupied by Year 2017, they have been included in an effort to conduct a conservative analysis and overstate and opposed to understate potential traffic impacts.

The currently adopted Southern California Association of Governments (SCAG) 2012 Regional Transportation Plan (RTP) (April 2012) growth forecasts for the unincorporated areas of the County of Riverside identifies projected growth in population of 349,100 in 2008 to 710,600 in 2035, or a 103.5 percent increase over the 27 year period. (5) The change in population equates to roughly a 2.67 percent growth rate compounded annually. Similarly, growth over the same 27 year period in households is projected to increase by 119.0 percent, or 2.95 percent annual growth rate. Finally, growth in employment over the same 27 year period is projected to increase by 198.8 percent, or a 4.14 percent annual growth rate.

Based on a comparison of Existing traffic volumes to the Horizon Year (2035) forecasts, the average growth rate is estimated at approximately 6.50 percent compounded annually between Existing and Horizon Year (2035) traffic conditions. The annual growth rate at each individual intersection is not lower than 5.20 percent compounded annually to as high as 9.27 percent compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the County of Riverside for both EAPC and Horizon Year (2035) traffic conditions, especially when considered along with the addition of project-related traffic. As such, the growth in traffic volumes assumed in this traffic impact analysis would tend to overstate as opposed to understate the potential impacts to traffic and circulation.

#### 1.2.5 HORIZON YEAR (2035) CONDITIONS

The Horizon Year (2035) Without Project traffic conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing conditions and Horizon Year conditions. The Horizon Year With Project traffic forecasts were determined by adding the Project traffic to the Horizon Year Without Project traffic



forecasts from the RivTAM model. The Horizon Year traffic forecasts used in the traffic analysis were refined with existing peak hour traffic count data collected at intersection analysis locations. The initial estimate of the future peak hour turning movements has, therefore, been reviewed for reasonableness. The reasonableness checks performed include a review of traffic flow conservation in addition to a comparison with the Existing and EAPC traffic volumes. Where necessary, the Horizon Year volumes have been adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes.

The Horizon Year Without and With Project traffic conditions analyses will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the TUMF and DIF programs, or other approved funding mechanism can accommodate the <u>long-range</u> cumulative traffic at the target LOS identified in the County of Riverside General Plan. (4) If the "funded" improvements can provide the target LOS, then the Project's payment into TUMF and/or DIF will be considered as <u>long-range</u> cumulative mitigation through the conditions of approval. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF facilities) are identified as such.

Post-processing worksheets for Horizon Year (2035) Without Project traffic conditions are provided in Appendix 4.2.

#### 1.3 STUDY AREA

To ensure that this TIA satisfies the County of Riverside's traffic study requirements, Urban Crossroads, Inc. prepared a project traffic study scoping package for review by County of Riverside staff prior to the preparation of this report. The scoping agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology and is included in Appendix 1.1.

#### 1.3.1 Intersections

The following 11 study area intersections shown on Exhibit 1-2 and listed in Table 1-1 were selected for this TIA based on consultation with County of Riverside staff. The study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the County of Riverside's traffic study guidelines. (1) Furthermore, the rationale for evaluating intersections where a project would contribute 50 or more peak-hour trips is standard industry practice and supported by substantial evidence. It should also be noted that the 50 peak hour trip threshold is used by several other lead agencies throughout southern California including Caltrans, County of Riverside, County of San Bernardino, and the County of Orange. The 50 peak hour trip threshold is based on the desire to analyze potential impacts when the project contributes 3 percent or more of the capacity of a typical signalized intersection. According to the Orange County CMP Guidelines, the 50 peak hour threshold represents less than 3 percent of capacity of a signalized intersection for critical movements, estimated based on the Highway Capacity Manual (HCM) at approximately 1700 vehicles per hour. The following 11 study area intersections were determined to be the only intersections between the Project and the I-215 Freeway where the Project is anticipated to contribute 50 or more peak hour trips.





**EXHIBIT 1-2: LOCATION MAP** 



LEGEND:

= INTERSECTION ANALYSIS LOCATION
 = CMP INTERSECTION ANALYSIS LOCATION

09347 - locmap.dwg

**TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS** 

ID	Intersection Location	Jurisdiction	CMP?
1	Driveway 1 / Oleander Avenue – Future Intersection	County of Riverside	No
2	Driveway 2 / Oleander Avenue – Future Intersection	County of Riverside	No
3	Driveway 3 / Oleander Avenue – Future Intersection	County of Riverside	No
4	Decker Road / Oleander Avenue – Future Intersection	County of Riverside	No
5	Driveway 4 / Oleander Avenue – Future Intersection	County of Riverside	No
6	Driveway 5 / Oleander Avenue – Future Intersection	County of Riverside	No
7	Driveway 6 / Oleander Avenue – Future Intersection	County of Riverside	No
8	Harvill Avenue / Harley Knox Boulevard	County of Riverside	No
9	Harvill Avenue / Oleander Avenue	County of Riverside	No
10	I-215 Southbound Ramps / Harley Knox Boulevard	Caltrans, County of Riverside	Yes
11	I-215 Northbound Ramps / Harley Knox Boulevard	Caltrans, City of Perris	Yes

In effect, acting as the lead agency, these jurisdictions have established 50 project trips as the threshold for when to analyze signalized intersections. Therefore, a project trip contribution of less than 50 peak hour trips is considered less than significant and is typically not evaluated.

The intent of a 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 impacts, 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 County of Riverside in December 2011. (4) There are two study area intersections that are ramp-to-arterial intersections with the I-215 Freeway, which are identified as CMP facilities.

#### 1.3.2 Freeway Mainline Segments

Study area freeway mainline analysis locations were selected based on Caltrans traffic study guidelines, which may require the analysis of State highway facilities. (2) This study evaluates the following freeway segments adjacent to the point of entry to the State Highway System (SHS), where the Project is anticipated to contribute 50 or more peak hour trips (see Table 1-2):

**TABLE 1-2: FREEWAY MAINLINE SEGMENT ANALYSIS LOCATIONS** 

ID	Freeway Mainline Segments
1	I-215 Freeway – Southbound, North of Harley Knox Boulevard
2	I-215 Freeway – Southbound, South of Harley Knox Boulevard
3	I-215 Freeway – Northbound, North of Harley Knox Boulevard
4	I-215 Freeway – Northbound, South of Harley Knox Boulevard



#### 1.3.3 Freeway Merge/Diverge Ramp Junctions

The study area freeway merge/diverge ramp junction analysis locations include the following freeway ramp junctions for each direction of flow as shown on Table 1-3, where the Project is anticipated to contribute 50 or more peak hour trips:

TABLE 1-3: FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS LOCATIONS

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Off-Ramp at Harley Knox Boulevard (Diverge)
2	I-215 Freeway – Southbound, On-Ramp at Harley Knox Boulevard (Merge)
3	I-215 Freeway – Northbound, On-Ramp at Harley Knox Boulevard (Merge)
4	I-215 Freeway – Northbound, Off-Ramp at Harley Knox Boulevard (Diverge)

#### 1.4 SUMMARY OF PROJECT IMPACTS

The study area intersections are currently operating at acceptable LOS during the peak hours and the study area intersections are anticipated to continue to operate acceptably with the addition of Project traffic (as defined by a comparison of Existing to both the E+P and EAP traffic analysis scenarios). Similarly, the I-215 Freeway mainline segments and merge/diverge ramp junctions are currently operating at acceptable LOS and are anticipated to continue to operate acceptably with the addition of Project traffic.

As such, the Project's contribution to the study area intersections, I-215 Freeway, and freeway ramps at Harley Knox Boulevard are anticipated to be less than significant.

#### 1.5 SUMMARY OF CUMULATIVE IMPACTS

Cumulative traffic impacts are deficiencies that are not directly caused by the Project, but occur as a result of regional growth combined with that or other nearby cumulative development projects. The Project's contribution to a particular cumulative transportation deficiency is deemed significant cumulative impacts if the Project adds significant traffic to the forecasted deficiency (as measured by the 50 or more peak hour trip threshold).

#### 1.5.1 **EAPC (2017) CONDITIONS**

The following study area intersections are anticipated to operate at unacceptable LOS during the peak hours under EAPC (2017) traffic conditions:

ID	Intersection Location
8	Harvill Avenue / Harley Knox Boulevard – LOS F AM and PM peak hours
10	I-215 Southbound Ramps / Harley Knox Boulevard – LOS F AM and PM peak hours
11	I-215 Northbound Ramps / Harley Knox Boulevard – LOS F PM peak hour only

There are queuing issues anticipated at the I-215 Southbound off-ramps during the AM peak hour only. However, these queuing issues are anticipated to be improved with the implementation of the recommended intersection improvements.



Similar to Existing, E+P, and EAP traffic conditions, the I-215 Freeway mainline and merge/diverge ramp junctions are anticipated to operate at acceptable LOS under EAPC traffic conditions. As such, no improvement have been identified or assessed.

#### 1.5.2 HORIZON YEAR (2035) CONDITIONS

Based on the assessment of Horizon Year Without and With Project traffic conditions, the following additional intersection was identified to operate at a deficient LOS, <u>in addition</u> to those previously identified under EAPC traffic conditions:

ID	Intersection Location
4	Decker Road / Oleander Avenue – LOS F AM and PM peak hours

There are queuing issues anticipated at both the I-215 Southbound and I-215 Northbound offramps during the AM and PM peak hours. However, these queuing issues are anticipated to be improved with the implementation of the recommended intersection improvements for Horizon Year traffic conditions.

All of the I-215 Freeway mainline segments and the merge/diverge ramp junctions at Harley Knox Boulevard are anticipated to operate at unacceptable LOS under Horizon Year Without Project traffic conditions. The addition of Project traffic is not anticipated to result in any additional deficiencies. Planned improvements (I-215 North Project) for the I-215 Freeway are anticipated to improve the peak hour LOS, however, the following I-215 Freeway mainline segments and ramp junctions are anticipated to continue to operate at unacceptable LOS:

IC	D	Freeway Mainline Segments
1	L	I-215 Freeway – Southbound, North of Harley Knox Boulevard – LOS E AM and PM peak hours
3	3	I-215 Freeway – Northbound, North of Harley Knox Boulevard – LOS E AM and PM peak hours

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Off-Ramp at Harley Knox Boulevard – LOS F AM peak hour; LOS E PM peak hour
3	I-215 Freeway – Northbound, On-Ramp at Harley Knox Boulevard – LOS E AM and PM peak hours

There are no additional improvements planned along the I-215 Freeway in addition to those planned as part of the I-215 North Project. However, the Project is anticipated to contribute less than 1.0 percent to the total Horizon Year traffic forecasts on the deficient freeway mainline segments and ramp junctions along the I-215 Freeway and the addition of Project traffic is not anticipated to result in a change in the LOS letter grade. As such, the Project's impact is considered less-than-significant to these freeway facilities.



#### 1.6 RECOMMENDED IMPROVEMENTS

Table 1-4 lists the recommended improvements necessary to reduce the identified intersection LOS deficiencies by traffic condition. For improvements that do not appear to be in TUMF or DIF, a fair share contribution based on the Project's percentage contribution may be imposed in order to mitigate the Project's share of impacts in lieu of construction. 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. Alternatively, minor fair share responsibilities may be waived when collection is infeasible or where other mitigation assignments substantially exceed the Project's demonstrated impacts.

The improvements listed in Table 1-4 are comprised of lane additions/modifications, installation of signals and signal modifications. The improvements that are covered either by the TUMF program or the DIF program have been identified as such. Lane additions are shown as the number of lanes required and the direction of travel. 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 impact fee programs is provided below. There are no other applicable pre-existing funding programs for the study area aside from TUMF and DIF.

#### 1.7 LOCAL AND REGIONAL FUNDING MECHANISMS

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

#### 1.7.1 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 2009 Nexus study.

TUMF is an ambitious regional program created to address cumulative impacts of 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.



# Table 1-4

# Summary of Improvements by Analysis Scenario

			F+D Recommended	EAP (2017)	EAPC (2017)	2035 Without Project	2035 With Project	Improvements in	Fair
#	# Intersection Location	Jurisdiction	Improvements	Recommended	Recommended	Recommended	Recommended	THME or DIE2	Share %3
				Improvements	Improvements	Improvements	Improvements		2000
4	4 Decker Rd. / Oleander Av.	County of Riverside	Install stop control on NB approach²	Same	Same	Install a traffic signal	Same	ON	5.4%
			NB left turn lane <sup>2</sup>	Same	Same	Same	Same	No	
			NB through lane (to be striped						
			out until northern leg is	Same	Same	Same	Same	No	
			constructed) <sup>2</sup>						
			NB shared througn-right turn lane (to be utilized as a right	Same	Same	Same	Same	2	
			turn lane until nortnern leg is constructed) <sup>2</sup>						
			EB shared through-right turn lane²	Same	Same	Same	Same	O <sub>N</sub>	
			WB left turn lane²	Same	Same	Same	Same	No	
			WB through lane <sup>2</sup>	Same	Same	Same	Same	No	
						SB left tum lane	Same	No	
							Same	No	
						SB shared through-right turn lane	Same	No	
<u> </u>					Modify traffic signal to				
ω	8 Harvill Av. / Harley Knox Bl.	County of Riverside	None	None	implement overlap phasing on the NB right	Same	Same	O Z	2.0%
					turn lanes	Modify traffic signal to implement overlap phasing on Same the EB right turn lane	Same	o Z	
Ţ.	10  -215 SB Ramps / Harley Knox BI Riverside	Caltrans, County of Riverside	None	None	Restripe SB ramp to provide 1 SB left turn lane and 1 shared SB left-through-right turn lane	rovide 1 shared e	Same	Yes (TUMF) <sup>4</sup>	NA <sup>5</sup>
					2nd WB left urn lane	Same 2nd SB left turn lane	Same Same	Yes (TUMF) <sup>4</sup> Yes (TUMF) <sup>4</sup>	
1	11 I-215 NB Ramps / Harley Knox B Perris	Caltrans, City of Perris	None	None	2nd EB left turn lane	Same	Same	Yes (TUMF) <sup>4</sup>	NA <sup>5</sup>
					WB free-right tum lane	Same	Same	Yes (TUMF)⁴	

Improvements are included wholly or partially in one or more of the following: County of Riverside TUMF or DIF programs for local, regional, and specific plan components.

Final determination on extent of the improvements included and covered by these fee programs is to be established by the governing lead agency.

<sup>&</sup>lt;sup>2</sup> To be constructed as part of Project's site adjacent improvements.

<sup>&</sup>lt;sup>3</sup> Program improvements constructed by the Project may be eligible for fee credit, at the discretion of the County, See Table 1-5 for fair share calculations.

Although the interchange is identified as a TUMF interchange, the interchange is not currently identified on the Central Zone 5-Year Transportation improvement Program Amendment (adopted January 6, 2014).

Fair share percentage is not shown as the recommended improvements at this location are included in a pre-existing fee program.

TUMF guidelines empower a local zone committee to prioritize and arbitrate certain projects. The Project is located in the Central 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. Cajalco Expressway / Ramona Expressway is a designated TUMF roadway within the Project's traffic study area.

#### 1.7.2 DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The Project is located within the County's Mead Valley Area Plan and therefore will be subject to County of Riverside Development Impact Fees (DIF) in an effort by the County to mitigate development throughout its unincorporated area. The DIF program consists of two separate transportation components: Roads, Bridges and Major Improvements component and the Traffic Signals component. Eligible facilities for funding by the County DIF program are identified on the County's Public Needs List, which currently extends through the year 2020.

The cost of signalizing DIF network intersections is identified under the Traffic Signals component of the DIF program. County staff generally defines DIF eligible intersections as those consisting of two intersecting general plan roadways. If the intersection meets this requirement, it is potentially eligible for up to \$235,000 of credit, which is subject to negotiations with the County.

#### 1.7.3 FAIR SHARE CONTRIBUTION

Project mitigation may include a combination of fee payments to established programs (e.g., TUMF and/or DIF), 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 County of Riverside's discretion).

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, has been provided on Table 1-5 for the applicable deficient intersections shown previously on Table 1-4. Improvements included in a defined program and constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate.

#### 1.8 SITE ADJACENT ROADWAY AND SITE ACCESS IMPROVEMENTS

This section summarizes Project site access and on-site circulation recommendations.

The Project is proposed to have access on Oleander Avenue via Driveways 1 through 6. All Project access points are assumed to allow full-access (i.e., full turning movements). Driveways 1 and 4 are proposed for truck access only, Driveways 2 and 5 are proposed for passenger car access only, and Driveways 3 and 6 are proposed to allow access for both trucks and passenger cars. Regional access to the project site is provided via the I-215 Freeway at Harley Knox Boulevard interchange. Roadway improvements necessary to provide site access and on-site



Project Fair Share Calculations for Intersections

Table 1-5

#	Intersection	Existing	Project	2035 WP Volume	Total New Traffic	Project % of New Traffic
4	Decker Rd. / Oleander Av.					
	AM:	5	97	1,760	1,755	5.5%
	PM:	8	113	2,112	2,104	5.4%
8	Harvill Av. / Harley Knox Bl.					
	AM:	718	169	2,307	1,589	10.6%
	PM:	829	201	4,880	4,051	5.0%

**BOLD** = Denotes highest deficient peak hour.



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. Exhibit 1-3 illustrates the site-adjacent roadway improvement recommendations and site access improvements. 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.

**Oleander Avenue** —Oleander Avenue is an east-west oriented roadway located along the Project's northern boundary. Construct Oleander Avenue from the Project's western boundary to the eastern Project boundary at its ultimate half-section width as an industrial collector (78-foot right-of-way), in compliance with applicable County of Riverside standards. The Project will also construct a minimum of one lane in the westbound direction in order to provide access to the site.

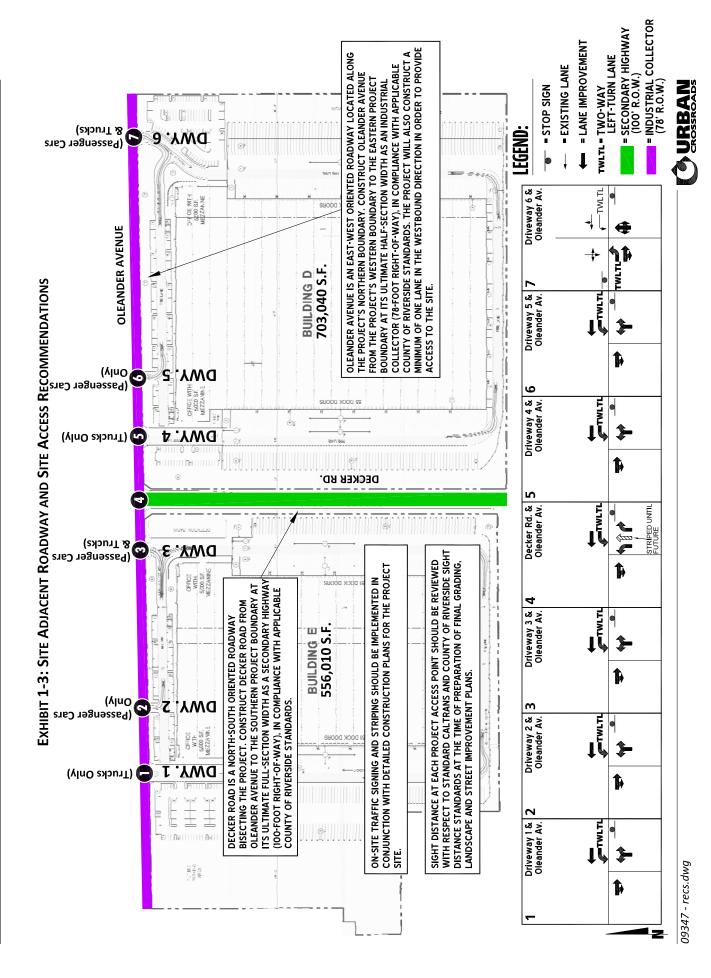
**Decker Road** – Decker Road is a north-south oriented roadway bisecting the Project. Construct Decker Road from Oleander Avenue to the southern Project boundary at its ultimate full-section width as a secondary highway (100-foot right-of-way), in compliance with applicable County of Riverside standards.

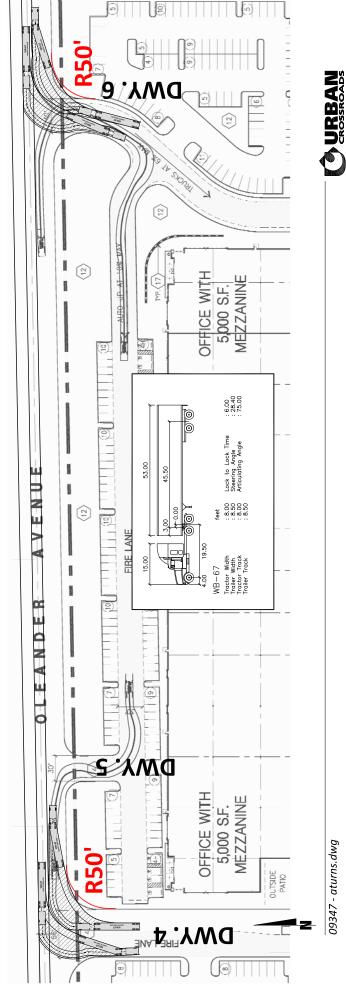
#### 1.9 Truck Access and Circulation

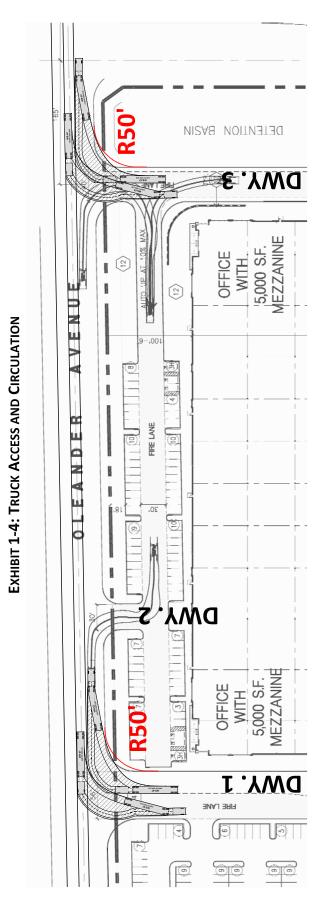
Due to the typical wide turning radius of large trucks, a truck turning template has been overlaid on the site plan at each applicable Project driveway anticipated to be utilized by heavy trucks in order to determine appropriate curb radii and to verify that trucks will have sufficient space to execute turning maneuvers. For the purposes of this evaluation, the WB-67 class truck template has been utilized. WB-67 class trucks are approximately 73.5 feet in length.

Exhibit 1-4 illustrates the proposed truck access for the site and circulation for each of the applicable Project driveways. As shown on Exhibit 1-4, the Project driveways will need to provide a minimum 50-foot curb radius on the southeast corner of each Project driveway in order to accommodate the ingress and egress of WB-67 trucks (or smaller). A truck turning template has not been overlaid on Driveways 2 and 5 as they are anticipated to provide access to passenger car parking only and would not likely be utilized by heavy trucks.









#### 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 County of Riverside and Caltrans traffic study guidelines. (1) (2)

#### 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. (6) The HCM uses different procedures depending on the type of intersection control.

#### 2.2.1 SIGNALIZED INTERSECTIONS

#### **County of Riverside**

The County of Riverside requires signalized intersection operations analysis based on the methodology described in the HCM. (6) 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 (Version 8 Build 806) analysis software package.

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.



**TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS** 

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	А	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	В	F
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	С	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

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. (6)

#### 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 8 Build 806) has also been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include interchange to arterial ramps (i.e. I-215 Freeway ramps at Harley Knox Boulevard). (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 County of Riverside requires the operations of unsignalized intersections be evaluated using the methodology described the HCM. (6) 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 THRESHOLDS** 

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	Α	F
Short traffic delays.	10.01 to 15.00	В	F
Average traffic delays.	15.01 to 25.00	С	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	Е	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM

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 Freeway Off-Ramp Queuing Analysis

The study area for this TIA includes the freeway-to-arterial interchange of the I-215 Freeway at Harley Knox Boulevard off-ramps. Consistent with Caltrans requirements, the 95<sup>th</sup> percentile queuing of vehicles has been assessed at the off-ramps to determine potential queuing impacts at the freeway ramp intersections on Harley Knox Boulevard. Specifically, the queuing analysis is utilized to identify any potential queuing and "spill back" onto the I-215 Freeway mainline from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential impacts/needs of the intersections with traffic added from the proposed Project. Storage (turn-pocket) length recommendations at the ramps have been based upon the 95<sup>th</sup> percentile queue resulting from the Synchro progression analysis. The queue length reported is for the lane with the highest queue in the lane group.

There are two footnotes which appear on the Synchro outputs. One footnote indicates if the 95<sup>th</sup> percentile cycle exceeds capacity. Traffic is simulated for two complete cycles of the 95<sup>th</sup> percentile traffic in Synchro in order to account for the effects of spillover between cycles. In practice, the 95<sup>th</sup> percentile queue shown will rarely be exceeded and the queues shown with the footnote are acceptable for the design of storage bays. The other footnote indicates whether or not the volume for the 95<sup>th</sup> percentile queue is metered by an upstream signal. In many cases, the 95<sup>th</sup> percentile queue will not be experienced and may potentially be less than



the 50<sup>th</sup> percentile queue due to upstream metering. If the upstream intersection is at or near capacity, the 50<sup>th</sup> percentile queue represents the maximum queue experienced.

A vehicle is considered queued whenever it is traveling at less than 10 feet/second. A vehicle will only become queued when it is either at the stop bar or behind another queued vehicle. Although only the 95<sup>th</sup> percentile queue has been reported in the tables, the 50<sup>th</sup> percentile queue can be found in the appendix alongside the 95<sup>th</sup> percentile queue for each ramp location. The 50<sup>th</sup> percentile maximum queue is the maximum back of queue on a typical cycle during the peak hour, while the 95<sup>th</sup> percentile queue is the maximum back of queue with 95<sup>th</sup> percentile traffic volumes during the peak hour. In other words, if traffic were observed for 100 cycles, the 95<sup>th</sup> percentile queue would be the queue experienced with the 95<sup>th</sup> busiest cycle (or 5% of the time). The 50<sup>th</sup> percentile or average queue represents the typical queue length for peak hour traffic conditions, while the 95<sup>th</sup> percentile queue is derived from the average queue plus 1.65 standard deviations. The 95<sup>th</sup> percentile queue is not necessarily ever observed, it is simply based on statistical calculations.

#### 2.4 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 TIA uses the signal warrant criteria presented in the latest edition of the Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*, as amended by *the MUTCD 2014 California Supplement*, for all study area intersections. (7)

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. Both the FHWA's MUTCD and the MUTCD 2014 California Supplement indicate that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (7) Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 criteria are basically identical for both the FHWA's MUTCD and the MUTCD 2014 California Supplement. Warrant 3 is appropriate to use for this TIA 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 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 on 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 / Oleander Avenue – Future Intersection	County of Riverside	No
2	Driveway 2 / Oleander Avenue – Future Intersection	County of Riverside	No
3	Driveway 3 / Oleander Avenue – Future Intersection	County of Riverside	No
4	Decker Road / Oleander Avenue – Future Intersection	County of Riverside	No
5	Driveway 4 / Oleander Avenue – Future Intersection	County of Riverside	No
6	Driveway 5 / Oleander Avenue – Future Intersection	County of Riverside	No
7	Driveway 6 / Oleander Avenue – Future Intersection	County 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 E+P Traffic Analysis, Section 6 EAP (2017) Traffic Analysis, Section 7 EAPC (2017) Traffic Analysis, and Section 8 Horizon Year (2035) 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 threshold 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.

## 2.5 Freeway Mainline Segment Analysis Methodology

Consistent with recent Caltrans guidance and because impacts to freeway segments dissipate with distance from the point of State Highway System (SHS) entry, quantitative study of freeway segments beyond those immediately adjacent to the point of entry is not required. As such, the traffic study has evaluated the freeway segments along the I-215 Freeway where the Project is anticipated to contribute 50 or more peak hour trips. Because impacts to freeway segments dissipate with distance from the point of SHS entry, quantitative evaluation of freeway segments with less than 50 peak hour trips is not necessary.

The freeway system in the study area has been broken into segments defined by the freeway-to-arterial interchange locations. The freeway segments have been evaluated in this TIA based upon peak hour directional volumes. The freeway segment analysis is based on the methodology described in the HCM and performed using HCS2010 software. The performance measure preferred by Caltrans to calculate LOS is density. Density is expressed in terms of passenger cars per mile per lane. Table 2-4 illustrates the freeway segment LOS descriptions for each density range utilized for this analysis.

The number of lanes for existing baseline conditions has been obtained from field observations conducted by Urban Crossroads in April 2015. These existing freeway geometrics have been utilized for Existing, E+P, EAP, EAPC, and Horizon Year Without and With Project conditions.



The I-215 Freeway mainline volume data were obtained from the Caltrans Performance Measurement System (PeMS) website for the segments of the I-215 Freeway interchange, north of Harley Knox Boulevard. The data was obtained from April 2015. In an effort to conduct a conservative analysis, the maximum value observed within the three day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and peak hour deficiencies. As such, actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the basic freeway segment analysis. (8)

**TABLE 2-4: DESCRIPTION OF FREEWAY MAINLINE LOS** 

Level of Service	Description	Density Range (pc/mi/ln) <sup>1</sup>
Α	Free-flow operations in which vehicles are relatively unimpeded in their ability to maneuver within the traffic stream. Effects of incidents are easily absorbed.	0.0 – 11.0
В	Relative free-flow operations in which vehicle maneuvers within the traffic stream are slightly restricted. Effects of minor incidents are easily absorbed.	11.1 – 18.0
С	Travel is still at relative free-flow speeds, but freedom to maneuver within the traffic stream is noticeably restricted. Minor incidents may be absorbed, but local deterioration in service will be substantial. Queues begin to form behind significant blockages.	18.1 – 26.0
D	Speeds begin to decline slightly and flows and densities begin to increase more quickly. Freedom to maneuver is noticeably limited. Minor incidents can be expected to create queuing as the traffic stream has little space to absorb disruptions.	26.1 – 35.0
E	Operation at capacity. Vehicles are closely spaced with little room to maneuver. Any disruption in the traffic stream can establish a disruption wave that propagates throughout the upstream traffic flow. Any incident can be expected to produce a serious disruption in traffic flow and extensive queuing.	35.1 – 45.0
F	Breakdown in vehicle flow.	>45.0

<sup>&</sup>lt;sup>1</sup> pc/mi/ln = passenger cars per mile per lane. Source: HCM

# 2.6 Freeway Merge/Diverge Ramp Junction Analysis

The freeway system in the study area has been broken into segments defined by freeway-to-arterial interchange locations resulting in two existing on and off ramp locations. Although the HCM indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis presented in this traffic study has been performed at all ramp locations with respect to the nearest on or off ramp at each interchange in an effort to be consistent with Caltrans guidance/comments on other projects Urban Crossroads has worked on in the region.

The merge/diverge analysis is based on the HCM Ramps and Ramp Junctions analysis method and performed using HCS+ software. The measure of effectiveness (reported in passenger car/mile/lane) are calculated based on the existing number of travel lanes, number of lanes at the on and off ramps both at the analysis junction and at upstream and downstream locations (if applicable) and acceleration/deceleration lengths at each merge/diverge point. Table 2-5



presents the merge/diverge area level of service descriptions for each density range utilized for this analysis.

TABLE 2-5: DESCRIPTION OF FREEWAY MERGE AND DIVERGE LOS

Level of Service	Density Range (pc/mi/ln) <sup>1</sup>
А	≤10.0
В	10.0 – 20.0
С	20.0 – 28.0
D	28.0 – 35.0
E	>35.0
F	Demand Exceeds Capacity

<sup>&</sup>lt;sup>1</sup> pc/mi/ln = passenger cars per mile per lane. Source: HCM

Similar to the basic freeway segment analysis, the I-215 Freeway mainline volume data were obtained from the Caltrans maintained PeMS website for the segments of the I-215 Freeway interchange, north of Harley Knox Boulevard. The ramp data (per the count data presented in Appendix 3.1) were then utilized to flow conserve the mainline volumes to determine the remaining I-215 Freeway mainline segment volumes. Flow conservation checks ensure that traffic flows from north to south (and vice versa) of the interchange area with no unexplained loss of vehicles. The data was obtained from April 2015. In an effort to conduct a conservative analysis, the maximum value observed within the three day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and peak hour deficiencies. (8) As such, actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the freeway ramp junction (merge/diverge) analysis.

# 2.7 MINIMUM LEVEL OF SERVICE (LOS)

The definition of an intersection deficiency has been obtained from each of the applicable surrounding jurisdictions.

#### 2.7.1 COUNTY OF RIVERSIDE

County of Riverside General Plan Policy C 2.1 states that the County will maintain the following County-wide target level of service (LOS): LOS "C" on all County-maintained roads and conventional State Highways. As an exception, LOS "D" may be allowed in Community Development areas at intersections of any combination of Secondary Highways, Major Highways, Arterial Highways, Urban Arterial Highways, Expressways or conventional State Highways. LOS "E" may be allowed in designated Community Centers to the extent that it would support transit-oriented development and pedestrian communities. As the Project is located within a Community Development area, LOS "D" has been considered acceptable at any intersection within the County of Riverside because all of the study area intersections are classified as Secondary Highways or a higher classification.



#### 2.7.2 CMP

In an effort to more directly link land use, transportation and air quality and promote reasonable growth, the County of Riverside adopted a Congestion Management Plan (CMP) (December 2011). The Riverside County Transportation Commission (RCTC) monitors the CMP roadway network system to minimize LOS deficiencies. Within the project study area, the I-215 Freeway is recognized as a key transportation facility within the CMP system. Although Caltrans utilizes LOS D as their stated threshold, RCTC has adopted LOS E as the minimum standard for intersections and segments along the CMP System of Highways and Roadways. However, for the purposes of this traffic impact analysis, LOS D has been considered to be the limit of acceptable traffic operations for the I-215 Freeway mainline segments and ramp junctions in an effort to be conservative.

#### 2.7.3 CALTRANS

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on 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. Caltrans acknowledges that the region-wide goal for an acceptable LOS on all freeways, roadway segments, and intersections is LOS D. Consistent with the County of Riverside LOS threshold of LOS D and in excess of the CMP stated LOS threshold of LOS E, LOS D will be used as the target LOS for freeway ramps, freeway segments, and freeway merge/diverge ramp junctions.

## 2.8 THRESHOLDS OF SIGNIFICANCE

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

#### 2.8.1 Intersections

For the purposes of this analysis, the following thresholds of significance have been applied to study area intersections located within the County of Riverside to identify significant impacts through a comparison of Existing (2015) and EAP (2017) traffic conditions:

- If an intersection is projected to operate at an acceptable level of service (i.e., LOS D or better) under Existing (2015) traffic conditions and the addition of project traffic, as measured by 50 or more peak hour trips, is expected to cause the intersection to operate at an unacceptable level of service (i.e., LOS E or F), the impact is considered significant;
- If an intersection is projected to operate at LOS E or LOS F under Existing (2015), and the
  addition of project traffic, as measured by 50 or more peak hour trips, the impact is considered
  significant.

Cumulative traffic impacts are deficiencies that are not directly caused by the Project, but occur as a result of regional growth combined with that or other nearby cumulative development projects. The Project's contribution to a particular cumulative transportation deficiency is



deemed a significant cumulative if the Project adds significant traffic to the forecasted deficiency (as measured by the 50 or more peak hour trip threshold). A Project's contribution to a significant cumulative impact can be reduced to less than significant if the Project is required to implement or fund its fair share of improvements designed to alleviate the potential cumulative impact. If full funding of future cumulative improvements is not reasonably assured, a temporary unmitigated cumulative impact may occur until the needed improvement is fully funded and constructed.

#### 2.8.2 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 peak hour trips. A segment that is operating at or near capacity is deemed to be deficient.

## 2.9 Project Fair Share Calculation Methodology

In cases where this TIA 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 Traffic / (2035 With Project Total Traffic – Existing Traffic)



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## 3 AREA CONDITIONS

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

#### 3.1 Existing Circulation Network

Pursuant to the agreement with County of Riverside staff (Appendix 1.1), the study area includes a total of 11 existing and future intersections as shown previously on Exhibit 1-2 where the Project is anticipated to contribute 50 or more peak hour trips. 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 COUNTY OF RIVERSIDE GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the County of Riverside. However, the study area includes intersections within the neighboring jurisdiction of Perris (e.g., the I-215 Northbound Ramps at Harley Knox Boulevard.

#### 3.2.1 COUNTY OF RIVERSIDE

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

**Urban Arterial Highways** are 6 to 8 lanes with a minimum right-of-way of 152-feet. These highways are primarily for through traffic where traffic volumes exceed four-lane capacities. Access from other streets or highways shall be limited to approximately one-quarter mile intervals. The following study area roadway within the County of Riverside is classified as an Urban Arterial Highway:

Harley Knox Boulevard

**Major Highways** are 4 lanes with a minimum right-of-way of 118-feet. These highways are intended to serve property zoned for major industrial and commercial uses, or to serve through traffic. Intersections with other streets or highways may be limited to approximately 660-foot intervals. The following study area roadway within the County of Riverside is classified as a Major Highway:

Harvill Avenue



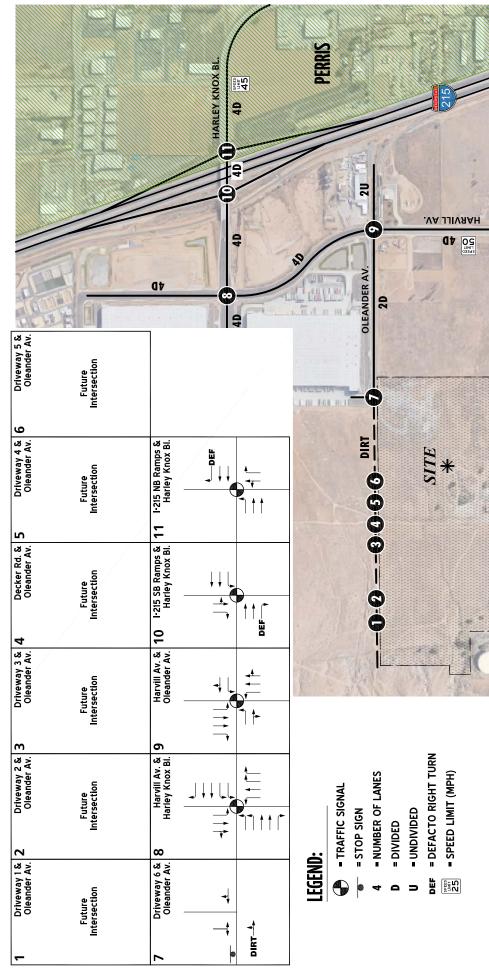
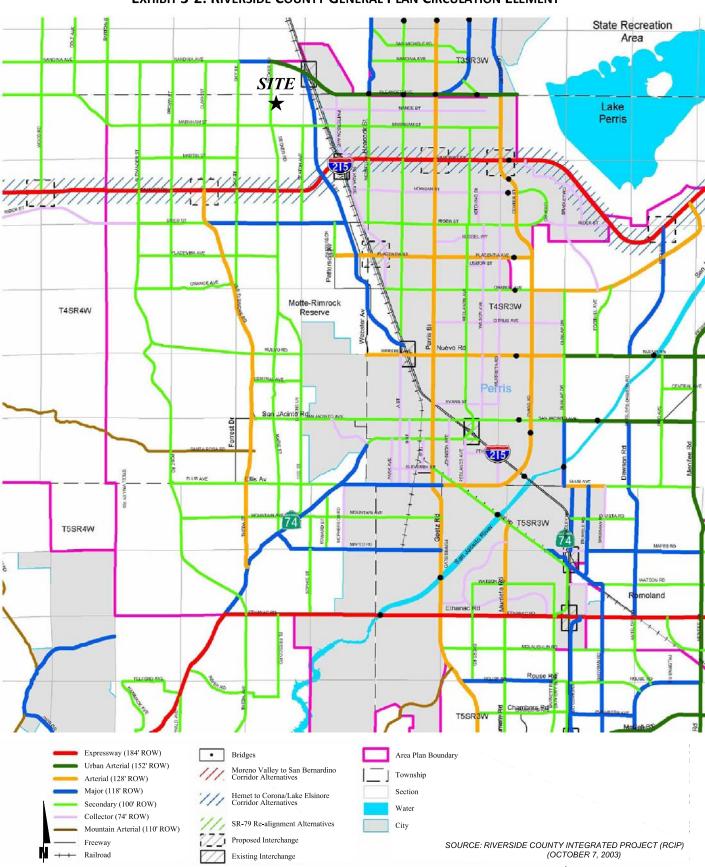


EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



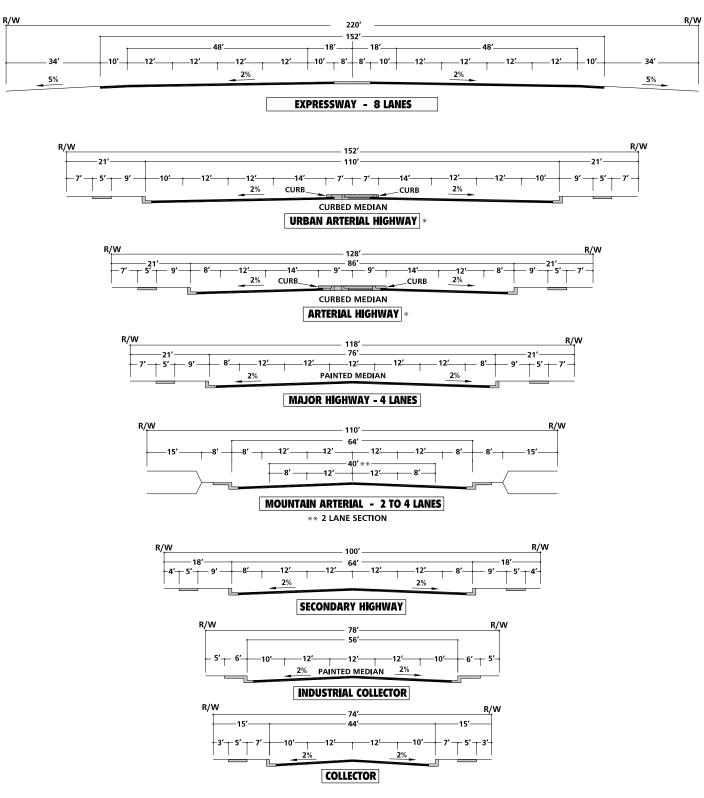
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**EXHIBIT 3-2: RIVERSIDE COUNTY GENERAL PLAN CIRCULATION ELEMENT** 

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**EXHIBIT 3-3: RIVERSIDE COUNTY GENERAL PLAN ROADWAY CROSS-SECTIONS** 



<sup>\*</sup> 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



**Secondary Highways** are 4 lanes, generally with no turn lanes, and a minimum right-of-way of 100-feet. These highways are intended to serve through traffic along longer routes between major traffic generating areas or to serve property zoned for multiple residential, secondary industrial or commercial uses. Intersections with other streets and highways may be limited to 330-foot intervals. The following study area roadway within the County of Riverside is classified as a Secondary Highway:

Decker Road

**Industrial Collectors** are 2 lanes and have a minimum right-of-way of 78-feet. Industrial Collectors are circulatory streets with a continuous left-turn lane with at least one end connecting to a road of equal or greater classification. The following study area roadway within the County of Riverside is classified as an Industrial Collector:

Oleander Avenue

#### 3.2.2 CITY OF PERRIS

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the City of Perris as identified in the City of Perris General Plan Circulation Element are described subsequently. The circulation plan and proposed roadway cross-sections defined within the City of Perris are shown on Exhibits 3-4 and 3-5.

**Arterial Streets** in general vary from a curb-to-curb width of 64 feet to 86 feet in accordance with the General Plan roadway cross sections. The following study area roadway within the City of Perris is classified as an Arterial:

• Harley Knox Boulevard, east of the I-215 Freeway

#### 3.3 TRUCK ROUTES

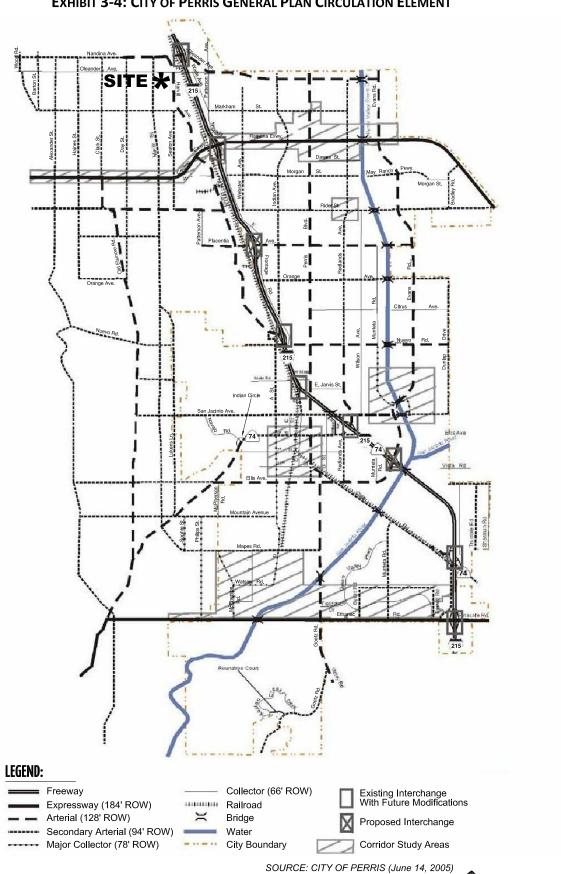
While the County of Riverside's General Plan recognizes the trucking industry and the importance of the region's role in the movement of goods, there are no truck routes defined within the County. However, the City of Perris has a designated truck route map, which is shown on Exhibit 3-6. As shown, Harley Knox Boulevard, east of the I-215 Freeway, is identified as designated City of Perris truck route.

## 3.4 BICYCLE & PEDESTRIAN FACILITIES

Field observations conducted in April 2015 indicate nominal pedestrian and bicycle activity within the study area. Exhibit 3-7 illustrates the existing pedestrian facilities, including sidewalks and crosswalk locations.

In an effort to promote alternative modes of transportation, the County of Riverside also includes a trails and bikeway system. The trails and bikeway system, shown on Exhibit 3-8, shows the proposed trails are connected with major features within the County. There are proposed Community Trails along Oleander Avenue, Harvill Avenue (north of Oleander Avenue), and Harley Knox Boulevard within the study area.



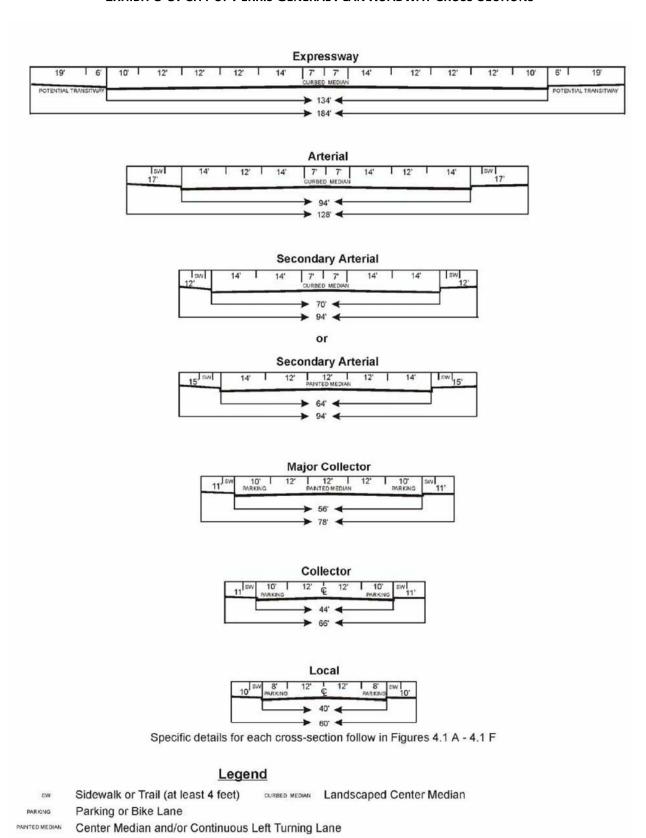


**EXHIBIT 3-4: CITY OF PERRIS GENERAL PLAN CIRCULATION ELEMENT** 

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## **EXHIBIT 3-5: CITY OF PERRIS GENERAL PLAN ROADWAY CROSS-SECTIONS**



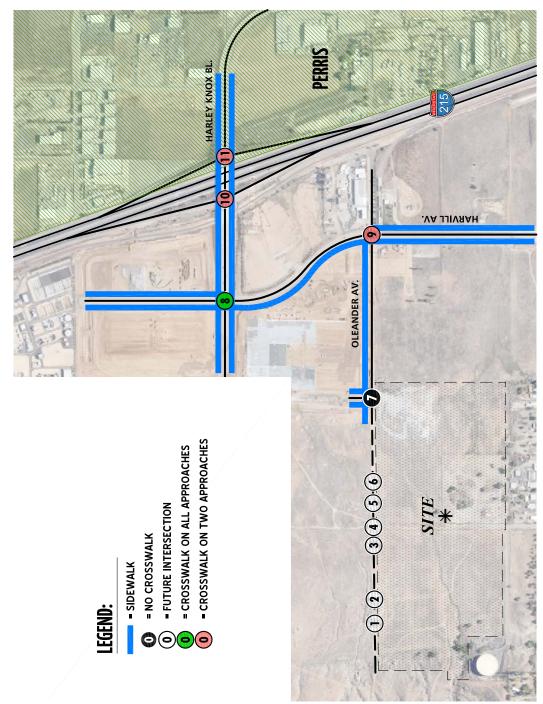


MARKHAM ST MORGAN ST RIDER ST PLACENTIA AVE ORANGE AVE METZ RD SAN JACINTO AVE ELLIS AVE MURRIETA RD MAPES RD **LEGEND** Truck Routes Perris City Limits

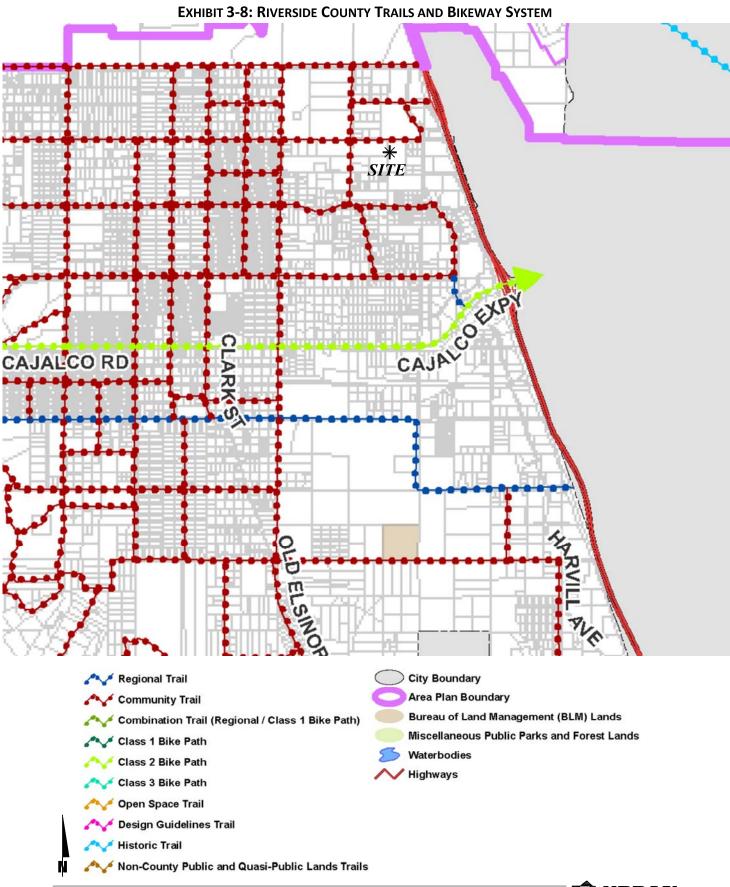
**EXHIBIT 3-6: CITY OF PERRIS TRUCK ROUTES** 

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**EXHIBIT 3-7: EXISTING PEDESTRIAN FACILITIES** 



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## 3.5 TRANSIT SERVICE

The study area is currently served by the Riverside Transit Authority (RTA), a public transit agency serving the unincorporated Riverside County region. There are currently no existing bus routes that serve the roadways within the study area in close proximity to the proposed Project. 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. As such, it is recommended that the applicant work in conjunction with RTA to potentially provide bus service to the site.

## 3.6 Existing (2015) Traffic Counts

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in April 2015. 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 April 2015 include the vehicle classifications as shown below:

- Passenger Cars
- 2-Axle Trucks
- 3-Axle Trucks
- 4 or More Axle Trucks

To represent the impact large trucks, buses and recreational vehicles have on traffic flow; all trucks were converted into PCEs. By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow-down is also much longer than for passenger cars, and varies depending on the type of vehicle and number of axles. For the purpose of this analysis, a PCE factor of 1.5 has been applied to 2-axle trucks, 2.0 for 3-axle trucks and 3.0 for 4+-axle trucks to estimate each turning movement. These factors are consistent with the values recommended for use in the San Bernardino County CMP and are in excess of the factor recommended for use in the County of Riverside traffic study guidelines. (9) Although the County of Riverside has a recommended PCE factor of 2.0, the San Bernardino County CMP PCE factors have been utilized in an effort to conduct a more conservative analysis.



Existing weekday average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-9. 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 12.2094 = 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 8.19 percent. As such, the above equation utilizing a factor of 12.2094 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 8.19 percent (i.e., 1/0.0819 = 12.2094) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes (in PCE) are also shown on Exhibit 3-9.

## 3.7 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 the existing study area intersections are currently operating at an acceptable LOS during the peak hours (i.e., LOS D or better).

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-10. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

#### 3.8 Traffic Signal Warrants Analysis

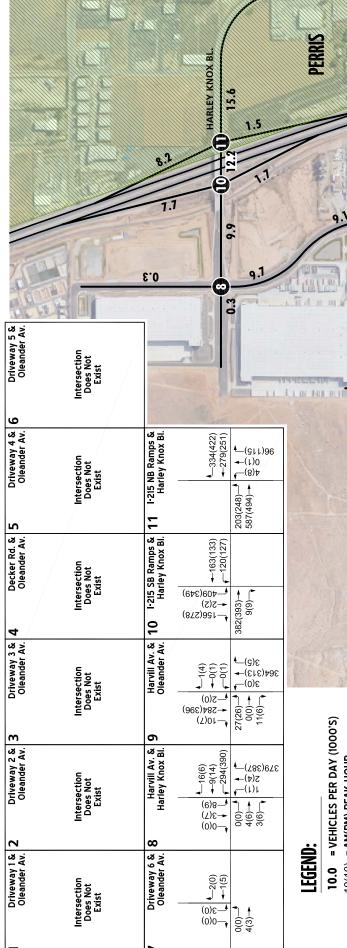
Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. No study area intersections currently warrant a traffic signal for Existing traffic conditions. Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

## 3.9 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Harley Knox Boulevard 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 I-215 Freeway mainline. Queuing analysis findings are presented in Table 3-2. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 3-2, there are no movements that are currently experiencing queuing issues during the weekday AM or weekday PM peak 95<sup>th</sup> percentile traffic flows. Worksheets for Existing traffic conditions off-ramp queuing analysis are provided in Appendix 3.4.







10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

0.1

OLEANDER AV.

0.1

G

0.5

0.

VA JIIVAAH

8.8

SITE

DECKER RD

1.0

2

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EXHIBIT 3-10: SUMMARY OF PEAK HOUR INTERSECTION LOS FOR EXISTING (2015) CONDITIONS



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Table 3-1

## Intersection Analysis for Existing (2015) Conditions

				Intersection Approach Lanes <sup>1</sup>						Delay <sup>2</sup>		Level of		Acceptable					
		Traffic	Nor	thbo	und	Sou	ıthbo	und	Eas	stbou	ınd	Westbound		und	(se	cs.)	Ser	vice	•
#	Intersection	Control <sup>3</sup>	L	Т	R	L	Т	R	L	Т	R	L	Т	R	AM	PM	AM	PM	LOS
1	Dwy. 1 / Oleander Av.						Futu	re In	terse	ction									С
2	Dwy. 2 / Oleander Av.						Futu	re In	terse	ction									С
3	Dwy. 3 / Oleander Av.						Futu	re In	terse	ction									С
4	Decker Rd. / Oleander Av.						Futu	re In	terse	ction									D
5	Dwy. 4 / Oleander Av.						Futu	re In	terse	ction									С
6	Dwy. 5 / Oleander Av.						Futu	re In	terse	ction									С
7	Dwy. 6 / Oleander Av.	CSS	0	0	0	0	1	0	0	1	0	0	1	0	8.9	0.0	Α	Α	С
8	Harvill Av. / Harley Knox Bl.	TS	1	1	2	1	2	0	2	2	1	2	2	1	32.8	32.2	С	С	D
9	Harvill Av. / Oleander Av.	TS	1	2	0	1	2	1	1	1	0	1	1	0	6.5	4.6	Α	Α	D
10	I-215 SB Ramps / Harley Knox Bl.	TS	0	0	0	0	1	1	0	2	d	1	2	0	37.0	26.8	D	С	D
11	I-215 NB Ramps / Harley Knox Bl.	TS	0	1	1	0	0	0	1	2	0	0	2	d	13.6	22.2	В	С	D

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; d = Defacto Right Turn Lane

Per the 2010 Highway Capacity Manual, 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.

<sup>&</sup>lt;sup>3</sup> CSS = Cross-street Stop; TS = Traffic Signal

<sup>&</sup>lt;sup>4</sup> Volume-to-capacity ratio is greater than 1.00; Intersection unstable; Level of Service "F".

Peak Hour Freeway Off-Ramp Queuing Summary for Existing (2015) Conditions

Table 3-2

		Available				
		Stacking	95th Percentile	Queue (Feet) <sup>2</sup>	Accept	able? 1
Intersection	Movement	Distance (Feet)	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Off-Ramp / Harley Knox Bl.	SBL/T	1,330	383	339	Yes	Yes
	SBR	270	44	60	Yes	Yes
I-215 NB Off-Ramp / Harley Knox Bl.	NBL/T	1,120	13	22	Yes	Yes
	NBR	265	47	52	Yes	Yes

<sup>&</sup>lt;sup>1</sup> 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.



<sup>&</sup>lt;sup>2</sup> Maximum queue length for the approach reported.

## 3.10 BASIC FREEWAY SEGMENT ANALYSIS

Existing mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 3-11. As shown on Table 3-3, the basic freeway segments analyzed for this study were found to operate at an acceptable LOS (i.e., LOS C or better) during the peak hours. Existing basic freeway segment analysis worksheets are provided in Appendix 3.5.

## 3.11 Freeway Merge/Diverge Analysis

Ramp merge and diverge operations were also evaluated for Existing conditions and the results of this analysis are presented in Table 3-4. As shown in Table 3-4, the freeway ramp merge and diverge areas currently operate at LOS C or better. Existing freeway ramp junction operations analysis worksheets are provided in Appendix 3.6.



215 HARLEY KNOX BL. OLEANDER AV. HARVILL AV.

EXHIBIT 3-11: EXISTING (2015) FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)



← 100/100 - AM/PM PEAK HOUR VOLUMES





Basic Freeway Segment Analysis for Existing (2015) Conditions

Table 3-3

Freeway	ction	Mainline Segment		Volu	ıme	Truck %	Truck %	Density <sup>2</sup>		LOS	
Fre	Direction		Lanes <sup>1</sup>	AM	PM	AM	PM	AM	PM	AM	PM
/ay	SB	North of Harley Knox Boulevard	3	2,544	3,855	4%	4%	13.4	20.5	В	С
reeway	S	South of Harley Knox Boulevard	3	2,186	3,445	2%	3%	11.4	18.1	В	С
15 F	NB	North of Harley Knox Boulevard	3	4,092	3,247	4%	4%	22.0	17.1	С	В
1-2	2	South of Harley Knox Boulevard	3	3,721	2,779	3%	3%	19.6	14.6	С	В

<sup>&</sup>lt;sup>1</sup> Number of lanes are in the specified direction and is based on existing conditions.



<sup>&</sup>lt;sup>2</sup> Density is measured by passenger cars per mile per lane (pc/mi/ln).

Table 3-4

# Freeway Ramp Junction Merge/Diverge Analysis for Existing (2015) Conditions

way	ection	Ramp or Segment	Lanes on	AM Pea	ık Hour	PM Peak Hour		
Freew	Dire	Namp of Segment	Freeway <sup>1</sup>	Density <sup>2</sup>	LOS	Density <sup>2</sup>	LOS	
vay	SB	Off-Ramp at Harley Knox Boulevard	3	20.2	С	27.5	С	
Freeway	S	On-Ramp at Harley Knox Boulevard	3	15.1	В	21.5	С	
15 FI	NB	On-Ramp at Harley Knox Boulevard	3	25.8	С	21.9	С	
1-2	Ν	Off-Ramp at Harley Knox Boulevard	3	25.1	С	20.0	В	

<sup>&</sup>lt;sup>1</sup> Number of lanes are in the specified direction and is based on existing conditions



<sup>&</sup>lt;sup>2</sup> Density is measured by passenger cars per mile per lane (pc/mi/ln).

## 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 a total of 1,259,050 square feet (sf) of high-cube warehouse use/distribution center within two buildings. Building D located on the southeast corner of Decker Road and Oleander Avenue is proposed to consist of 703,040 sf of high-cube warehouse/distribution center use and Building E, located on the southwest corner of Decker Road and Oleander Avenue, is proposed to consist of 556,010 sf of high-cube warehouse/distribution center use. The Project is anticipated to be constructed and occupied by Year 2017.

The Project is proposed to have access on Oleander Avenue via Driveways 1 through 6. All Project access points are assumed to allow full-access. Driveways 1 and 4 are proposed for truck access only, Driveways 2 and 5 are proposed for passenger car access only, and Driveways 3 and 6 are proposed to allow access for both trucks and passenger cars. Regional access to the project site is provided via the I-215 Freeway at Harley Knox Boulevard interchange.

## 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. The ITE <u>Trip Generation</u> manual is a nationally recognized source for estimating site specific trip generation. ITE recently released an updated edition of the <u>Trip Generation</u> manual (9<sup>th</sup> Edition) in 2012. (3) The <u>Trip Generation</u> manual is based on more than 4,800 trip generation studies submitted to ITE by public agencies, consulting firms, universities/colleges, developers, associations and local sections/districts/student chapters of ITE.

High-cube warehouse/distribution centers (ITE Land Use Code 152) are a unique land use type within the larger, more generalized industrial land use category. ITE's most recent edition of the *Trip Generation* manual (ITE 9<sup>th</sup> Edition), published in 2012, defines "high-cube warehouses" as "...used for storage of materials, goods and merchandise prior to their distribution to retail outlets, distribution centers or other warehouses. These facilities are typically characterized by ceiling heights of at least 24 feet with small employment counts due to a high level of mechanization." The average square footage for the sites surveyed for high-cube warehouse/distribution center (Land Use 152) use is above 500,000 square feet. The number of sites observed in the compilation of this data ranges from 57-70 sites of which more than 20 sites exceed 1,000,000 square feet in gross floor area. The weighted average daily trip generation rate for high-cube warehouse (Land Use 152) use is 1.68 trips per thousand square feet (TSF).

The ITE *Trip Generation* manual includes data regarding the types of vehicles that are generated (passenger cars and trucks), but provides no guidance on vehicle mix (different sizes of trucks). While trucks, as a percentage of total traffic, has been based on the ITE *Trip Generation* manual,



data regarding the vehicle mix has been obtained from a separate report; the South Coast Air Quality Management District's (SCAQMD) recent Warehouse Truck Trip Study. (10) (11) The SCAQMD is currently recommending the use of the ITE <u>Trip Generation</u> manual in conjunction with their truck mix by axle-type to better quantify trip rates associated with local warehouse and distribution projects, as truck emission represent more than 90 percent of air quality impacts from these projects. This recommended procedure has been utilized for the purposes of this analysis in effort to be consistent with other technical studies prepared for the Project.

Trip generation rates used to estimate Project traffic are shown in Table 4-1. A summary of the Project's trip generation based on PCE is shown in Table 4-2 while the trip generation based on actual vehicles is shown on Table 4-3 (for comparative purposes). For purposes of this analysis, ITE land use code 152 (High-Cube Warehousing) has been used to derive site specific trip generation estimates. In order to accurately reflect the impact that heavy trucks would have on the street system, Project trips have been further broken down between passenger cars and trucks for each of the peak hours and weekday daily trip generation. As noted on Table 4-1, refinements to the raw trip generation estimates have been made to provide a more detailed breakdown of trips between passenger cars and trucks. The percentage of trucks has been determined from the table shown on page 267 of the ITE *Trip Generation* manual. As shown on page 267, the truck trip generation rate for weekday daily traffic is 0.64 or 38.1% of the total traffic. Similarly, the truck trip generation rate for the weekday AM peak hour is 0.03 (27.3% of the total traffic) and 0.04 (or 33.3% of the total traffic) for the weekday PM peak hour.

Trip generation for heavy trucks was further broken down by truck type (or axle type). The total truck percentage is comprised of 3 different truck types: 2-axle, 3-axle, and 4+-axle trucks. For the purposes of this analysis, the percentage of trucks, by axle type, were obtained from the South Coast Air Quality Management District's (SCAQMD) interim recommended truck mix. The SCAQMD has recently performed surveys of existing facilities and compiled the data to provide interim guidance on the mix of heavy trucks for these types of high-cube warehousing/distribution facilities. Based on this interim guidance from the SCAQMD, the following truck fleet mix was utilized for the purposes of estimating the truck trip generation for the site: 22.0% of the total trucks as 2-axle trucks, 17.7% of the total trucks as 3-axle trucks, and 60.3% of the total trucks as 4+-axle trucks. Lastly, PCE factors were applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). As directed by the County of Riverside and consistent with standard traffic engineering practice in Southern California, PCE factors have been utilized due to the expected heavy truck component for the proposed Project uses. PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. These PCE factors are consistent with the values recommended by the San Bernardino County CMP and are accepted factors in the County of Riverside. (9) Although the County of Riverside has a recommended PCE factor of 2.0, the San Bernardino County CMP PCE factors have been utilized in an effort to conduct a more conservative analysis.

As shown on Table 4-2, the proposed Project is anticipated to generate a net total of 3,319 PCE trip-ends per day with 195 net PCE AM peak hour trips and 226 net PCE PM peak hour trips.



Table 4-1

## **Project Trip Generation Rates**

		ITE LU	Al	M Peak Ho	ur	PI	M Peak Ho	ur	Daily
Land Use <sup>1</sup>	Units <sup>2</sup>	Code	In	Out	Total	In	Out	Total	Daily
	A	ctual Vel	nicle Trip G	eneration	Rates				
High-Cube Warehouse/Distribution Center <sup>3</sup>	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
	Passen	ger Cars	0.055	0.025	0.080	0.025	0.055	0.080	1.040
	2-Axle	e Trucks	0.005	0.002	0.007	0.003	0.006	0.009	0.141
	3-Axle	e Trucks	0.004	0.002	0.005	0.002	0.005	0.007	0.113
	4-Axle-	+ Trucks	0.012	0.006	0.018	0.007	0.017	0.024	0.386
Pa	ssenger	Car Equ	ivalent (PC	E) Trip Ger	neration Ra	ites			
High-Cube Warehouse/Distribution Center <sup>3,4</sup>	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
	Passen	ger Cars	0.055	0.025	0.080	0.025	0.055	0.080	1.040
2-Axle Tr	ucks (PC	E = 1.5)	0.007	0.003	0.010	0.004	0.009	0.013	0.211
3-Axle Tr	0.007	0.003	0.011	0.004	0.010	0.014	0.226		
4-Axle+ Tr	ucks (PC	CE = 3.0)	0.037	0.017	0.054	0.022	0.050	0.072	1.158

<sup>&</sup>lt;sup>1</sup> Trip Generation Source: Institute of Transportation Engineers (ITE), <u>Trip Generation Manual</u>, Ninth Edition (2012).



<sup>&</sup>lt;sup>2</sup> TSF = thousand square feet

<sup>&</sup>lt;sup>3</sup> Vehicle Mix Source: Total truck percentage source from ITE <u>Trip Generation</u> manual. Truck mix (by axle type) source from SCAQMD. AM peak hour = 72.7% passenger cars, 6.01% 2-Axle trucks, 4.83% 3-Axle trucks, 16.46% 4-Axle trucks

PM peak hour = 66.7% passenger cars, 7.33% 2-Axle trucks, 5.89% 3-Axle trucks, 20.08% 4-Axle trucks

ADT = 61.9% passenger cars, 8.38% 2-Axle trucks, 6.74% 3-Axle trucks, 22.98% 4-Axle trucks

<sup>&</sup>lt;sup>4</sup> PCE rates are per SANBAG.

Table 4-2

# **Project Trip Generation Summary (in PCE)**

			AN	/I Peak H	our	PN	/I Peak Ho	our	
Land Use	Quantity	Units <sup>1</sup>	ln	Out	Total	In	Out	Total	Daily
Building D	703.040	TSF							
Passenger Cars:			39	17	56	17	39	56	731
Truck Trips:									0
2-axle:			5	2	7	3	6	9	148
3-axle:			5	2	7	3	7	10	159
4+-axle:			26	12	38	16	35	51	814
- Net Truck Trips (PCE) <sup>2</sup>			36	16	53	22	48	70	1,122
BUILDING D TOTAL NET TRIPS (PCE) 3			<i>75</i>	34	109	39	87	126	1,853
Building E	556.010	TSF							
Passenger Cars:			31	14	44	14	31	45	578
Truck Trips:									0
2-axle:			4	2	6	2	5	7	117
3-axle:			4	2	6	2	5	8	126
4+-axle:			21	9	30	12	28	40	644
- Net Truck Trips (PCE) <sup>2</sup>			29	13	42	17	887		
BUILDING E TOTAL NET TRIPS (PCE) 3		59	27	86	31	69	100	1,466	
	TOTAL (PCE):							226	3,319



<sup>&</sup>lt;sup>1</sup> TSF = thousand square feet
<sup>2</sup> Vehicle Mix Source: Total truck percentage source from ITE <u>Trip Generation</u> manual. Truck mix (by axle type) source from SCAQMD.
<sup>3</sup> TOTAL NET TRIPS (PCE) = Passenger Cars + Net Truck Trips (PCE).

Table 4-3

## **Project Trip Generation Summary (Actual Vehicles)**

		AN	/I Peak H	our	PN	/I Peak Ho	our		
Land Use	Quantity	Units <sup>1</sup>	ln	Out	Total	ln	Out	Total	Daily
Building D	703.040	TSF							
Passenger Cars:			39	17	56	17	39	56	731
Truck Trips:									
2-axle:			3	1	5	2	4	6	99
3-axle:			3	1	4	2	3	5	80
4+-axle:			9	4	13	5	12	17	271
- Net Truck Trips (Actual Trucks	s) <sup>2</sup>		15	7	21	9	19	28	450
BUILDING D TOTAL NET TRIPS (Actual			53	24	77	26	58	84	1,181
Building E	556.010	TSF							
Passenger Cars:			31	14	44	14	31	45	578
Truck Trips:									
2-axle:			3	1	4	2	3	5	78
3-axle:			2	1	3	1	3	4	63
4+-axle:			7	3	10	4	9	13	215
- Net Truck Trips (Actual Trucks		12	5	17	7	15	22	356	
BUILDING E TOTAL NET TRIPS (Actual	42	19	61	21	46	67	934		
	TOTAL (	ACTUAL):	96	43	138	47	104	151	2,115



TSF = thousand square feet

Vehicle Mix Source: Total truck percentage source from ITE Trip Generation manual. Truck mix (by axle type) source from SCAQMD.

TOTAL NET TRIPS (Actual Vehicles) = Passenger Cars + Net Truck Trips (Actual Trucks).

## 4.2 PROJECT TRIP DISTRIBUTION

Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute.

The Project trip distribution was developed based on anticipated travel patterns to and from the Project site for both passenger cars and truck traffic. The truck trip distribution patterns have been developed based on the anticipated travel patterns for the high-cube warehousing trucks. The Project trip distribution patterns for both passenger cars and trucks were developed based on an understanding of existing travel patterns in the area, the geographical location of the site, and the site's proximity to the regional arterial and state highway system.

The Project passenger car trip distribution patterns is graphically depicted on Exhibit 4-1 and the Project truck trip distribution patterns is graphically depicted on Exhibit 4-2.

#### 4.3 MODAL SPLIT

The traffic reducing potential of public transit, walking or bicycling have not been considered in this TIA. Essentially, the traffic projections are "conservative" in that these alternative travel modes might be able to reduce the forecasted traffic volumes (employee trips only).

## 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 4-3.

#### 4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year for 2017 traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. 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.





HARLEY KNOX BL. HARVILL AV. 20 OLEANDER AV. 100 50 DMA' 6 DECKER RD. 10 JOVA 3 0t DMA 5 DM.

EXHIBIT 4-1: PROJECT (PASSENGER CARS) TRIP DISTRIBUTION

09347 - trips.dwg

10 - PERCENT TO/FROM PROJECT

EXHIBIT 4-2: PROJECT (TRUCKS) TRIP DISTRIBUTION



HARLEY KNOX BL. HARVILL AV. OLEANDER AV. 100 DMX 2-DECKER RD. - 52 - 000 3 DMX 1-

10 - PERCENT TO/FROM PROJECT

09347 - trips.dwg

**EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES** 

			7.0	HARLEY KNOX BL.	0.3	PERRIC	512
Driveway 5 & Oleander Av.	-21(9)	(12)6	1.9	1	3.0		3.3 OOLEANDER AV. 0.4 9.0 °E. 3.3 9.0 °C. 9.4 9.0 °C. 9.0
5 Driveway 4 & 6 Oleander Av.		30(78) - (0)0)0 (0)0) - (0)0)0 (0)0)0 (0)0)0 (0)0)0 (0)0)0 (0)0000 (0)000 (0)000 (0)000 (0)000 (0)000 (0)000 (0)000 (0)000 (0)000	11 i-215 NB Ramps & Harley Knox Bi.	(0) -14(7)	84(92) 6(15) 6(15) 7(14) 7(14) 9(0) 9(0)	i n m	DMA: 6 0.5 0 2.2 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
Oleander Av. 4 Decker Rd. & Oleander Av. +44(22)		30(28) + 30(00) - 0(0) -	Harvill Av. & 10 I-215 SB Ramps & Oleander Av.	(5) (5) (6) (7) (41) (7) (41) (7) (41) (7) (41) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7	40(107) +		2.0 2.9 YWd  2.0 2.4 YWd  3.0 2.4 YWd  3.0 3.0 5.0 YWd
2 Driveway 2 & 3 Oleander Av.	- 10(15) - 74(22) - 74(23)	7(22) 0(0) 12(28) 12(28) 12(28) 12(28) 12(28) 12(28) 12(28)	8 Harvill Av. & 9 Harley Knox Bl.	0(0) -0(0) -0(0) -117(62) -0(0) -117(62) -0(0) -117(62) -0(0)	0(0) + (2) (3) + (2) (2) + (2) (2) + (2) (2) + (2) (2) + (2) (2) + (2) (2) + (2) (2) +		10.0 = VEHICLES PER DAY (1000'S) 10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
1 Driveway 1 & Oleander Av.	(9) • 16(10)	(0)0 (0)0 (0)0	7 Driveway 6 & Oleander Av.	0(0) -0(0) -104(54) -104(54)	47(121) 47(121) (0)0)	LEGEND:	10(10)

09347 - volumes.dwg

The currently adopted SCAG 2012 RTP (April 2012) growth forecasts for the unincorporated areas of the County of Riverside identifies projected growth in population of 349,100 in 2008 to 710,600 in 2035, or a 103.5 percent increase over the 27 year period. (5) The change in population equates to roughly a 2.67 percent growth rate compounded annually. Similarly, growth over the same 27 year period in households is projected to increase by 119.0 percent, or 2.95 percent annual growth rate. Finally, growth in employment over the same 27 year period is projected to increase by 198.8 percent, or a 4.14 percent annual growth rate.

Based on a comparison of Existing traffic volumes to the Horizon Year (2035) forecasts, the average growth rate is estimated at approximately 6.50 percent compounded annually between Existing and Horizon Year (2035) traffic conditions. The annual growth rate at each individual intersection is not lower than 5.20 percent compounded annually to as high as 9.27 percent compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the County of Riverside for both EAPC and Horizon Year (2035) traffic conditions, especially when considered along with the addition of project-related traffic. As such, the growth in traffic volumes assumed in this traffic impact analysis would tend to overstate as opposed to understate the potential impacts to traffic and circulation.

#### 4.6 CUMULATIVE DEVELOPMENT TRAFFIC

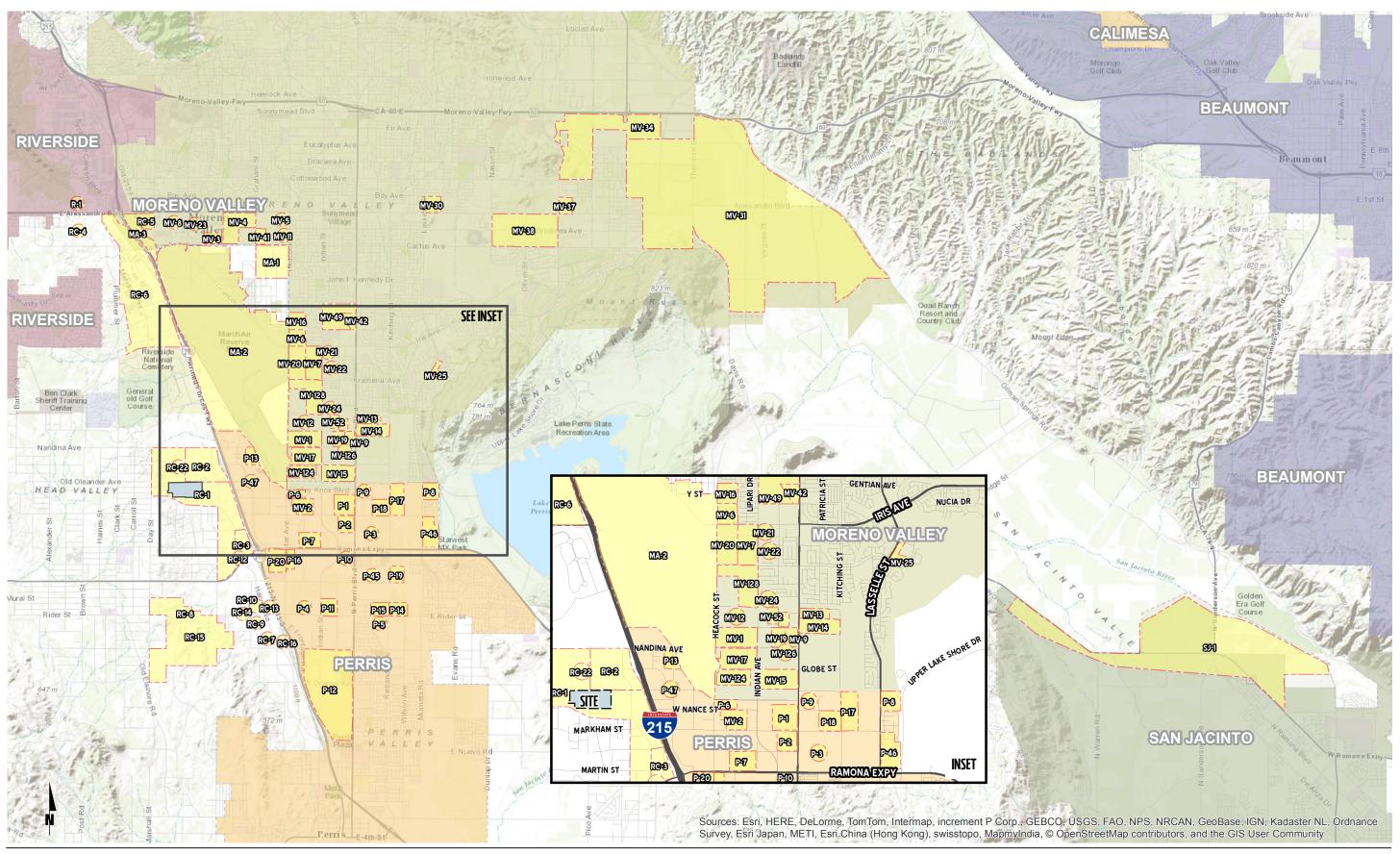
California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the County of Riverside, the cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections. The cumulative projects provided by the County of Riverside are provided in Appendix 4.1.

Where applicable, cumulative projects anticipated to contribute measurable traffic (i.e. 50 or more peak hour trips) to study area intersections have been manually added to the study area network to generate EAPC 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 4-4 and listed on Table 4-4.

Although it is unlikely that these cumulative projects would be fully built and occupied by Year 2017, they have been included in an effort to conduct a conservative analysis and overstate and opposed to understate potential traffic impacts.



### **EXHIBIT 4-4: CUMULATIVE DEVELOPMENT PROJECTS LOCATION MAP**





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Table 4-4 Page 1 of 3

### **Cumulative Development Land Use Summary**

TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
	COUNTY OF RIVERSIDE	Ē		
RC-1	SP 341; PP 21552 (Majestic Freeway Business Center)	High-Cube Warehouse	6100.715	TSF
RC-2	PP 20699 (Oleander Business Park)	Warehousing	1206.710	TSF
RC-3	Ramona Metrolink Station	Light Rail Transit Station	300	SP
		Office (258.102 TSF)	258.102	TSF
RC-4	DD 22025 (Ameter/Kalibar Davalanment)	Warehousing	409.312	TSF
NC-4	PP 22925 (Amstar/Kaliber Development)	General Light Industrial	42.222	TSF
		Retail	10.000	TSF
RC-5	Alessandro Metrolink Station	Light Rail Transit Station	300	SP
RC-6	Meridian Business Park North	Industrial Park	5985.000	TSF
RC-7	PP 18908	General Light Industrial	133.000	TSF
RC-8	Tract 33869	SFDR	39.000	DU
RC-9	PP 16976	General Light Industrial	85.000	TSF
RC-10	PP 21144	Industrial Park	190.802	TSF
		Gas Station w/ Market	17	VFP
RC-12	CUP03315	Fast Food w/o Drive Thru	5.600	TSF
		High-Turnover Restaurant	6.500	TSF
RC-13	PP23342	Industrial Park	180.600	TSF
RC-14	TR30592	SFDR	131	DU
RC-15	Rider Street Quarry	Quarry	2500.0	AC
10 15	PP 20711	Manufacturing	20.0	AC
RC-16	Yocum Baldwin	Warehousing	46.8	AC
RC-22	Blanding Assemblage	High-Cube Warehouse	707.880	TSF
NC-22	CITY OF MORENO VALL	ŭ	707.880	131
MV-1	PA 06-0152 & PA 06-0153 (First Park Nandina I & II)	High-Cube Warehouse	1182.918	TSF
MV-2	Integra Pacific Industrial Facility	High-Cube Warehouse	880.000	TSF
MV-3	PA 08-0072 (Overton Moore Properties)	High-Cube Warehouse	520.000	TSF
MV-4	Harbor Freight Expansion	High-Cube Warehouse	1279.910	TSF
MV-5	PA 04-0063 (Centerpointe Buildings 8 and 9)	General Light Industrial	361.384	TSF
1010-2	FA 04-0003 (Centerpointe Buildings 8 and 5)	General Light Industrial	204.657	TSF
MV-6	PA 07-0035; PA 07-0039 (Moreno Valley Industrial Park)	High-Cube Warehouse	409.920	TSF
MV-7	PA 07-0079 (Indian Business Park)	High-Cube Warehouse	1560.046	TSF
IVI V-7	PA 07-0079 (Illulati Busilless Park)			
MV-8	PA 08-0047-0052 (Komar Cactus Plaza) <sup>3</sup>	Hotel Fast Food w/Drive Thru	2,000	RMS
IVI V-O	PA 08-0047-0052 (Komar Cactus Piaza)	· · · · · · · · · · · · · · · · · · ·	8.000	TSF
N 41 / O	First Inland Lasistics Contain	Commercial	42.400	TSF
MV-9	First Inland Logistics Center	High-Cube Warehouse	400.130	TSF
	PA 08-0093 (Centerpointe Business Park II)	General Light Industrial	99.988	TSF
MV-12	PA 06-0021; PA 06-0022; PA 06-0048; PA 06-0049 (Komar Investments)	Warehousing	2057.400	TSF
MV-13	PA 06-0017 (Ivan Devries)	Industrial Park	569.200	TSF
MV-14	Modular Logistics (Dorado Property)	High-Cube Warehouse	1109.378	TSF
MV-15	PA 09-0004 (Vogel)	High-Cube Warehouse	1616.133	TSF
MV-16	TM 34748	SFDR	135	DU
MV-17	First Nandina Logistics Center	High-Cube Warehouse	1450.000	TSF
MV-19	First Park Nandina III	High-Cube Warehouse	691.960	TSF
	Moreno Valley Commerce Park	High-Cube Warehouse	354.321	TSF
		General Light Industrial	16.732	TSF
MV-20	March Business Center	Warehousing	87.429	TSF
		High-Cube Warehouse	1380.246	TSF
MV-21	TM 33810	SFDR	16	DU
MV-22	TM 34151	SFDR	37	DU
MV-23	373K Industrial Facility	High-Cube Warehouse	373.030	TSF
MV-24	TM 32716	SFDR	57	DU

### **Cumulative Development Land Use Summary**

TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
	·	Discount Supermarket	95.440	TSF
MV-30	PA 08-0079-0081 (Winco Foods)	Specialty Retail	14.800	TSF
	Moreno Beach Marketplace (Lowe's)	Commercial Retail	175.000	TSF
	Auto Mall Specific Plan (Planning Area C)	Commercial Retail	304.500	TSF
	Westridge	High-Cube Warehouse	937.260	TSF
	-	High-Cube Warehouse	1916.190	TSF
MV-31	ProLogis	Warehousing	328.448	TSF
		High-Cube Warehouse	41400.000	TSF
		Warehousing	200.000	TSF
	World Logistics Center	Gas Station w/ Market	12	VFP
		Existing SFDR	7	DU
	a Westridge Commerce Center	High-Cube Warehouse	937.260	TSF
	b P06-158 (Gascon)	Commercial Retail	116.360	TSF
	c Auto Mall Specific Plan (PAC)	Commercial Retail	304.500	TSF
MV-34		Warehousing	367.000	TSF
	d ProLogis	High-Cube Warehouse	1901.000	TSF
		SFDR	261	DU
	e TR 35823 (Stowe Passco)	Apartments	216	DU
MV-37	Lowe's (Moreno Beach Marketplace)	Home Improvement Store	175.000	TSF
	a Convenience Store/ Fueling Station	Gas Station w/ Market	30.750	TSF
	b Senior Assisted Living	Assisted Living Units	139	DU
	c TR 31590 (Winchester Associates)	SFDR	96	DU
	d TR 32548 (Gabel, Cook & Associates)	SFDR	107	DU
MV-38	e 26th Corp. & Granite Capitol	SFDR	32	DU
	f TR 32218 (Whitney)	SFDR	63	DU
	g Moreno Marketplace	Commercial Retail	93.788	TSF
	h Medical Plaza	Medical Offices	311.633	TSF
MV-40	Moreno Valley Industrial Center (Industrial Area SP)	General Light Industrial	354.810	TSF
MV-41	Centerpointe Business Park	General Light Industrial	356.000	TSF
	School pointe Saumeso Fark	Free Standing Discount Store	189.520	TSF
MV-42	Moreno Valley Shopping Center	Gas Station w/ Market / Car Wash	16	VFP
MV-49	TR 22180 / Young Homes	Residential	140	DU
MV-52	San Michele Industrial Center (Industrial Area SP)	General Light Industrial	865.960	TSF
	PA 06-0014 (Pierce Hardy Limited Partnership)	Lumbar Yard	67.000	TSF
	Moval Assemblage	High-Cube Warehouse	456.337	TSF
		High-Cube Warehouse	1351,770	TSF
MV-128	Moreno Valley Logistics Center	General Light Industrial	385.748	TSF
	MARCH JOINT POWERS A			
		Medical Offices	190.000	TSF
		Commercial Retail	210.000	TSF
MA-1	March Lifecare Campus Specific Plan <sup>4</sup>	Research & Education	200.000	TSF
	and an areas of campas openine riam	Hospital	50	Beds
		Institutional Residential	660	Beds
MA-2	Airport Master Plan	Airport Use	559.000	TSF
MA-3	Freeway Business Center (March JPA)	High-Cube Warehouse	710	TSF
1717 ( 3	CITY OF RIVERSII		,10	131
	P07-1028 (Alessandro Business Park)	General Light Industrial	662.018	TSF
R-1	Alessandro and Gorgonio	Fast Food w/Drive Thru	4.050	TSF
	2100 Alessandro Boulevard	Vocational School	11.505	TSF
	CITY OF PERRIS		11.505	131
P-1	P 05-0113 (IDI)	High-Cube Warehouse	1750.000	TSF
P-1 P-2	P 05-0113 (IDI)	High-Cube Warehouse	697.600	TSF
P-3	P 05-0477	High-Cube Warehouse	462.692	TSF
P-4	Rados Distribution Center	High-Cube Warehouse	1200.000	TSF
1174	וימעסט אוטנווטענוטוו לכוונכו	High-cape Materiouse	1200.000	135

Table 4-4 Page 3 of 3

### **Cumulative Development Land Use Summary**

TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
P-5	Investment Development Services (IDS) II	High-Cube Warehouse	350.000	TSF
P-6	P 07-09-0018	Warehousing	170.000	TSF
P-7	P 07-07-0029 (Oakmont II)	High-Cube Warehouse	1600.000	TSF
P-8	TR 32707	SFDR	137	DU
P-9	TR 34716	SFDR	318	DU
P-10	P 05-0493 (Ridge I)	High-Cube Warehouse	700.000	TSF
P-11	Ridge II	High-Cube Warehouse	2000.000	TSF
		SFDR	717	DU
		Condo/Townhomes	1,139	DU
P-12	Harvest Landing Specific Plan	Sports Park	16.7	AC
P-12		Business Park	1233.401	TSF
		Shopping Center	73.181	TSF
	Perris Marketplace	Shopping Center	450.000	TSF
P-13	P 06-0411 (Concrete Batch Plant)	Manufacturing	2.000	TSF
P-14	Jordan Distribution	High-Cube Warehouse	378.000	TSF
P-15	Aiere	High-Cube Warehouse	642.000	TSF
P-16	P 08-11-0005; P 08-11-0006 (Starcrest)	High-Cube Warehouse	454.088	TSF
P-17	Stratford Ranch Specific Plan	High-Cube Warehouse	1725.411	TSF
P-18	Stratford Ranch	High-Cube Warehouse	480.000	TSF
P-10	Strationa Ranch	General Light Industrial	120.000	TSF
P-19	P05-0493	Logistics	597.370	TSF
P-20	Starcrest, P011-0005; 08-11-0006	General Light Industrial	454.088	TSF
P-45	IDS 04-0464	High-Cube Warehouse	1686.760	TSF
P-46	TTM 32708 (50% Complete)	SFDR	238	DU
	PM 34199	Gen. Light Industrial	46.500	TSF
	DPR 05-0387	Gen. Light Industrial	9.854	TSF
P-47	DPR 05-0452	Warehousing	31.200	TSF
	TPM 34697	Gen. Light Industrial	47.400	TSF
	DPR 06-0396	Warehousing	159.823	TSF

<sup>&</sup>lt;sup>1</sup> SFDR = Single Family Detached Residential ; MFDR = Multi-Family Detached Residential

<sup>&</sup>lt;sup>2</sup> DU = Dwelling Units; TSF = Thousand Square Feet; SP = Spaces; VFP = Vehicle Fueling Positions; RMS = Rooms; AC = Acres; EMP = Employees

<sup>&</sup>lt;sup>3</sup> Source: Cactus Avenue and Commerce Center Drive Commercial Center TIA, Urban Crossroads, Inc., December 9, 2008 (Revised).

 $<sup>^4\,</sup>$  Source: March Lifecare Campus Specific Plan Traffic Impact Analysis, Mountain Pacific, Inc., May 2009 (Revised).

Any other cumulative projects that are not expected to contribute measurable traffic to study area intersections have not been included since the traffic would dissipate due to the distance from the Project site and study area intersections. Any additional traffic generated by other projects not on the cumulative projects list is accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 *Background Traffic*.

### 4.7 NEAR-TERM TRAFFIC FORECASTS

To provide a comprehensive assessment of potential transportation network deficiencies, two types of analyses, "buildup" and "buildout", were performed in support of this work effort. The "buildup" method was used to approximate the EAP traffic forecasts includes background traffic, and is intended to identify the significant impacts on both the existing and planned near-term circulation system. The "buildup" method was also utilized to approximate the EAPC traffic forecasts, and is intended to identify the cumulative impacts on both the existing and planned near-term circulation system. The EAPC traffic forecasts include background traffic, traffic generated by other cumulative development projects within the study area, and the traffic generated by the proposed Project. The "buildout" approach is used to forecast the Horizon Year Without and With Project conditions of the study area.

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast the near-term 2017 traffic conditions. An ambient growth factor of 4.04% (2017) accounts for background (area-wide) traffic increases that occur over time, up to the year 2017 from the year 2015 (compounded two percent per year growth over a two year period). Traffic volumes generated by the Project are then added to assess the EAP and EAPC traffic conditions. The 2017 roadway network is similar to the existing conditions roadway network with the exception of future roadways and intersections proposed to be developed by the Project.

As noted previously, an analysis of the proposed Project at various development tiers has been assessed for the purposes of this traffic study. The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- EAP (2017)
  - o Existing 2015 counts
  - o Ambient growth traffic (4.04%)
  - Project traffic
- EAPC (2017)
  - o Existing 2015 counts
  - Ambient growth traffic (4.04%)
  - Cumulative Development Project traffic
  - Project traffic



### 4.8 Horizon Year (2035) Volume Development

The Horizon Year (2035) With Project traffic conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing conditions and Horizon Year conditions.

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 With Project peak hour forecasts were refined using the model derived long-range forecasts, along with existing peak hour traffic count data collected at each analysis location in April 2015. 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 With Project peak hour forecasts.

The refined future peak hour approach and departure volumes obtained from the model output data 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 Long Range traffic conditions. However, review of the resulting model growth indicates negative growth for several study area intersections. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or EAPC 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 EAPC volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between EAPC 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 (2015) and EAPC 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 are 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.



The truck competent of RivTAM has data that is unusually low. As such, in an effort to conduct a conservative analysis, the presence of trucks has been accounted for based on the manual volume adjustments made to demonstrate growth above EAPC traffic forecasts, which are presented and evaluated in PCE (see *Section 3.6 Existing (2015) Traffic Counts* for discussion on PCE). As such, the Horizon Year forecasts are also assumed to be in PCE for the purposes of this analysis.

Post-processing worksheets for Horizon Year Without Project traffic conditions are provided in Appendix 4.2.



### 5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations, traffic signal warrant, and freeway mainline operations 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 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 each phase of development, for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 5-1, which indicates that the study area intersections are anticipated to continue to operate at acceptable LOS under E+P traffic conditions, consistent with Existing traffic conditions. As such, the impact to study area intersections from the addition of Project traffic is anticipated to be less than significant.

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 TIA.

### 5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no intersections anticipated to meet traffic signal warrants for E+P traffic conditions (see Appendix 5.2).



9.2 HARVILL AV.

DECKER RD.

F.0

EXHIBIT 5-1: E+P TRAFFIC VOLUMES

A. Ka		8.7 8.7	89H P 351	1.8	Saga	OLEANDER AV. 0 0.1	.VA
6 Driveway 5 & Oleander Av	0(0)0 (12)6 (12)6				Li de Fo		8.0 8.0 9. YWd
5 Driveway 4 & Oleander Av. +68(40)	34(81) 0(0) (0)0 (0)0 7(222)	11 I-215 NB Ramps & Harley Knox Bl.	—334(422) —293(258)	593(509) 593(50		2.3	)
4 Decker Rd. & Oleander Av. 4 − 67(35) (−1(5)	30(78) + (90)0	10 I-215 SB Ramps & Harley Knox BI.	233(319) -2(2) -409(349) -120(127)	422(500)→ 21(40)→		0.5	5.0 S.YWd
3 Driveway 3 & Oleander Av.  -44(22)  -23(13)	20(50) 0(0) 10(28) 10(28)	9 Harvill Av. & Oleander Av.	(96)721 (986)436) (0)2 (0)2 (0)2 (0)2 (0)2 (0)2 (0)2 (0)	79(165) 4 0(0) 7 19(24) 7 364(313) 3 364(313) 3		00'S)	3
Driveway 2 & Oleander Av.	7(22) 0(0) 12(28) 12(28)	Harvill Av. & Harley Knox Bl.	0(0) -3(9) -8(9) -9(14) -411(452)	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		10.0 = VEHICLES PER DAY (1000'S) 10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES	
1 Driveway 1 & 2 Oleander Av.	(000) (000) (000) (000)	7 Driveway 6 & 8 Oleander Av.	0(0) -0(0) -105(59) -30(16)	0(0) (124) (00) (00) (00) (00) (00) (00) (00) (0	LEGEND:	10.0 = V 10(10) = A II	
<u>,                                    </u>		<u> </u>					

URBAN CROSSROADS

EXHIBIT 5-2: SUMMARY OF PEAK HOUR INTERSECTION LOS FOR E+P CONDITIONS



**4** Z

Intersection Analysis for E+P Conditions

Table 5-1

			E	xisting	(2015)		Exis	ting Plu	s Proje	ect	
			De	lay¹	Lev	el of	Del	ay¹	Leve	el of	Acceptable
		Traffic	(se	cs.)	Ser	vice	(se	cs.)	Ser	vice	LOS
#	Intersection	Control <sup>2</sup>	AM	PM	AM	PM	AM	PM	AM	PM	
1	Dwy. 1 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	rsectio	n	0.0	0.0	Α	Α	С
2	Dwy. 2 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	rsectio	n	8.4	8.5	Α	Α	С
3	Dwy. 3 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	rsectio	n	8.4	8.6	Α	Α	С
4	Decker Rd. / Oleander Av.	<u>CSS</u>	Fut	ture Inte	rsectio	n	8.5	8.7	Α	Α	D
5	Dwy. 4 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	rsectio	n	8.5	8.8	Α	Α	С
6	Dwy. 5 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	rsectio	n	8.5	8.9	Α	Α	С
7	Dwy. 6 / Oleander Av.	CSS	8.9	0.0	Α	Α	10.2	9.5	В	Α	С
8	Harvill Av. / Harley Knox Bl.	TS	32.8	32.2	С	С	33.5	34.8	С	С	D
9	Harvill Av. / Oleander Av.	TS	6.5	4.6	Α	Α	13.8	14.3	В	В	D
10	I-215 SB Ramps / Harley Knox Bl.	TS	37.0	26.8	D	С	37.1	28.4	D	С	D
11	I-215 NB Ramps / Harley Knox Bl.	TS	13.6	22.2	В	С	15.0	28.9	В	С	D

Per the 2010 Highway Capacity Manual, 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.



<sup>&</sup>lt;sup>2</sup> CSS = Cross-street Stop; TS = Traffic Signal; <u>CSS</u> = Improvement

### 5.5 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Harley Knox Boulevard 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 I-215 Freeway mainline. Queuing analysis findings are presented in Table 5-2 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 on Table 5-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95<sup>th</sup> 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.

### 5.6 BASIC FREEWAY SEGMENT ANALYSIS

E+P mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibits 5-3. As shown on Table 5-3, the basic freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS C or better) during the peak hours, with the addition of Project traffic. E+P basic freeway segment analysis worksheets are provided in Appendix 5.4.

### 5.7 Freeway Merge/Diverge Analysis

Ramp merge and diverge operations were also evaluated for E+P traffic conditions and the results of this analysis are presented in Table 5-4. As shown in Table 5-4, the freeway ramp merge and diverge areas are anticipated to operate at LOS C or better. E+P freeway ramp junction operations analysis worksheets are provided in Appendix 5.5.



Table 5-2

Peak Hour Freeway Off-Ramp Queuing Summary for E+P Conditions

		Available		<b>Existing (2015)</b>	2)		Ē	<b>Existing plus Project</b>	oject	
		Stacking	95th Percel	95th Percentile Queue		,	95th Percel	95th Percentile Queue		,
		Distance	(Fe	(Feet) <sup>2</sup>	Acceptable? 1	able? ¹	(Feet)	et)²	Accept	Acceptable? <sup>1</sup>
Intersection	Movement	(Feet)	AM Peak	PM Peak	AM	PM	AM Peak	PM Peak	AM	PM
I-215 SB Off-Ramp / Harley Knox Bl.	SBL/T	1,330	383	339	Yes	Yes	379	341	Yes	Yes
	SBR	270	44	09	Yes	Yes	52	64	Yes	Yes
I-215 NB Off-Ramp / Harlev Knox Bl	T/ INN	1.120	73	22	Yes	Yes	71	44	Yes	Yes
	NBR	265	47	52	Yes	Yes	47	53	Yes	Yes

<sup>&</sup>lt;sup>1</sup> 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.

 $<sup>^{\</sup>mathrm{2}}$  Maximum queue length for the approach reported.

### **Basic Freeway Segment Analysis for E+P Conditions**

Table 5-3

	_				Existing (	(2015)		Exi	isting plu	s Projec	:t
Freeway	Direction	Mainline Segment	Lanes <sup>1</sup>	Den	sity <sup>2</sup>	LC	os	Den	sity <sup>2</sup>	LC	os
Ŧ	ā			AM	PM	AM	PM	AM	PM	AM	PM
vay	SB	North of Harley Knox Boulevard	3	13.4	20.5	В	С	13.8	20.8	В	С
reeway	S	South of Harley Knox Boulevard	3	11.4	18.1	В	С	11.5	18.3	В	С
5 F	В	North of Harley Knox Boulevard	3	22.0	17.1	С	В	22.2	17.5	С	В
1-21	Z	South of Harley Knox Boulevard	3	19.6	14.6	С	В	19.9	14.6	С	В

 $<sup>^{1}\,\</sup>mathrm{Number}$  of lanes are in the specified direction and is based on existing conditions.



<sup>&</sup>lt;sup>2</sup>Density is measured by passenger cars per mile per lane (pc/mi/ln).

Table 5-4

## Freeway Ramp Junction Merge/Diverge Analysis for E+P Conditions

,	ι			Ē	xisting	Existing (2015)		Exis	ting Pl	<b>Existing Plus Project</b>	
sewa)	ectioi	Ramp or Segment	Lanes on	Lanes on AM Peak Hour PM Peak Hour AM Peak Hour PM Peak Hour	Hour	PM Peak	Hour	AM Peak	Hour	PM Peak	Hour
N7	ni <b>Q</b>			Density <sup>2</sup>	ros	Density <sup>2</sup>	ros	Density <sup>2</sup> LOS Density <sup>2</sup> LOS Density <sup>2</sup> LOS Density <sup>2</sup> LOS	ros	Density <sup>2</sup>	ros
γeν	8	Off-Ramp at Harley Knox Boulevard	3	20.2	С	27.5	С	20.2 C 27.5 C 20.7 C 27.7	С	27.7	С
vəəl	S	On-Ramp at Harley Knox Boulevard	3	15.1	В	21.5	С	21.5 C 15.2	В	21.8	С
12 E	81	On-Ramp at Harley Knox Boulevard	3	25.8	С	21.9	С	25.8 C 21.9 C 26.0 C 22.4	С	22.4	С
Z-I	N	Off-Ramp at Harley Knox Boulevard	3	25.1	С	C 20.0	В	B 25.3 C 20.0	С	20.0	С

 $^1\text{Number of lanes}$  are in the specified direction and is based on existing conditions.  $^2\text{Density}$  is measured by passenger cars per mile per lane (pc/mi/ln).

HARLEY KNOX BL. OLEANDER AV. HARVILL AV.

EXHIBIT 5-3: E+P FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)



← 100/100 - AM/PM PEAK HOUR VOLUMES





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### **6** EAP (2017) TRAFFIC CONDITIONS

This section discusses the methods used to develop Existing plus Ambient Growth plus Project (EAP) (2017) traffic forecasts, and the resulting intersection operations, traffic signal warrant, and freeway mainline operations analyses.

### 6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for EAP 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 EAP conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).

### 6.2 EAP (2017) TRAFFIC VOLUME FORECASTS

To account for background traffic growth, an ambient growth from Existing conditions of 4.04% (2 percent per year over 2 years, compounded annually) is included for EAP traffic conditions. Cumulative development projects are not included as part of the EAP analysis. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for EAP traffic conditions are shown on Exhibit 6-1.

### 6.3 Intersection Operations Analysis

LOS calculations were conducted for the study intersections to evaluate their operations under EAP 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 LOS under EAP traffic conditions, consistent with Existing traffic conditions. As such, the impact to study area intersections from the addition of Project traffic is anticipated to be less than significant.

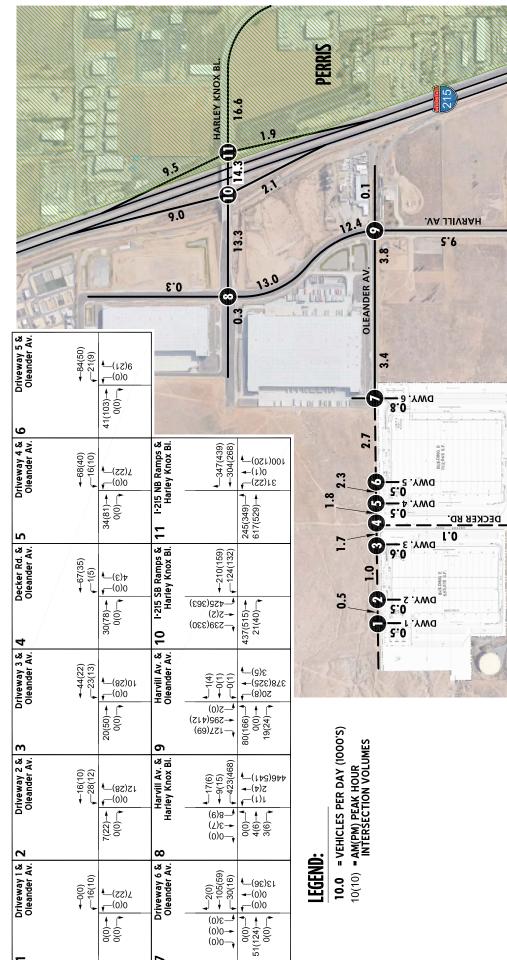
A summary of the peak hour intersection LOS for EAP traffic conditions are shown on Exhibit 6-2. The intersection operations analysis worksheets for EAP traffic conditions are included in Appendix 6.1 of this TIA.

### 6.4 Traffic Signal Warrants Analysis

No study area intersections are anticipated to meet traffic signal warrants for EAP traffic conditions (see Appendix 6.2).



### EXHIBIT 6-1: EAP (2017) TRAFFIC VOLUMES



09347 - volumes.dwg

EXHIBIT 6-2: SUMMARY OF PEAK HOUR INTERSECTION LOS FOR EAP (2017) CONDITIONS



Intersection Analysis for EAP (2017) Conditions

Table 6-1

			E	xisting	(2015)			EAP (2	017)		
			Del	lay <sup>1</sup>	Leve	el of	Del	ay¹	Lev	el of	Acceptable
		Traffic	(se	cs.)	Ser	vice	(se	cs.)	Ser	vice	LOS
#	Intersection	Control <sup>2</sup>	AM	PM	AM	PM	AM	PM	AM	PM	
1	Dwy. 1 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	ersectio	n	0.0	0.0	Α	Α	С
2	Dwy. 2 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	ersectio	n	8.4	8.5	Α	Α	С
3	Dwy. 3 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	ersectio	n	8.4	8.6	Α	Α	С
4	Decker Rd. / Oleander Av.	<u>CSS</u>	Fut	ture Inte	ersectio	n	8.5	8.7	Α	Α	D
5	Dwy. 4 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	ersectio	n	8.5	8.8	Α	Α	С
6	Dwy. 5 / Oleander Av.	<u>CSS</u>	Fut	ture Inte	ersectio	n	8.5	8.9	Α	Α	С
7	Dwy. 6 / Oleander Av.	CSS	8.9	0.0	Α	Α	10.2	9.5	В	Α	С
8	Harvill Av. / Harley Knox Bl.	TS	32.8	32.2	С	С	33.2	35.0	С	D	D
9	Harvill Av. / Oleander Av.	TS	6.5	4.6	Α	Α	13.8	14.2	В	В	D
10	I-215 SB Ramps / Harley Knox Bl.	TS	37.0	26.8	D	С	37.5	31.3	D	С	D
11	I-215 NB Ramps / Harley Knox Bl.	TS	13.6	22.2	В	С	15.1	29.5	В	С	D

Per the 2010 Highway Capacity Manual, 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.



 $<sup>^2</sup>$  CSS = Cross-street Stop; TS = Traffic Signal;  $\underline{\textbf{CSS}}$  = Improvement

### 6.5 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Harley Knox Boulevard 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 I-215 Freeway mainline. Queuing analysis findings are presented in Table 6-2 for EAP 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 on Table 6-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95<sup>th</sup> percentile traffic flows for EAP traffic conditions.

Worksheets for EAP conditions off-ramp queuing analysis are provided in Appendix 6.3.

### 6.6 Basic Freeway Segment Analysis

EAP mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 6-3. As shown on Table 6-3, the freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS C or better) during the peak hours. EAP basic freeway segment analysis worksheets are provided in Appendix 6.4.

### 6.7 Freeway Merge/Diverge Analysis

Ramp merge and diverge operations were also evaluated for EAP conditions and the results of this analysis are presented in Table 6-4. As shown in Table 6-4, the freeway ramp merge and diverge areas are anticipated to operate at LOS D or better. EAP freeway ramp junction operations analysis worksheets are provided in Appendix 6.5.



Table 6-2

Peak Hour Freeway Off-Ramp Queuing Summary for EAP (2017) Conditions

		Available		Existing (2015)	2)			EAP (2017)		
		Stacking	95th Percer	95th Percentile Queue			95th Percentile Queue	itile Queue		
		Distance	(Feet)	et)²	Acceptable?	able? <sup>1</sup>	(Feet) <sup>2</sup>	et)²	Acceptable? <sup>1</sup>	able? <sup>1</sup>
Intersection	Movement	(Feet)	AM Peak	PM Peak	AM	PM	AM Peak	PM Peak	AM	PM
I-215 SB Off-Ramp / Harley Knox Bl.	SBL/T	1,330	383	688	Yes	Yes	390	353	Yes	Yes
	SBR	270	44	09	Yes	Yes	51	63	Yes	Yes
I-215 NB Off-Ramp / Harley Knox BI.	NBL/T NBR	1,120 265	13	22 52	Yes Yes	Yes	51 49	44 54	Yes	Yes

<sup>&</sup>lt;sup>1</sup> 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.

 $<sup>^{2}\,</sup>$  Maximum queue length for the approach reported.

Basic Freeway Segment Analysis for EAP (2017) Conditions

Table 6-3

	ے				Existing (	(2015)			EAP (20	017)	
Freeway	Direction	Mainline Segment	Lanes <sup>1</sup>	Den	sity <sup>2</sup>	LC	os	Den	sity <sup>2</sup>	LC	os
Ŧ	ā			AM	PM	AM	PM	AM	PM	AM	PM
vay	SB	North of Harley Knox Boulevard	3	13.4	20.5	В	С	14.3	21.7	В	С
reeway	S	South of Harley Knox Boulevard	3	11.4	18.1	В	С	12.0	19.1	В	С
5 F	В	North of Harley Knox Boulevard	3	22.0	17.1	С	В	23.2	18.2	С	С
1-21	Z	South of Harley Knox Boulevard	3	19.6	14.6	С	В	20.7	15.2	С	В

 $<sup>^{1}\,\</sup>mathrm{Number}$  of lanes are in the specified direction and is based on existing conditions.



<sup>&</sup>lt;sup>2</sup>Density is measured by passenger cars per mile per lane (pc/mi/ln).

Table 6-4

## Freeway Ramp Junction Merge/Diverge Analysis for EAP (2017) Conditions

,	ι			ш	xisting	<b>Existing (2015)</b>			EAP (2017)	2017)	
бема	ectioi	Ramp or Segment	Lanes on	AM Peak Hour  PM Peak Hour  AM Peak Hour  PM Peak Hour	Hour	PM Peak	Hour	AM Peak	Hour	PM Peak I	Hour
Fr	ıiQ		riceway	Density <sup>2</sup>	ros	Density <sup>2</sup>	SOT	Density <sup>2</sup>	ros	Density <sup>2</sup> LOS Density <sup>2</sup> LOS Density <sup>2</sup> LOS Density <sup>2</sup> LOS	ros
γeν	В	Off-Ramp at Harley Knox Boulevard	3	20.2	С	27.5	С	20.2 C 27.5 C 21.3 C 28.6	С	28.6	D
reev	S	On-Ramp at Harley Knox Boulevard	8	15.1	В	21.5	С	C 15.7	В	22.5	С
IS E	18	On-Ramp at Harley Knox Boulevard	3	25.8	С	21.9	С	25.8 C 21.9 C 26.9 C 23.1	С	23.1	С
.Z-I	V	Off-Ramp at Harley Knox Boulevard	3	25.1	С	C 20.0	В	26.1	С	C 20.7	С

 $^1\text{Number of lanes}$  are in the specified direction and is based on existing conditions.  $^2\text{Density}$  is measured by passenger cars per mile per lane (pc/mi/ln).

HARLEY KNOX BL. OLEANDER AV. HARVILL AV.

EXHIBIT 6-3: EAP (2017) FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)



← 100/100 - AM/PM PEAK HOUR VOLUMES





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### 7 EAPC (2017) TRAFFIC CONDITIONS

This section discusses the methods used to develop Existing plus Ambient Growth plus Project plus Cumulative (EAPC) (2017) traffic forecasts, and the resulting intersection operations, traffic signal warrant, and freeway mainline operations analyses.

### 7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for EAPC (2017) 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 EAPC 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 EAPC conditions only (e.g., intersection
  and roadway improvements along the cumulative development's frontages and driveways).

### 7.2 EAPC (2017) TRAFFIC VOLUME FORECASTS

To account for background traffic, other known cumulative development projects in the study area were included in addition to 4.04% of ambient growth for EAPC traffic conditions in conjunction with traffic associated with the proposed Project. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for EAPC (2017) traffic conditions are shown on Exhibit 7-1.

### 7.3 Intersection Operations Analysis

LOS calculations were conducted for the study intersections to evaluate their operations under EAPC 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:

ID	Intersection Location
8	Harvill Avenue / Harley Knox Boulevard – LOS F AM and PM peak hours
10	I-215 Southbound Ramps / Harley Knox Boulevard – LOS F AM and PM peak hours
11	I-215 Northbound Ramps / Harley Knox Boulevard – LOS F PM peak hour only

A summary of the peak hour intersection LOS for EAPC conditions are shown on Exhibit 7-2. The intersection operations analysis worksheets for EAPC traffic conditions are included in Appendix 7.1 of this TIA. Measures to address near-term cumulative deficiencies for EAPC traffic conditions are discussed in Section 7.8 *EAPC Deficiencies and Recommended Improvements*.



### EXHIBIT 7-1: EAPC (2017) TRAFFIC VOLUMES

Driveway 5 & Oleander Av.	84(50) 21(9)	41(103) + (00) -	1:5		3.8 0.22 A.1	Siddid	3.9 YWQ 3.8 3.8 3.1
4 & Av.		41(	% <u>≔</u>	471) 63)			Veneral at the second s
Driveway 4 & Oleander Av.	+68(40) +16(10)	34(81) + (000) - (000)	1 I-215 NB Ramps & Harley Knox Bl.	-632(1471 -440(763)	282(457) 1679(970) 4 0(43) 7 73(43) 7 73(43) 7 73(43) 7 73(43) 7		DWY. 5 0.5
Decker Rd. & 5	<del>-6</del> 7(35)	30(78) + 0(0) 0(0) 4(3)	10 I-215 SB Ramps & 11 Harley Knox BI.	-334(375) -334(793) -1482(793) -260(621)	479(635)→ 37(89)→ 166		2.0 2.0 YWd
Driveway 3 & 4 Oleander Av.	44(22) 23(13)	20(50) - (00) - (00) - (00) - (00)	Harvill Av. & Oleander Av.	- 127(69) 412(474) (0)(1) (2) (2) (2) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	(8)02 (8)05 (8)05 (9)05 (9)05		3 0
m m		20(:	ნ მ		80(166)- 0(0)- 19(24)-		JMES
2 Driveway 2 & Oleander Av.	←16(10) ←28(12)	7(22) 0(0) (00) 12(28)	8 Harvill Av. & Harley Knox Bl.	0(0) 0(0)	21(50) 21(50) 8(12) 8(5) 5(6) 487(665)		10.0 = VEHICLES PER DAY (1000'S) 10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
Driveway 1 &	<b>←</b> 0(0) <b>←</b> 16(10)	(0)0 (0)0 (0)0 (0)0	Driveway 6 & Oleander Av.	000 -000 -105(59) -105(59)	0(0) 0(0) 0(0) 0(0) 0(0) 0(0) 0(0) 0(0)	LEGEND:	10.01
<u></u>			7		5.		

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**EXHIBIT 7-2: SUMMARY OF PEAK HOUR INTERSECTION LOS** FOR EAPC (2017) CONDITIONS



Intersection Analysis for EAPC (2017) Conditions

Table 7-1

			E	xisting	(2015)			EAPC (20	17)		
			Del	ay²	Lev	el of	De	lay²	Leve	el of	Acceptable
		Traffic	(se	cs.)	Ser	vice	(se	cs.)	Ser	vice	LOS
#	Intersection	Control <sup>2</sup>	AM	PM	AM	PM	AM	PM	AM	PM	
1	Dwy. 1 / Oleander Av.	<u>CSS</u>	Fut	ure Inte	rsectio	n	0.0	0.0	Α	Α	С
2	Dwy. 2 / Oleander Av.	<u>CSS</u>	Fut	ure Inte	rsectio	on	8.4	8.5	Α	Α	С
3	Dwy. 3 / Oleander Av.	<u>CSS</u>	Fut	ure Inte	rsectio	on	8.4	8.6	Α	Α	С
4	Decker Rd. / Oleander Av.	<u>CSS</u>	Fut	ure Inte	rsectio	on	8.5	8.7	Α	Α	D
5	Dwy. 4 / Oleander Av.	<u>CSS</u>	Fut	ure Inte	rsectio	on	8.5	8.8	Α	Α	С
6	Dwy. 5 / Oleander Av.	<u>CSS</u>	Fut	ure Inte	rsectio	on	8.5	8.9	Α	Α	С
7	Dwy. 6 / Oleander Av.	CSS	8.9	0.0	Α	Α	10.2	9.5	В	Α	С
8	Harvill Av. / Harley Knox Bl.	TS	32.8	32.2	С	С	104.4	183.7	F	F	D
9	Harvill Av. / Oleander Av.	TS	6.5	4.6	Α	Α	10.1	13.1	В	В	D
10	I-215 SB Ramps / Harley Knox Bl.	TS	37.0	26.8	D	С	168.2	107.3	F	F	D
11	I-215 NB Ramps / Harley Knox Bl.	TS	13.6	22.2	В	С	36.8	179.8	D	F	D

<sup>\*</sup> **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).



Per the 2010 Highway Capacity Manual, 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.

<sup>&</sup>lt;sup>2</sup> CSS = Cross-street Stop; TS = Traffic Signal; <u>CSS</u> = Improvement

### 7.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

No study area intersections are anticipated to meet traffic signal warrants for EAPC traffic conditions (see Appendix 7.2).

### 7.5 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Harley Knox Boulevard 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 I-215 Freeway mainline. Queuing analysis findings are presented in Table 7-2 for EAPC 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 on Table 7-2, the following movement may potentially experience queuing issues during the weekday AM peak 95<sup>th</sup> percentile traffic flows for EAPC traffic conditions:

ID	Intersection Location
10	I-215 SB Ramps / Harley Knox Boulevard – Southbound shared left-through lane (AM peak hour only)

The 95<sup>th</sup> percentile queues for EAPC traffic conditions indicates potential queuing for the movement and peak hour identified above. As shown, the analysis indicates that potential queues would exceed the length of the off-ramp and could potentially spillback into the adjacent through lanes on the freeway mainline during the AM peak hour only. Worksheets for EAPC conditions off-ramp queuing analysis are provided in Appendix 7.3.

### 7.6 BASIC FREEWAY SEGMENT ANALYSIS

EAPC mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 7-3. As shown on Table 7-3, the freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours. EAPC basic freeway segment analysis worksheets are provided in Appendix 7.4.

### 7.7 Freeway Merge/Diverge Analysis

Ramp merge and diverge operations were also evaluated for EAPC conditions and the results of this analysis are presented in Table 7-4. As shown in Table 7-4, the freeway ramp merge and diverge areas are anticipated to operate at LOS D or better. EAPC freeway ramp junction operations analysis worksheets are provided in Appendix 7.5.



Table 7-2

Peak Hour Freeway Off-Ramp Queuing Summary for EAPC (2017) Conditions

		Available		<b>Existing (2015)</b>	2)			EAPC (2017)		
		Stacking	95th Perce	95th Percentile Queue			95th Perce	95th Percentile Queue		
		Distance	(Fe	(Feet) <sup>2</sup>	Accept	Acceptable? <sup>1</sup>	(Fe	(Feet)²	Accept	Acceptable? 1
Intersection	Movement	(Feet)	AM Peak	PM Peak	AM	Md	AM Peak	PM Peak	AM	PM
I-215 SB Off-Ramp / Harley Knox Bl.	SBL/T	1,330	383	339	Yes	Yes	1,910 ³	1,014 <sup>3</sup>	No	Yes
	SBR	270	44	09	Yes	Yes	102	145	Yes	Yes
I-215 NB Off-Ramp / Harley Knox Bl.	NBL/T	1,120	13	22	Yes	Yes	52	73	Yes	Yes
	NBR	265	47	52	Yes	Yes	246 ³	126	Yes	Yes

<sup>1</sup> 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.

 $<sup>^{\</sup>mathrm{2}}$  Maximum queue length for the approach reported.

<sup>&</sup>lt;sup>3</sup> 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

Basic Freeway Segment Analysis for EAPC (2017) Conditions

Table 7-3

	_				Existing (	(2015)			EAPC (2	017)	
Freeway	Direction	Mainline Segment	Lanes <sup>1</sup>	Den	sity <sup>2</sup>	LC	os	Den	sity <sup>2</sup>	LC	os
F	Dir			AM	PM	AM	PM	AM	PM	AM	PM
vay	SB	North of Harley Knox Boulevard	3	13.4	20.5	В	С	20.9	30.7	С	D
reeway	S	South of Harley Knox Boulevard	3	11.4	18.1	В	С	15.4	27.5	В	D
5 F	NB	North of Harley Knox Boulevard	3	22.0	17.1	С	В	31.9	25.9	D	С
1-21	Z	South of Harley Knox Boulevard	3	19.6	14.6	С	В	28.7	18.8	D	С

 $<sup>^{1}\,\</sup>mathrm{Number}$  of lanes are in the specified direction and is based on existing conditions.



<sup>&</sup>lt;sup>2</sup>Density is measured by passenger cars per mile per lane (pc/mi/ln).

Table 7-4

# Freeway Ramp Junction Merge/Diverge Analysis for EAPC (2017) Conditions

,	ι			Э	xisting	<b>Existing (2015)</b>			EAPC (2017)	(2017)	
sewa)	ectioi	Ramp or Segment	Lanes on	AM Peak Hour PM Peak Hour AM Peak Hour PM Peak Hour	Hour	PM Peak	Hour	AM Peak	Hour	PM Peak I	lour
ΉŦ	ηiα		riceway	Density <sup>2</sup>	ros	Density <sup>2</sup>	ros	Density <sup>2</sup>	ros	Density <sup>2</sup> LOS Density <sup>2</sup> LOS Density <sup>2</sup> LOS Density <sup>2</sup> LOS	ros
γeν	8	Off-Ramp at Harley Knox Boulevard	8	20.2	С	20.2 C 27.5 C 29.2 D	С	29.2	D	34.7	D
reev	S	On-Ramp at Harley Knox Boulevard	8	15.1	В	21.5	С	C 19.3	В	30.0	D
T2 E	18	On-Ramp at Harley Knox Boulevard	8	25.8	С	25.8 C 21.9 C 33.2	С		D	31.3	D
.Z-I	V	Off-Ramp at Harley Knox Boulevard	8	25.1	С	20.0	В	32.0	D	D 24.5	С

 $^1\text{Number of lanes}$  are in the specified direction and is based on existing conditions.  $^2\text{Density}$  is measured by passenger cars per mile per lane (pc/mi/ln).

HARLEY KNOX BL. OLEANDER AV. HARVILL AV.

EXHIBIT 7-3: EAPC (2017) FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)



← 100/100 - AM/PM PEAK HOUR VOLUMES





## 7.8 EAPC DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

#### 7.8.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient in an effort to reduce each location's peak hour delay and improve the associated LOS grade to an acceptable LOS (LOS D or better). The effectiveness of the recommended improvement strategies discussed below to address EAPC traffic deficiencies is presented in Table 7-5.

The 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 TUMF or County of Riverside DIF fees (if the improvements are included in the TUMF or DIF programs) or on a fair share basis (if the improvements are not included in the TUMF or DIF programs). These fees shall be collected by the County 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.

Worksheets for EAPC conditions, with improvements, HCM calculation worksheets are provided in Appendix 7.6.

### 7.8.2 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

With the implementation of the recommended intersection improvements shown on Table 7-5, which are necessary to reduce near-term cumulative impacts to less than significant levels, there are no potential queuing issues anticipated for EAPC traffic conditions (see Table 7-6). As such, no spill-back onto the I-215 Freeway Southbound mainline is anticipated. Worksheets for EAPC conditions, with improvements, queuing analysis is provided in Appendix 7.7.



Table 7-5

## Intersection Analysis for EAPC (2017) Conditions With Improvements

					ı	nter	section	on Ap	pro	ach L	anes	1			Del	ay²	Leve	el of
		Traffic	Nor	thbo	und	Sou	thbo	und	Eas	tbou	ınd	We	stbo	und	(se	cs.)	Ser	vice
#	Intersection	Control <sup>3</sup>	L	Т	R	L	Т	R	L	Т	R	L	Т	R	AM	PM	AM	PM
8	Harvill Av. / Harley Knox Bl.																	
	- Without Improvements	TS	1	1	2	1	2	0	2	2	1	2	2	1	104.4	183.7	F	F
	- With Improvements	TS	1	1	<u>2&gt;</u>	1	2	0	2	2	1	2	2	1	30.4	25.4	С	С
10	I-215 SB Ramps / Harley Knox Bl.																	
	- Without Improvements	TS	0	0	0	0	1	1	0	2	d	1	2	0	168.2	107.3	F	F
	- With Improvements	TS	0	0	0	<u>1</u>	1	<u>0</u>	0	2	d	<u>2</u>	2	0	36.8	45.7	D	D
11	I-215 NB Ramps / Harley Knox Bl.																	
	- Without Improvements	TS	0	1	1	0	0	0	1	2	0	0	2	d	36.8	179.8	D	F
	- With Improvements	TS	0	1	1	0	0	0	<u>2</u>	2	0	0	2	1>>	13.8	30.4	В	С

<sup>\*</sup> **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).



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; >> = Free Right Turn Lane; d = Defacto Right Turn Lane; <u>1</u> = Improvement

Per the 2010 Highway Capacity Manual, 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.

<sup>3</sup> TS = Traffic Signal

Peak Hour Freeway Off-Ramp Queuing Summary for EAPC (2017) Conditions With Improvements

		Available	EAPC (201	EAPC (2017) Without Improvements	proveme	ents	EAPC (20	EAPC (2017) With Improvements	roveme	ıts
		Stacking	95th Percer	95th Percentile Queue			95th Percentile Queue	itile Queue		
		Distance	(Feet)	et)²	Acceptable? 1	able? 1	(Feet)	et)²	Accept	Acceptable? 1
Intersection	Movement	(Feet)	AM Peak	РМ Реак	AM	PM	AM Peak	PM Peak	AM	PM
I-215 SB Off-Ramp / Harley Knox Bl.	L/TBS	1,330	1,910 ³	1,014 <sup>3</sup>	ON	Yes	845 3	299	Yes	Yes
	SBR	270	102	145	Yes	Yes	708	445	Yes⁴	Yes <sup>4</sup>
I-215 NB Off-Ramp / Harley Knox Bl.	NBL/T NBR	1,120 265	52 246 ³	73 126	Yes Yes	Yes	52 246 ³	65	Yes Yes	Yes

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.



 $<sup>^{\</sup>rm 2}$  Maximum queue length for the approach reported.

<sup>&</sup>lt;sup>3</sup> 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

<sup>4</sup> Adjacent left turn lane has sufficient storage to accommodate any spillover from the southbound shared through-right turn lane without spilling back and affecting the I-215 Freeway mainline.

# **8 HORIZON YEAR (2035) TRAFFIC CONDITIONS**

This section discusses the methods used to develop Horizon Year (2035) Without and With Project traffic forecasts, and the resulting intersection operations, traffic signal warrant, and freeway mainline operations analyses.

#### 8.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year 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 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 conditions only (e.g.,
  intersection and roadway improvements along the cumulative development's frontages and
  driveways).
- The extension of Decker Road to the north of Oleander Avenue.
- Other parallel facilities, that although not evaluated for the purposes of this analysis, are anticipated to be in place for Horizon Year traffic conditions and would affect the travel patterns within the study area (e.g., Nandina Avenue, Markham Street, Day Street, etc.).

# 8.2 Horizon Year (2035) Without Project Traffic Volume Forecasts

This scenario includes the refined post-processed volumes obtained from the RivTAM. For additional information on the development of the Horizon Year Without Project traffic forecasts, see Section 4.8 *Horizon Year (2035) Volume Development* of this TIA. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year Without Project traffic conditions are shown on Exhibit 8-1.

# 8.3 HORIZON YEAR (2035) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-processed volumes obtained from the RivTAM, plus Project traffic. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year With Project traffic conditions are shown on Exhibit 8-2.



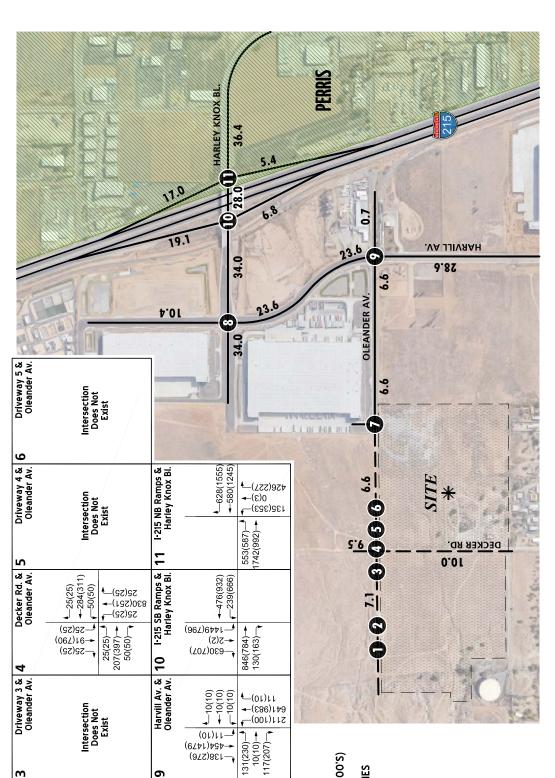


EXHIBIT 8-1: HORIZON YEAR (2035) WITHOUT PROJECT TRAFFIC VOLUMES

Driveway 2 & Oleander Av.

Driveway 1 & Oleander Av.

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

LEGEND:

6

Harvill Av. & Harley Knox Bl.

 $\infty$ 

Driveway 6 & Oleander Av.

Intersection Does Not Exist

Intersection Does Not Exist

←49(406) ←499(572) ←558(661)

~12(128) ~12(128)

**↓**\_0(0) **→**359(386)

(0)0 (0)0

(842)71 ←(841)8 ←(867)817

4(497)— 201(143)— 11(740)—

0(0) 257(447)

EXHIBIT 8-2: HORIZON YEAR (2035) WITH PROJECT TRAFFIC VOLUMES

Oleander Av.	-442(431) -21(9)		₽.01	0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 1	26.5	28.9  PERRIS  28.9  PERRIS  28.9  PERRIS  21.0
Driveway 4 & 6 Driveway 5 & Oleander Av.	-426(421) -16(10)	294(547) (00) (00) (00) (00)	Ramps & Knox BI.	-628(1555) -594(1252)	0(3)→ 426(227)→	8.0 8.0 8.0 9. WMG
2		287(525) + (00)	nps & 11 I-215 NB Ramps & Harley Knox BI.		587(679) 4 1748(1007) 4 168(365)	10.0 DWY. 3 — 9.5 9.5 9.4 9.5 9.5 9.4 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5
A Decker Rd. & Oleander Av.	25(25) -25(25) -25(25) -351(346) -50(50)	25(25) — 237(475) — 237(475) — 26(26) —	k 10 I-215 SB Ramps & Harley Knox BI.	(847)707 - 202) - 1449(796)	886(891) <del></del> 142(194) <del></del>	2.0 - 1 YWd
3 Driveway 3 & Oleander Av.	+-378(383) +-23(13)	302(522) + 0(0) 0(0) 100(28)	9 Harvill Av. & Oleander Av.	255(338) 454(1479) 11(10) 11(10) 11(10)	183(369) + + + + + + + + + + + + + + + + + + +	(S)
2 Driveway 2 & Oleander Av.	◆-350(371) ←-28(12)	289(494) → 0(0) → 0(0) → 12(28)	Harvill Av. & Harvill Av. & Harley Knox Bl.	7. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2.	4(497) 4 201(143) 4 (2449) 1 11(740) 7 (2449) 7 6(14932) 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	EHICLES F M(PM) PE.
1 Driveway 1 ର Oleander Av.	<del>-334(361)</del>	282(472) + 0(0) 0 0(0) 7 (0) 7 (0) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	7 Driveway 6 & Oleander Av.	0(0) 0(0) 0(0) 0(0) 0(0) 0(0) 0(0) 0(0)	304(568) + (0) 0 (0	LEGEND: 10.0 = V 10(10) = A

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## 8.4 Intersection Operations Analysis

#### 8.4.1 Horizon Year Without Project Traffic Conditions

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year Without Project conditions with roadway and intersection geometrics consistent with Section 8.1 *Roadway Improvements*. As shown in Table 8-1, the study area intersections are anticipated to operate at acceptable levels of service, with the exception of the following locations:

ID	Intersection Location
4	Decker Road / Oleander Avenue – LOS F AM and PM peak hours
8	Harvill Avenue / Harley Knox Boulevard – LOS F PM peak hour only
10	I-215 Southbound Ramps / Harley Knox Boulevard – LOS F AM and PM peak hours
11	I-215 Northbound Ramps / Harley Knox Boulevard – LOS E AM peak hour; LOS F PM peak hour

A summary of the peak hour intersection LOS for Horizon Year Without Project conditions are shown on Exhibit 8-3. The intersection operations analysis worksheets for Horizon Year Without Project traffic conditions are included in Appendix 8.1 of this TIA.

#### 8.4.2 Horizon Year With Project Traffic Conditions

As shown on Table 8-1 and illustrated on Exhibit 8-4, 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 Without Project conditions. However, the Project's contribution to the deficient intersections identified above are significant cumulative impacts as the Project is anticipated to contribute 50 or more peak hour trips. The intersection operations analysis worksheets for Horiozn Year With Project traffic conditions are included in Appendix 8.2 of this TIA. Measures to address long range deficiencies for Long Range traffic conditions are discussed in Section 8.9 Horiozn Year Deficiencies and Recommended Improvements.

#### 8.5 Traffic Signal Warrants Analysis

The following study area intersection is anticipated to warrant a traffic signal for Horizon Year Without Project traffic conditions (see Appendix 8.3):

ID	Intersection Location
4	Decker Road / Oleander Avenue

There are no additional intersections anticipated to warrant a traffic signal under Horizon Year With Project traffic conditions, in addition to those identified under Horizon Year Without Project conditions (see Appendix 8.4).



Intersection Analysis for Horizon Year (2035) Conditions

Table 8-1

			203	5 Withou	t Proje	ct	20	35 With I	Project		
			De	lay²	Leve	el of	De	lay²	Lev	el of	Acceptable
		Traffic	(se	cs.)	Ser	vice	(se	cs.)	Ser	vice	LOS
#	Intersection	Control <sup>3</sup>	AM	PM	AM	PM	AM	PM	AM	PM	
1	Dwy. 1 / Oleander Av.	<u>CSS</u>	Fut	ture Inter	sectior	1	9.9	11.7	Α	В	С
2	Dwy. 2 / Oleander Av.	<u>CSS</u>	Fut	ture Inter	sectior	1	10.0	12.0	В	В	С
3	Dwy. 3 / Oleander Av.	<u>CSS</u>	Fut	ture Inter	section	1	10.1	12.2	В	В	С
4	Decker Rd. / Oleander Av.	<u>CSS</u>	>100.0	>100.0	F	F	>100.0	>100.0	F	F	D
5	Dwy. 4 / Oleander Av.	<u>CSS</u>	Fut	sectior	1	10.0	12.2	В	В	С	
6	Dwy. 5 / Oleander Av.	<u>CSS</u>	Fut	ture Inter	rsection		10.0	12.4	В	В	С
7	Dwy. 6 / Oleander Av.	CSS	0.0	0.0	A A		11.1	16.6	В	С	С
8	Harvill Av. / Harley Knox Bl.	TS	22.7	177.4	С	F	113.6	181.9	F	F	D
9	Harvill Av. / Oleander Av.	TS	24.9	25.9	С	С	29.8	41.4	С	D	D
10	I-215 SB Ramps / Harley Knox Bl.	TS	140.0	119.4	F	F	156.4	139.1	F	F	D
11	I-215 NB Ramps / Harley Knox Bl.	TS	60.8	>200.0	E	F	67.5	>200.0	E	F	D

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

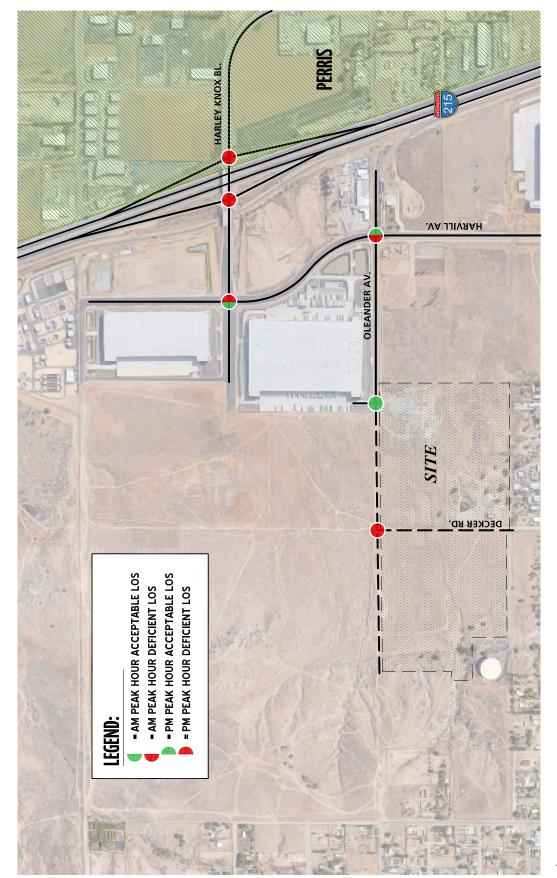


<sup>&</sup>lt;sup>2</sup> Per the 2010 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

<sup>&</sup>lt;sup>3</sup> CSS = Cross-street Stop; TS = Traffic Signal; <u>CSS</u> = Improvement

URBAN CROSSROADS

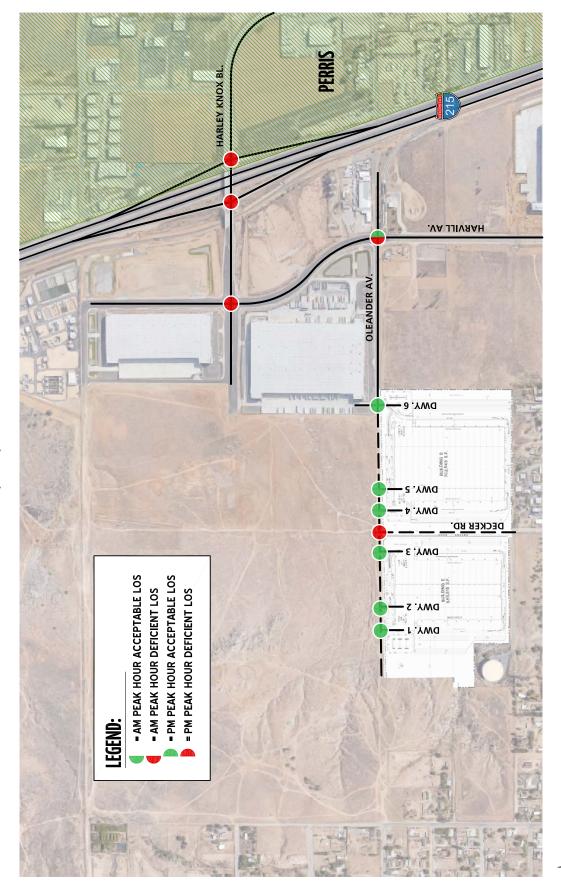
EXHIBIT 8-3: SUMMARY OF PEAK HOUR INTERSECTION LOS FOR HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS



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URBAN CROSSROADS

EXHIBIT 8-4: SUMMARY OF PEAK HOUR INTERSECTION LOS FOR HORIZON YEAR (2035) WITH PROJECT CONDITIONS



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# 8.6 OFF-RAMP QUEUING ANALYSIS

#### 8.6.1 Horizon Year Without Project Traffic Conditions

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Harley Knox Boulevard 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 I-215 Freeway mainline. Queuing analysis findings are presented in Table 8-2 for Horizon Year Without and With Project 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 on Table 8-2, the following movements may potentially experience queuing issues during the weekday AM or weekday PM peak 95<sup>th</sup> percentile traffic flows for Horizon Year Without Project traffic conditions:

ID	Intersection Location
10	I-215 SB Ramps / Harley Knox Boulevard – Southbound shared left-through lane (AM peak hour only)
11	I-215 NB Ramps / Harley Knox Boulevard – Southbound right turn lane (AM and PM peak hours)

The 95<sup>th</sup> percentile queues for Horizon Year Without Project traffic conditions indicates potential queuing for the movements and peak hours identified above. As shown, the analysis indicates that potential queues would exceed the length of the off-ramp and could potentially spillback into the adjacent through lanes on the freeway mainline during the AM and PM peak hours. Worksheets for Horizon Year Without Project conditions off-ramp queuing analysis are provided in Appendix 8.5.

#### 8.6.2 Horizon Year With Project Traffic Conditions

As shown on Table 8-2, there are no additional off-ramps anticipated to experience queues that exceed the 95<sup>th</sup> percentile with the addition of Project traffic, in addition to those previously identified under Horizon Year Without Project conditions. However, the Project's contribution to the potential queuing issues at the locations identified above are significant cumulative impacts as the Project is anticipated to contribute 50 or more peak hour trips. Worksheets for Horiozn Year With Project conditions off-ramp queuing analysis are provided in Appendix 8.6.

## 8.7 BASIC FREEWAY SEGMENT ANALYSIS

# 8.7.1 HORIZON YEAR WITHOUT PROJECT TRAFFIC CONDITIONS

Horizon Year Without Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 8-5. As shown on Table 8-3, all of the freeway segments analyzed for this study are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours. Horizon Year Without Project basic freeway segment analysis worksheets are provided in Appendix 8.7.



Table 8-2

Peak Hour Freeway Off-Ramp Queuing Summary for Horizon Year (2035) Conditions

		Available	:07	2035 Without Project	oject		2	2035 With Project	ject	
		Stacking	95th Percer	95th Percentile Queue			95th Percer	95th Percentile Queue		
		Distance	(Fe	(Feet) <sup>2</sup>	Acceptable? 1	able? 1	(Fe	(Feet)²	Acceptable? <sup>1</sup>	able? <sup>1</sup>
Intersection	Movement	(Feet)	AM Peak	PM Peak	MA	PM	AM Peak	PM Peak	AM	PM
I-215 SB Off-Ramp / Harley Knox Bl.	L/18S	1,330	1,903 ³	1,020 <sup>3</sup>	oN	Yes	1,903 <sup>3</sup>	1,020 <sup>3</sup>	No	Yes
	SBR	270	361	771 3	N <sub>o</sub>	No	464	852 <sup>3</sup>	N <sub>o</sub>	8
I-215 NB Off-Ramp / Harley Knox Bl.	NBL/T NBR	1,120 265	151 481 ³	640 <sup>3</sup> 146	Yes Yes <sup>4</sup>	Yes	146 414 ³	668 <sup>3</sup> 150	Yes Yes <sup>4</sup>	Yes

**BOLD** = 95th percentile queue is anticipated to exceed available storage.

<sup>1</sup> 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.

 $^{\rm 2}$  Maximum queue length for the approach reported.

<sup>3</sup> 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

4 Adjacent through lane has sufficient storage to accommodate any spillover from the northbound right turn lane without spilling back and affecting the I-215 Freeway mainline.



Basic Freeway Segment Analysis for Horizon Year (2035) Conditions

Table 8-3

	_			203	35 Withou	ut Proje	ct	2	035 With	Project	
Freeway	Direction	Mainline Segment	Lanes <sup>1</sup>	Den	sity <sup>2</sup>	LC	os	Den	sity <sup>2</sup>	LC	os
포	Σi			AM	PM	AM	PM	AM	PM	AM	PM
/ay	SB	North of Harley Knox Boulevard	3	53.5	51.5	F	F	54.5	52.0	F	F
reeway	S	South of Harley Knox Boulevard	3	29.7	41.2	D	E	29.8	41.5	D	E
5 F	В	North of Harley Knox Boulevard	3	51.4	53.7	F	F	51.8	55.0	F	F
1-21	Z	South of Harley Knox Boulevard	3	41.5	30.8	E	D	41.8	31.2	E	D

**BOLD** = Unacceptable Level of Service



<sup>&</sup>lt;sup>1</sup>Number of lanes are in the specified direction and is based on existing conditions.

 $<sup>^{\</sup>rm 2}$  Density is measured by passenger cars per mile per lane (pc/mi/ln).

EXHIBIT 8-5: HORIZON YEAR (2035) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)





← 100/100 - AM/PM PEAK HOUR VOLUMES





#### 8.7.2 HORIZON YEAR WITH PROJECT TRAFFIC CONDITIONS

Horizon Year With Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 8-6. As shown on Table 8-3, there are no additional freeway segments anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under Horizon Year Without Project conditions. However, the Project's contribution to the deficient basic freeway segments identified above are significant cumulative impacts as the Project is anticipated to contribute 50 or more peak hour trips. Worksheets for Horizon Year With Project conditions basic freeway segment analysis worksheets are provided in Appendix 8.8.

# 8.8 Freeway Merge/Diverge Analysis

# 8.8.1 Horizon Year (2035) Without Project Traffic Conditions

Ramp merge and diverge operations were also evaluated for Horizon Year Without Project conditions and the results of this analysis are presented in Table 8-4. As shown in Table 8-4, all of the study area freeway merge and diverge ramp junctions are anticipated to operate at deficient LOS (i.e., LOS E or worse). Horizon Year Without Project freeway ramp junction operations analysis worksheets are provided in Appendix 8.9.

# 8.8.2 Horizon Year (2035) With Project Traffic Conditions

As shown on Table 8-4, there are no additional freeway merge/diverge ramp junctions anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under Horizon Year Without Project conditions. However, the Project's contribution to the deficient freeway merge/diverge ramp junctions identified previously are significant cumulative impacts as the Project is anticipated to contribute 50 or more peak hour trips. Worksheets for Horizon Year With Project conditions freeway ramp junction operations analysis worksheets are provided in Appendix 8.10.

# 8.9 HORIZON YEAR DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

#### 8.9.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient in an effort to reduce each location's peak hour delay and improve the associated LOS grade to an acceptable LOS (LOS D or better). The effectiveness of the recommended improvement strategies discussed below to address Horizon Year traffic deficiencies is presented in Table 8-5.

The 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 TUMF and County of Riverside DIF fees (if the improvements are included in the TUMF or DIF programs) or on a fair share basis (if the improvements are not included in the TUMF or DIF programs). These fees shall be collected by the County of Riverside, with the proceeds solely used as part



EXHIBIT 8-6: HORIZON YEAR (2035) WITH PROJECT FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)





← 100/100 - AM/PM PEAK HOUR VOLUMES





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Table 8-4

Freeway Ramp Junction Merge/Diverge Analysis for Horizon Year (2035) Conditions

AM Peak Hour         PM Peak Hour         AM Peak Hour         PM Peak Hour         PM Peak Hour         PM Peak Hour           Density²         LOS         Density²         LOS         Density²         LOS         Density²         LOS         P         45.0         F         F         45.0         F         F         45.0         F         F         45.0         F         F         44.0         F         45.0         F         F         44.0         F         45.0         F         45.0         F         45.0	2035 Without Project
S Density <sup>2</sup> LOS Density <sup>3</sup> LOS Density <sup>3</sup> LOS density <sup>4</sup> LOS density <sup>5</sup> LOS density <sup>6</sup> LOS density <sup>7</sup> LOS dens	Segment Lanes on AM Peak Hou
F       46.2       F         E       31.4       D         F       41.8       F         D       38.3       E	
	snox Boulevard 3 45.7
F	nox Boulevard 3 31.4
Е	nox Boulevard 3 <b>41.6</b>
	cnox Boulevard 3 38.1

**BOLD** = Unacceptable Level of Service

 $^{1}\mathrm{Number}$  of lanes are in the specified direction and is based on existing conditions.

 $^{\rm 2}\,{\rm Density}$  is measured by passenger cars per mile per lane (pc/mi/ln).

Table 8-5

Intersection Analysis for Horizon Year (2035) Conditions With Improvements

						Inte	rsecti	on A	pproa	ch La	nes <sup>1</sup>				Del	lay <sup>2</sup>	Lev	el of
		Traffic	Nor	thbo	und	Sou	thbo	und	Eas	stbou	ınd	We	stbo	und	(se	cs.)	Ser	vice
#	Intersection	Control <sup>3</sup>	٦	Т	R	٦	Т	R	L	Т	R	L	Т	R	AM	PM	AM	PM
4	Decker Rd. / Oleander Av.																	
	- Without Project	<u>TS</u>	0	<u>1</u>	0	0	<u>1</u>	0	<u>1</u>	<u>1</u>	0	<u>1</u>	<u>1</u>	0	26.3	35.6	С	D
	- With Project	<u>TS</u>	0	<u>1</u>	0	0	<u>1</u>	0	<u>1</u>	<u>1</u>	0	<u>1</u>	<u>1</u>	0	31.1	48.4	С	D
8	Harvill Av. / Harley Knox Bl.																	
	- Without Project	TS	1	1	<u>2&gt;</u>	1	2	0	2	2	<u>1&gt;</u>	2	2	1	22.0	45.0	С	D
	- With Project	TS	1	1	<u>2&gt;</u>	1	2	0	2	2	<u>1&gt;</u>	2	2	1	28.8	50.8	С	D
10	I-215 SB Ramps / Harley Knox Bl.																	
	- Without Project	TS	0	0	0	<u>2</u>	1	<u>o</u>	0	2	d	<u>2</u>	2	0	32.5	42.6	С	D
	- With Project	TS	0	0	0	<u>2</u>	1	<u>0</u>	0	2	d	<u>2</u>	2	0	34.7	43.8	С	D
11	I-215 NB Ramps / Harley Knox Bl.																	
	- Without Project	TS	0	1	1	0	0	0	<u>2</u>	2	0	0	2	<u>1&gt;&gt;</u>	17.6	28.2	В	С
	- With Project	TS	0	1	1	0	0	0	<u>2</u>	2	0	0	2	<u>1&gt;&gt;</u>	21.7	38.6	С	D

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; >> = Free Right Turn Lane; d = Defacto Right Turn Lane; <u>1</u> = Improvement

Per the 2010 Highway Capacity Manual, 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.

<sup>3</sup> TS = Traffic Signal

of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases. There are no other applicable pre-existing funding programs for the study area aside from TUMF and DIF.

Worksheets for Horizon Year Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 8.11 and Appendix 8.12.

## 8.9.2 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

The 95<sup>th</sup> percentile queues for Horizon Year Without and With Project traffic conditions, with improvements, are shown on Table 8-6. Table 8-6 indicates there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95<sup>th</sup> percentile traffic flows for Horizon Year traffic conditions, with the improvements identified previously in Table 8-5. Worksheets for Horizon Year Without and With Project conditions off-ramp queuing analysis, with improvements, are provided in Appendix 8.13 and Appendix 8.14.

#### 8.9.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

The Project Study Report/Project Development Support in Riverside County on I-215 and SR-60 between Nuevo Road (I-215) & I-215/SR-60 Junction and Box Springs Road (I-215) & Day Street (SR-60) (prepared by Caltrans in April 2008), also known as the I-215 North Project, includes the construction of an high-occupancy vehicle lane in each direction of the I-215 Freeway between Nuevo Road and Box Springs Road within the existing median. Based on information provided on the Project website, these improvements are longer range as priority has been given to the I-215 South and I-215 Central projects. (12)

Caltrans typically assumes a reduction of fourteen (14) percent to the I-215 Freeway mainline through volumes in this region to account for vehicles utilizing the carpool (high-occupancy vehicle) lanes. Although the reduction to I-215 Freeway mainline volumes has been applied to account for the proposed carpool lanes, the analysis is performed assuming the same number of mixed-flow lanes and on and off-ramp configurations as existing baseline conditions.

As shown on Table 8-7, all of the freeway mainline segments are anticipated to operate at an acceptable LOS with the construction of a carpool lane in both directions of travel (i.e., LOS D or better), with the exception of the following:

ID	Freeway Mainline Segments
1	I-215 Freeway – Southbound, North of Harley Knox Boulevard – LOS E AM and PM peak hours
3	I-215 Freeway – Northbound, North of Harley Knox Boulevard – LOS E AM and PM peak hours

Similarly, Table 8-8 shows that the I-215 Freeway ramp junctions are anticipated to operate at an acceptable LOS with the improvements discussed above (i.e., LOS D or better), with the exception of the following freeway ramp junctions:

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Off-Ramp at Harley Knox Boulevard – LOS F AM peak hour; LOS E PM peak hour
3	I-215 Freeway – Northbound, On-Ramp at Harley Knox Boulevard – LOS E AM and PM peak hours



Peak Hour Freeway Off-Ramp Queuing Summary for Horizon Year (2035) Conditions With Improvements

		Available	2035 Withou	2035 Without Project With Improvements	h Improv	ements	2035 With	2035 With Project With Improvements	Improver	nents
		Stacking	95th Percentile Queue	ntile Queue			95th Percentile Queue	ntile Queue		
		Distance	(Feet) <sup>2</sup>	et) <sup>2</sup>	Acceptable? 1	able? 1	(Feet) <sup>2</sup>	et)²	Accept	Acceptable? 1
Intersection	Movement	(Feet)	AM Peak	PM Peak	MA	PM	AM Peak	PM Peak	MA	PM
I-215 SB Off-Ramp / Harley Knox Bl.	T/J8S	1,330	511	317	Yes	Yes	809	317	Yes	Yes
	SBR	270	363	775 3	Yes <sup>4</sup>	Yes <sup>4</sup>	504	857 3	Yes <sup>4</sup>	Yes <sup>4</sup>
I-215 NB Off-Ramp / Harley Knox Bl.	NBL/T NBR	1,120 265	151 481 ³	449 <sup>3</sup> 162	Yes Yes <sup>5</sup>	Yes	134 321 <sup>3</sup>	476 <sup>3</sup> 166	Yes Yes <sup>5</sup>	Yes

**BOLD** = 95th percentile queue is anticipated to exceed available storage.

<sup>1</sup> 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.

 $^{2}\,$  Maximum queue length for the approach reported.

 $^3$  95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

4 Adjacent left turn lane has sufficient storage to accommodate any spillover from the southbound shared through-right turn lane without spilling back and affecting the I-215 Freeway mainline.

<sup>5</sup> Adjacent through lane has sufficient storage to accommodate any spillover from the northbound right turn lane without spilling back and affecting the I-215 Freeway mainline.



Table 8-7

# Basic Freeway Segment Analysis for Horizon Year (2035) Conditions With Improvements

	_			203	35 Withou	ut Proje	ct	2	035 With	Project	
Freeway	Direction	Mainline Segment	Lanes <sup>1</sup>	Den	sity <sup>2</sup>	LC	os	Den	sity <sup>2</sup>	LC	os
표	Diı			AM	PM	AM	PM	AM	PM	AM	PM
νау	SB	North of Harley Knox Boulevard	3	38.1	37.4	E	E	39.0	37.7	E	E
reeway	S	South of Harley Knox Boulevard	3	22.8	30.9	С	D	22.9	31.1	С	D
5 F	IB	North of Harley Knox Boulevard	3	37.4	38.6	E	Е	37.6	39.2	E	E
1-21	<u> </u>	South of Harley Knox Boulevard	3	31.2	23.6	D	С	31.3	23.7	D	С

**BOLD** = Unacceptable Level of Service



<sup>&</sup>lt;sup>1</sup>Number of lanes are in the specified direction and is based on existing conditions.

 $<sup>^{\</sup>rm 2}$  Density is measured by passenger cars per mile per lane (pc/mi/ln).

Table 8-8

Freeway Ramp Junction Merge/Diverge Analysis for Horizon Year (2035) Conditions With Improvements

	ι			2035	Witho	2035 Without Project		203	35 Wit	2035 With Project	
	oitoe	Ramp or Segment	Lanes on	AM Peak Hour  PM Peak Hour  PM Peak Hour  PM Peak Hour	Hour	PM Peak	Hour	AM Peak	Hour	PM Peak	Hour
	nia		riceway	Density <sup>2</sup>	ros	Density <sup>2</sup>	ros	Density <sup>2</sup> LOS Density <sup>2</sup> LOS Density <sup>2</sup> LOS Density <sup>2</sup> LOS	ros	Density <sup>2</sup>	ros
	В	Off-Ramp at Harley Knox Boulevard	3	40.9	F	39.0	Ε	E 41.4	F	39.2	E
	S	On-Ramp at Harley Knox Boulevard	3	26.6	С	33.6 D	D	26.6	С	C 33.8	D
l	81	On-Ramp at Harley Knox Boulevard	3	37.3	Ε	40.9	E	37.4	Ε	41.4	E
	N	Off-Ramp at Harley Knox Boulevard	3	33.8	D	29.2	D	D 29.2 D 33.9 D 29.3	D	29.3	D
ľ											

**BOLD** = Unacceptable Level of Service

 $^{\mathrm{1}}$  Number of lanes are in the specified direction and is based on existing conditions.

<sup>2</sup> Density is measured by passenger cars per mile per lane (pc/mi/ln).

Worksheets for Horizon Year Without and With Project conditions freeway mainline level of service analysis, with improvements, are provided in Appendix 8.15 and Appendix 8.16. Horizon Year Without and With Project freeway ramp junction level of service analysis worksheets, with improvements, are provided in Appendix 8.17 and Appendix 8.18.



# 9 REFERENCES

- 1. **Riverside County Transportation Department.** *Traffic Impact Analysis Preparation Guide.* County of Riverside: s.n., April 2008.
- 2. California Department of Transportation. Guide for the Preparation of Traffic Impact Studies.

  December 2002.
- 3. Institute of Transportation Engineers. *Trip Generation*. 9th Edition. 2012.
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- 5. Southern California Association of Governments. 2012 Regional Transportation Plan. April 2012.
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- 7. **Federal Highway Administration.** Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD)*. 2014.
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- 9. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino*: s.n., Updated December 2007.
- 10. **South Coast Air Quality Managment District.** *Warehouse Truck Trip Study.* [Powerpoint Presentation] July 17, 2014.
- 11. **South Coast Air Quality Managment District (SCAQMD).** *Warehouse Truck Trip Study Data Results and Usage.* June 2014.
- 12. **Riverside County Transportation Commission (RCTC).** RCTC: I-215 North Project. *RCTC*. [Online] [Cited: May 22, 2015.] http://www.rctc.org/projects/interstate-215/i-215-north-project.



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# **10 CERTIFICATION**

The contents of this traffic impact analysis represent an accurate depiction of the traffic environment and impacts associated with the proposed Knox Business Park development. The information contained in this traffic impact analysis is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5978.

# **ARIC EVATT, PTP**

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#### **EDUCATION**

Bachelor of Science - Finance, Real Estate, and Law California Polytechnic State University, Pomona • 1992

#### **PROFESSIONAL REGISTRATIONS**

PTP – Professional Transportation Planner • 2008 – Present **Professional Affiliations** 

ITE – Institute of Transportation Engineers

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Senior Transportation Engineer URBAN CROSSROADS, INC. 41 Corporate Park, Suite 300 Irvine, CA 92606 (949) 336-5982 cso@urbanxroads.com

### **EDUCATION**

Bachelor of Science – Civil Engineering University of California, Irvine • 2004

#### **PROFESSIONAL REGISTRATIONS**

TE – Professional Traffic Engineer, TR 2414 • 2006 – Present **Professional Affiliations** 

ITE – Institute of Transportation Engineers



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# APPENDIX 1.1:

**APPROVED TRAFFIC STUDY SCOPING AGREEMENT** 



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April 6, 2015

Mr. Kevin Tsang COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT 4080 Lemon Street, 8<sup>th</sup> Floor Riverside, CA 92501

# SUBJECT: TRAFFIC IMPACT ANALYSIS SCOPING AGREEMENT FOR THE KNOX LOGISTICS CENTER PHASE II

Dear Mr. Kevin Tsang:

The firm of Urban Crossroads, Inc. is pleased to submit this scoping letter regarding the traffic impact analysis for the proposed Knox Logistics Center Phase II ("Project"), which is generally located east and west of Decker Road and south of Oleander Avenue in unincorporated County of Riverside. It is our understanding that the Project is to consist of up to 1,234,160 square feet (sf) of high-cube warehouse/distribution center divided over two buildings: Building D (692,990 SF) and Building E (541,170 SF).

A site plan for the proposed Project is shown on Exhibit 1. Exhibit 2 depicts the location of the proposed Project in relation to the existing roadway network and the study area intersections. It is anticipated that the Project would be developed within a single phase. The Project's opening year is anticipated to be 2017 (i.e., fully built and occupied). Access to the Project site will be provided via the following five driveways:

- Driveway 1 to Oleander Avenue is a full access driveway for trucks only.
- Driveway 2 to Oleander Avenue is a full access driveway for passenger cars only.
- Driveway 3 to Oleander Avenue is a full access driveway for both trucks and passenger cars.
- Driveway 4 to Oleander Avenue is a full access driveway for trucks only.
- Driveway 5 to Oleander Avenue is a full access driveway for both trucks and passenger cars.

# **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. Trip generation rates for the Project are shown in Table 1. The trip generation summary illustrating daily and peak hour trip generation estimates for the proposed Project by buildings are shown on Table 2 in passenger car equivalent (PCE) and on Table 3 for actual vehicles.

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, 9th Edition, 2012. For

Mr. Kevin Tsang
COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT
April 6, 2015
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purposes of this analysis, ITE land use code 152 (High-Cube Warehousing) has been used to derive site specific trip generation estimates. As noted on Table 1, refinements to the raw trip generation estimates have been made to provide a more detailed breakdown of trips by vehicle mix. Total vehicle mix percentages were also obtained from the ITE *Trip Generation* manual in conjunction with the South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type. Finally, PCE factors were applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The PCE factors are consistent with the recommended PCE factors in Appendix "C" of the San Bernardino County Congestion Management Program (CMP), 2005 Update. Trip generation rates with PCE factors are also shown on Table 1.

As shown on Table 2, the proposed Project is anticipated to generate a net total of 3,253 PCE trip-ends per day with 191 PCE AM peak hour trips and 222 PCE PM peak hour trips. In comparison, as shown on Table 3, the proposed Project is anticipated to generate a net total of 2,073 actual trip-ends per day with 136 actual AM peak hour trips and 148 actual 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 pattern of passenger cars is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. The trip distribution pattern for truck traffic is also influenced by the local truck routes approved by the County of Riverside, the City of Perris, and the California Department of Transportation (Caltrans). Given these differences, separate trip distributions were generated for both passenger cars and truck trips.

The Project passenger car trip distribution pattern is graphically depicted on Exhibit 3. The Project truck trip distribution pattern is graphically depicted on Exhibit 4.

# **ANALYSIS SCENARIOS**

Consistent with the County's TIA guidelines, intersection analysis will be provided for the following analysis scenarios:

- Existing (2015) Conditions
- Existing plus Project Conditions
- Existing plus Ambient Growth plus Project (E+A+P) Conditions
- Existing plus Ambient Growth plus Project Plus Cumulative (E+A+P+C) Conditions



Mr. Kevin Tsang
COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT
April 6, 2015
Page 3 of 4

- Horizon Year (2035) without Project Conditions
- Horizon Year (2035) with Project Conditions

All study area intersections will be analyzed using the SYNCHRO (Version 8.0) software using the HCM 2010 methodology.

In addition, the traffic impact analysis will include Basic Freeway Segment, Ramp Junction (Merge/Diverge), and off-ramp queuing analyses consistent with Caltrans requirements.

## **SPECIAL ISSUES**

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

- Truck turning templates will be used to address how Project truck traffic (e.g., large trucks such as a WB-67) would enter and exit the Project site.
- Provide a queuing analysis for the Project driveways and site adjacent signalized intersections to determine necessary storage lengths.

### **OPEN ITEMS - CUMULATIVE DEVELOPMENT PROJECTS**

Exhibit 5 illustrates a cumulative development location map. A summary of the cumulative development projects are shown on Table 4. It is requested that the County provide land use and intensity information for any additional cumulative development projects.

# **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 Knox Logistics Center Phase II Traffic Impact Study. We will continue to move forward towards completing the traffic study after receiving jurisdiction approval or comments finalizing the study area.



Mr. Kevin Tsang COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT April 6, 2015 Page 4 of 4

If you have any questions, please contact me directly at (949) 660-1994, extension 204.

Respectfully submitted,

URBAN CROSSROADS, INC.

Aric Evatt, PTP

Attachments

Principal

Charlene So, PE

Senior Transportation Engineer



# **EXHIBIT B**

# **SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY**

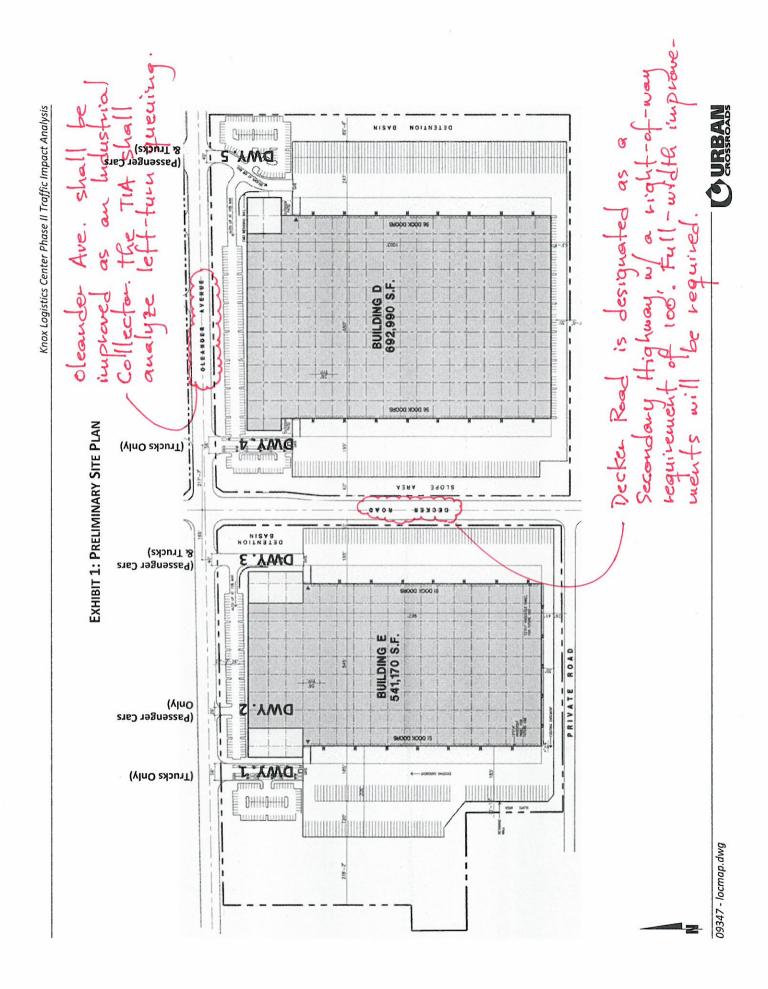
This letter acknowledges the Riverside County Transportation Department requirements for traffic impact analysis of the following project. The analysis must follow the Riverside County Transportation Department Traffic Study Guidelines dated April 2008.

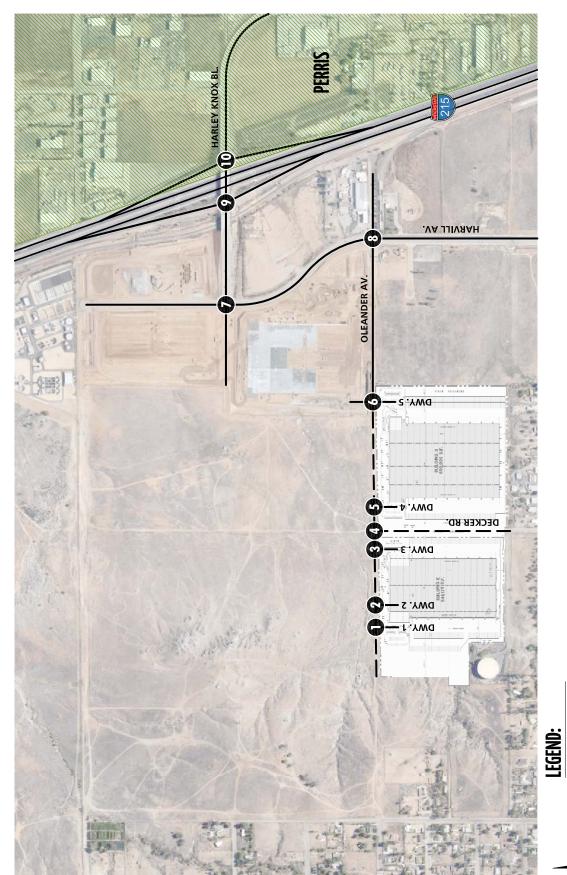
Cas	se No.												
	ated Cas	es-											
		SP No.											
		EIR No.											
		GPA No.											
		CZ No.											
Pro	ject Nam	e:	Knox Lo	gistics Cen	ter Phase	e II							
Pro	ject Addr	ess:	East and	d West of D	ecker Ro	ad, Sout	h of Ole	ander	Avenue				
Pro	ject Desc	ription:	1,234,16	30 square fo	eet of higl	n-cube w	arehou	se/distr	ibution c	enter use	s, divid	ded over two	buildings:
	•	·		D (692,990									•
					•		,						
				Consultant							Deve	<u>eloper</u>	
Nar	me:	Urban Cr		Inc Aric	-			Tramn	nell Crow	Compar			
	dress:			, Suite 300			_			Road, S		80	
		Irvine, CA		·			_			, CA 926			
Telephone: (949) 660-1994 ext. 204 Fax: (949) 660-1911				t. 204			_	(949) 477-4719					
					_	(949) 477-9107							
		(1 1)					_	()					
Α.	Trip Ge	neration S	Source:		ITE 9th E	dition (20	012)				(See	Table 1)	
	•			-		,					,	,	
Cur	rent GP I	_and Use	Business	Park			Propo	sed La	nd Use	High-Cu	be Ware	ehousing	
	rent Zoni			1-M), (I-P)				sed Zo		Industria			
		J					<u> </u>		J	-	,	,	
			Current 7	Trip Genera	ation		Propo	sed Tri	p Genera	ation (PC	E)		
			<u>In</u>	Out	Total		In	Out	Total	,	,		
	AM Trip	S	0	0	0		132	59	191				
	PM Trip		0	0	0		69	153	222	_			
	•		1							_			
Inte	ernal Trip	Allowance	ļ	☐ Yes	No		(	%	Trip Disc	count)			
	-	Allowanc		☐ Yes	No		<u>`</u>	%	Trip Disc				
	, ,			<del></del>			`			,			
Ар	assby trip	discount	of 25% is	allowed fo	r appropr	iate land	uses.	The pa	ssby trips	s at adjac	ent stu	dy area inte	ersections and
				ated on a re				•	, ,	•		•	
	•	•											
В.	Trip Ge	ographic	Distribut	tion:	(See	attached E	xhibits 3	& 4 for d	letailed ass	signment)			
	•		Varies		S	Varies	<b>s</b> %	Ε	Varies	<b>s</b> %		W Vario	es %
								'					
C.	Backgr	ound Traf	fic										
	Project I	Build-out Y	ear:	2017		Annual A	Ambient	t Growt	h Rate:		2	%	
	Phase Y	ear(s)		2017									
		` '											
	Other a	rea Projec	ts to be a	analyzed:	County to	provide	list of c	umulat	ive proje	cts			
		orecast M		-	Riverside						RivTAN	<b>J</b> )	
			_										



or comments form other agencies). (See Exhibit 2)	
Driveway 1 / Oleander Avenue	16.
2. Driveway 2 / Oleander Avenue	17.
3. Driveway 3 / Oleander Avenue	18.
Decker Road / Oleander Avenue	19.
5. Driveway 4 / Oleander Avenue	20.
6. Driveway 5 / Oleander Avenue	21
7. Harvill Avenue / Harley Knox Boulevard	22
8. Harvill Avenue / Oleander Avenue	23.
9. I-215 SB Ramps / Harley Knox Boulevard	24.
10. I-215 NB Ramps / Harley Knox Boulevard	25.
11. 12	26.
·	LI.
10.	20.
17.	23.
15	30
determined, or comments form other agencies).  1.	2
F. Other Jurisdictional Impacts	
Is this project within a City's Sphere of influence or one m	nile radius of City boundarie: Yes No
If so, name of City jurisdiction: Perris	
G. Site Plan (please attach reduced copy)	
	ansportation Department) warranted" (or "a traffic signal appears to be warranted", or similar der existing conditions, 8-hour approach traffic volume information g movement counts for that intersection.
	4
I. Existing Conditions  Traffic count data must be new or recent. Provide traffic of Date of counts	count dates if using other than new counts.
	e fee must be submitted with, or prior to submittal of this form. cess the Scoping Agreement prior to receipt of the fee.
Recommended by:	Approved Scoping Agreement:
QENT 3/30/2015	04/9/2015
Consultant's Representative Date	Riverside County Transportation Date Department
Scoping Agreement Revised on	- NOTE: If secondary access is required by fire Dept. the TIA will need to be re-scope.
	•

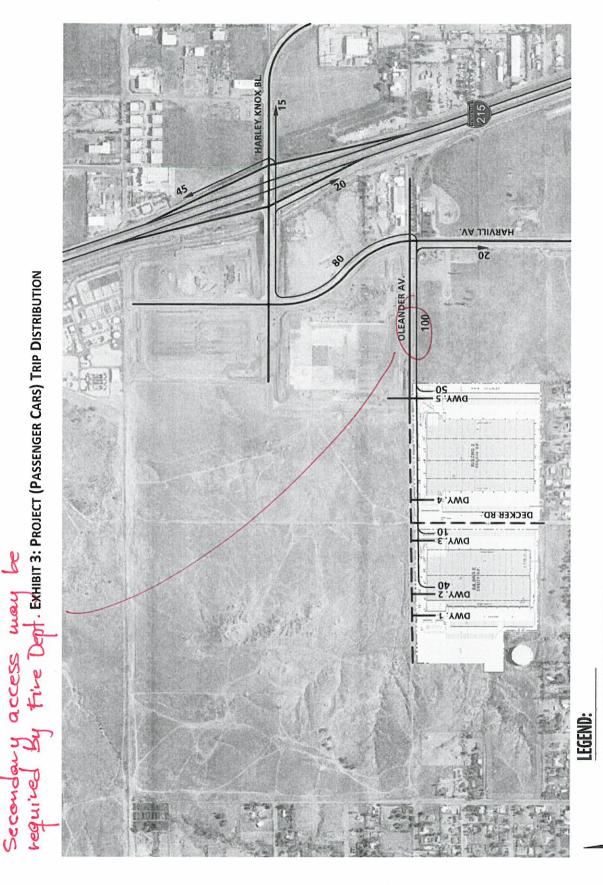
D. Study Intersections: (NOTE: Subject to revision after other projects, trip generation and distribution are determined,





= INTERSECTION ANALYSIS LOCATION

09347 - locmap.dwg



10 = PERCENT TO/FROM PROJECT

09347 - trips.dwg

Knox Logistics Center Phase II Traffic Impact Analysis

Access may

Secondary

-10 = PERCENT TO/FROM PROJECT

1.1-10

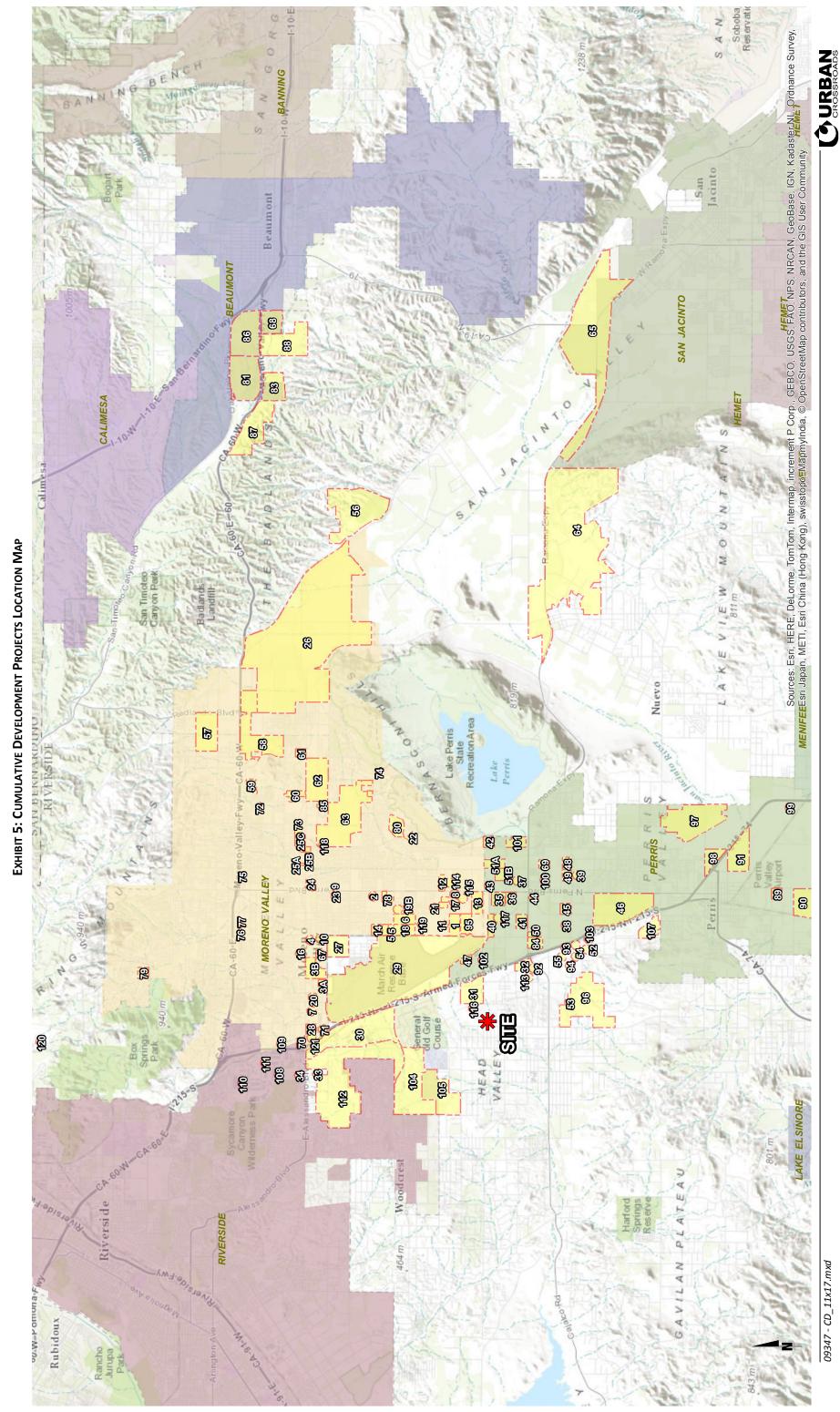


Table 1

#### **Project Trip Generation Rates**

		ITE LU	Α	M Peak Ho	ur	PI	M Peak Ho	ur	Daily
Land Use <sup>1</sup>	Units <sup>2</sup>	Code	In	Out	Total	In	Out	Total	Daily
	A	ctual Vel	nicle Trip G	eneration	Rates				
High-Cube Warehouse/Distribution Center <sup>3</sup>	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
	0.055	0.025	0.080	0.025	0.055	0.080	1.040		
	0.005	0.002	0.007	0.003	0.006	0.009	0.141		
	0.004	0.002	0.005	0.002	0.005	0.007	0.113		
	4-Axle-	+ Trucks	0.012	0.006	0.018	0.007	0.017	0.024	0.386
Pa	ssenger	Car Equ	ivalent (PC	E) Trip Ger	neration Ra	ites			
High-Cube Warehouse/Distribution Center <sup>3,4</sup>	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
	0.055	0.025	0.080	0.025	0.055	0.080	1.040		
2-Axle Tr	0.007	0.003	0.010	0.004	0.009	0.013	0.211		
3-Axle Tr	0.007	0.003	0.011	0.004	0.010	0.014	0.226		
4-Axle+ Tr	ucks (PC	CE = 3.0)	0.037	0.017	0.054	0.022	0.050	0.072	1.158

<sup>&</sup>lt;sup>1</sup> Trip Generation Source: Institute of Transportation Engineers (ITE), <u>Trip Generation Manual</u>, Ninth Edition (2012).

AM peak hour = 72.7% passenger cars, 6.01% 2-Axle trucks, 4.83% 3-Axle trucks, 16.46% 4-Axle trucks

PM peak hour = 66.7% passenger cars, 7.33% 2-Axle trucks, 5.89% 3-Axle trucks, 20.08% 4-Axle trucks

ADT = 61.9% passenger cars, 8.38% 2-Axle trucks, 6.74% 3-Axle trucks, 22.98% 4-Axle trucks



<sup>&</sup>lt;sup>2</sup> TSF = thousand square feet

<sup>&</sup>lt;sup>3</sup> Vehicle Mix Source: Total truck percentage source from ITE <u>Trip Generation</u> manual. Truck mix (by axle type) source from SCAQMD.

<sup>&</sup>lt;sup>4</sup> PCE rates are per SANBAG.

Table 2

#### **Project Trip Generation Summary (in PCE)**

			AN	/I Peak H	our	PN	/I Peak Ho	our	
Land Use	Quantity	Units <sup>1</sup>	ln	Out	Total	In	Out	Total	Daily
Building D	692.990	TSF							
Passenger Cars:	*******		38	17	55	17	38	55	721
Truck Trips:									
2-axle:			5	2	7	3	6	9	146
3-axle:			5	2	7	3	7	10	157
4+-axle:			26	12	38	16	35	50	803
- Net Truck Trips (PCE) <sup>2</sup>			36	16	52	21	48	69	1,106
BUILDING D TOTAL NET TRIPS (PCE) 3			74	33	107	39	86	125	1,827
Building E	541.170	TSF							
Passenger Cars:			30	13	43	13	30	43	563
Truck Trips:									***************************************
2-axle:			4	2	5	2	5	7	114
3-axle:			4	2	6	2	5	8	123
4+-axle:			20	9	29	12	27	39	627
- Net Truck Trips (PCE) <sup>2</sup>			28	13	41	17	37	54	864
BUILDING E TOTAL NET TRIPS (PCE) 3			58	26	84	30	67	97	1,426
	TO1	AL (PCE):	132	59	191	69	153	222	3,253

<sup>&</sup>lt;sup>1</sup> TSF = thousand square feet



<sup>&</sup>lt;sup>2</sup> Vehicle Mix Source: Total truck percentage source from ITE<u>Trip Generation</u> manual. Truck mix (by axle type) source from SCAQMD.

 $<sup>^{\</sup>rm 3}$  TOTAL NET TRIPS (PCE) = Passenger Cars + Net Truck Trips (PCE).

Table 3

#### **Project Trip Generation Summary (Actual Vehicles)**

			Αľ	И Peak H	our	PN	/I Peak Ho	our	
Land Use	Quantity	Units <sup>1</sup>	In	Out	Total	In	Out	Total	Daily
Building D	692.990	TSF							
Passenger Cars:			38	17	55	17	38	55	721
Truck Trips:									
2-axle:			3	1	5	2	4	6	98
3-axle:			3	1	4	2	3	5	<i>78</i>
4+-axle:			9	4	13	5	12	17	268
- Net Truck Trips (Actual Trucks	- Net Truck Trips (Actual Trucks) <sup>2</sup>				21	9	19	28	444
BUILDING D TOTAL NET TRIPS (Actual	Vehicles) 3		53	24	76	26	57	83	1,164
Building E	541.170	TSF							
Passenger Cars:			30	13	43	13	30	43	563
Truck Trips:									
2-axle:			2	1	4	1	3	5	76
3-axle:			2	1	3	1	3	4	61
4+-axle:			7	3	10	4	9	13	209
- Net Truck Trips (Actual Trucks	- Net Truck Trips (Actual Trucks) <sup>2</sup>			5	16	7	15	22	346
BUILDING E TOTAL NET TRIPS (Actual	BUILDING E TOTAL NET TRIPS (Actual Vehicles) <sup>3</sup>			18	60	20	45	65	909
	TOTAL (	ACTUAL):	94	42	136	46	102	148	2,073

<sup>&</sup>lt;sup>1</sup> TSF = thousand square feet



<sup>&</sup>lt;sup>2</sup> Vehicle Mix Source: Total truck percentage source from ITE<u>Trip Generation</u> manual. Truck mix (by axle type) source from SCAQMD.

 $<sup>^3</sup>$  TOTAL NET TRIPS (Actual Vehicles) = Passenger Cars + Net Truck Trips (Actual Trucks).

## Table 4 (Page 1 of 7)

TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
1	PA 06-0152 & PA 06-0153 (First Park Nandina I & II)	High-Cube Warehouse	1,182.918	TSF
2	Marana Vallay Walmart	Free-Standing Discount Stor	189.520	TSF
2	Moreno Valley Walmart	Gas Station	16	VFP
3A	PA 08-0072 (Overton Moore Properties)	High-Cube Warehouse	520.000	TSF
3B	Harbor Freight Expansion	High-Cube Warehouse	1,279.910	TSF
4	PA 04-0063 (Centerpointe Buildings 8 and 9)	General Light Industrial	361.384	TSF
5	PA 07-0035; PA 07-0039 (Moreno Valley Industrial Park)	General Light Industrial	204.657	TSF
,	FA 07-0033, FA 07-0039 (Morello Valley Illuustilai Faik)	High-Cube Warehouse	409.920	TSF
6	PA 07-0079 (Indian Business Park)	High-Cube Warehouse	1,560.046	TSF
		Hotel	110	RMS
7	PA 08-0047-0052 (Komar Cactus Plaza) <sup>3</sup>	Fast Food w/Drive Thru	8.000	TSF
		Commercial	42.400	TSF
8	First Inland Logistics Center	High-Cube Warehouse	400.130	TSF
9	TM 33607	Condo/Townhomes	54	DU
10	PA 08-0093 (Centerpointe Business Park II)	General Light Industrial	99.988	TSF
11	PA 06-0021; PA 06-0022; PA 06-0048; PA 06-0049 (Komar	Warehousing	2,057.400	TSF
12	PA 06-0017 (Ivan Devries)	Industrial Park	569.200	TSF
13	PA 09-0004 (Vogel)	High-Cube Warehouse	1,616.133	TSF
14	TM 34748	SFDR	135	DU
15	TR 32548 (Gabel, Cook & Associates)	SFDR	107	DU
16	PA 09-0031	Gas Station	12	VFP
17	First Park Nandina III	High-Cube Warehouse	691.960	TSF
1,	Moreno Valley Commerce Park	High-Cube Warehouse	354.321	TSF
		General Light Industrial	16.732	TSF
18	March Business Center	Warehousing	87.429	TSF
		High-Cube Warehouse	1,380.246	TSF
19A	TM 33810	SFDR	16	DU
19B	TM 34151	SFDR	37	DU
	373K Industrial Facility	High-Cube Warehouse	373.030	TSF
21	TM 32716	SFDR	57	DU
22	TM 32917	Condo/Townhomes	227	DU
23	TM 33417	Condo/Townhomes	10	DU
24	TM 34988	Condo/Townhomes	251	DU
25A	TM 34216	Condo/Townhomes	40	DU
25B	TM 34681	Condo/Townhomes	49	DU
25C	PA 08-0079-0081 (Winco Foods)	Discount Supermarket	95.440	TSF
230	177 00 0075 0001 (William Foods)	Specialty Retail	14.800	TSF



## Table 4 (Page 2 of 7)

TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
	Moreno Beach Marketplace (Lowe's)	Commercial Retail	175.000	TSF
	Auto Mall Specific Plan (Planning Area C)	Commercial Retail	304.500	TSF
	Westridge	High-Cube Warehouse	937.260	TSF
	ProLogis	High-Cube Warehouse	1,916.190	TSF
26	FIOLOgis	Warehousing	328.448	TSF
		High-Cube Warehouse	41,400.000	TSF
	World Logistics Center	Warehousing	200.000	TSF
	World Logistics Certier	Gas Station w/ Market	12	VFP
		Existing SFDR	7	DU
		Medical Offices	190.000	TSF
		Commercial Retail	210.000	TSF
27	March Lifecare Campus Specific Plan <sup>4</sup>	Research & Education	200.000	TSF
		Hospital	50	Beds
		Institutional Residential	660	Beds
28	Alessandro Metrolink Station	Light Rail Transit Station	300	SP
29	Airport Master Plan	Airport Use	559.000	TSF
30	Meridian Business Park North	Industrial Park	5,985.000	TSF
31	PP 20699 (Oleander Business Park)	Warehousing	1,206.710	TSF
32	Ramona Metrolink Station	Light Rail Transit Station	300	SP
		Office (258.102 TSF)	258.102	TSF
33	PP 22925 (Amstar/Kaliber Development)	Warehousing	409.312	TSF
33	11 22323 (Amstar/Ranber Development)	General Light Industrial	42.222	TSF
		Retail	10.000	TSF
34	P07-1028 (Alessandro Business Park)	General Light Industrial	652.018	TSF
35	P 05-0113 (IDI)	High-Cube Warehouse	1,750.000	TSF
36	P 05-0192 (Oakmont I)	High-Cube Warehouse	697.600	TSF
37	P 05-0477	High-Cube Warehouse	462.692	TSF
38	Rados Distribution Center	High-Cube Warehouse	1,200.000	TSF
	Investment Development Services (IDS) II	High-Cube Warehouse	350.000	TSF
40	P 07-09-0018	Warehousing	170.000	TSF
41	P 07-07-0029 (Oakmont II)	High-Cube Warehouse	1,600.000	TSF
42	TR 32707	SFDR	137	DU
43	TR 34716	SFDR	318	DU
44	P 05-0493 (Ridge I)	High-Cube Warehouse	700.000	TSF
45	Ridge II	High-Cube Warehouse	2,000.000	TSF



## Table 4 (Page 3 of 7)

Harvest Landing Specific Plan	TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
Harvest Landing Specific Plan   Sports Park   16.700   AC   Business Park   1,233.401   TSF   Shopping Center   73.181   TSF   Shopping Center   450.000   TSF   Perris Marketplace   Shopping Center   450.000   TSF   48   Jordan Distribution   High-Cube Warehouse   378.000   TSF   48   Jordan Distribution   High-Cube Warehouse   378.000   TSF   48   Jordan Distribution   High-Cube Warehouse   642.000   TSF   50   P08-11-0005; P.08-11-0006 (Starcrest)   High-Cube Warehouse   454.088   TSF   TS			SFDR	717	
Business Park   1,233.401   TSF   Shopping Center   73.181   TSF   Pof-0411 (Concrete Batch Plant)   Manufacturing   2.000   TSF   48   Jordan Distribution   High-Cube Warehouse   378.000   TSF   49   Aiere   High-Cube Warehouse   642.000   TSF   49   Aiere   High-Cube Warehouse   642.000   TSF   50   P 08-11-0005 (Starcrest)   High-Cube Warehouse   454.088   TSF   Stratford Ranch Specific Plan   High-Cube Warehouse   1,725.411   TSF   High-Cube Warehouse   454.088   TSF   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   475.11			Condo/Townhomes	1,139	DU
Business Park	16	Harvest Landing Specific Plan	Sports Park	16.700	AC
Perris Marketplace	40		Business Park	1,233.401	TSF
47   P 06-0411 (Concrete Batch Plant)   Manufacturing   2.000   TSF   48   Jordan Distribution   High-Cube Warehouse   378.000   TSF   49   Aiere   High-Cube Warehouse   642.000   TSF   50   P 08-11-0005; P 08-11-0006 (Starcrest)   High-Cube Warehouse   454.088   TSF   51A   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan   High-Cube Warehouse   480.000   TSF   51B   Stratford Ranch Specific Plan (PAC)   High-Cube Warehouse   937.260   TSF   51B   Stratford Ranch Specific Plan (PAC)   High-Cube Warehouse   937.260   TSF   51B   High-Cube Warehouse   180.000   TSF   51B			Shopping Center	73.181	TSF
All		Perris Marketplace	Shopping Center	450.000	TSF
Aliere	47	P 06-0411 (Concrete Batch Plant)	Manufacturing	2.000	TSF
50   P 08-11-0005; P 08-11-0006 (Starcrest)   High-Cube Warehouse   454.088   TSF	48	Jordan Distribution	High-Cube Warehouse	378.000	TSF
Stratford Ranch Specific Plan	49	Aiere	High-Cube Warehouse	642.000	TSF
Stratford Ranch Specific Plan	50	P 08-11-0005; P 08-11-0006 (Starcrest)	High-Cube Warehouse	454.088	TSF
Stratford Ranch Specific Plan   General Light Industrial   120.000   TSF	51A	Stratford Ranch Specific Plan	High-Cube Warehouse	1,725.411	TSF
General Light Industrial   120.000   TSF	E1D	Stratford Panch Specific Plan	High-Cube Warehouse	480.000	TSF
SFDR   39.000   DU	210	Strational Ranch Specific Flam	General Light Industrial	120.000	TSF
FP 16976   General Light Industrial   85.000   TSF	52	PP 18908	General Light Industrial	133.000	TSF
Total Park   190.802   TSF	53	Tract 33869	SFDR	39.000	DU
Private School (K-12)   300   STU	54	PP 16976	General Light Industrial	85.000	TSF
Golf Course	55	PP 21144	Industrial Park	190.802	TSF
Hotel   500   RMS			Private School (K-12)	300	STU
Specialty Retail   66.667   TSF			Golf Course	18	Holes
Quail Ranch Specific Plan   General office   66.667   TSF			Hotel	500	RMS
General office	56	Quail Panch Specific Plan	Specialty Retail	66.667	TSF
Senior Living (Detached)   200   DU	30	Quali Naticii Specific Flati	General office	66.667	TSF
SFDR   G00   DU			Assisted Living	500	Beds
a TR 32460 (Sussex Capital)  b TR 32459 (Sussex Capital)  57 c TR 30411 (Pacific Communities)  d TR 33962 (Pacific Scene Homes)  e TR 30998 (Pacific Communities)  3 SFDR  31 DU  e TR 30998 (Pacific Communities)  a Westridge Commerce Center  b P06-158 (Gascon)  c Auto Mall Specific Plan (PAC)  d ProLogis  5 SFDR  5 Warehousing  4 Warehouse  5 SFDR  5 Warehouse  1,901.000  TSF  SFDR  5 SFDR  5 DR  5 SFDR			Senior Living (Detached)	200	DU
b TR 32459 (Sussex Capital)  c TR 30411 (Pacific Communities) d TR 33962 (Pacific Scene Homes) e TR 30998 (Pacific Communities)  3 SFDR  31 DU e TR 30998 (Pacific Communities)  a Westridge Commerce Center b P06-158 (Gascon) c Auto Mall Specific Plan (PAC)  d ProLogis  5 FDR  47 DU Commercial Retail 116.360 TSF Warehousing High-Cube Warehouse 1,901.000 TSF SFDR  24 DU TSF DU TSF DU TSF Warehousing High-Cube Warehouse 1,901.000 TSF SFDR  262 DU			SFDR	600	DU
57       c TR 30411 (Pacific Communities)       SFDR       24       DU         d TR 33962 (Pacific Scene Homes)       SFDR       31       DU         e TR 30998 (Pacific Communities)       SFDR       47       DU         a Westridge Commerce Center       High-Cube Warehouse       937.260       TSF         b P06-158 (Gascon)       Commercial Retail       116.360       TSF         c Auto Mall Specific Plan (PAC)       Commercial Retail       304.500       TSF         d ProLogis       Warehousing       367.000       TSF         High-Cube Warehouse       1,901.000       TSF         SEDR       262       DU		a TR 32460 (Sussex Capital)	SFDR	58	DU
d TR 33962 (Pacific Scene Homes)       SFDR       31       DU         e TR 30998 (Pacific Communities)       SFDR       47       DU         a Westridge Commerce Center       High-Cube Warehouse       937.260       TSF         b P06-158 (Gascon)       Commercial Retail       116.360       TSF         c Auto Mall Specific Plan (PAC)       Commercial Retail       304.500       TSF         d ProLogis       Warehousing       367.000       TSF         High-Cube Warehouse       1,901.000       TSF         SEDR       262       DU		b TR 32459 (Sussex Capital)	SFDR	11	DU
e TR 30998 (Pacific Communities)  a Westridge Commerce Center  b P06-158 (Gascon)  c Auto Mall Specific Plan (PAC)  d ProLogis  E TR 30998 (Pacific Communities)  SFDR  47  DU  High-Cube Warehouse  937.260  TSF  Commercial Retail  116.360  TSF  Warehousing  47  DU  High-Cube Warehouse  1,901.000  TSF  SFDR  262  DU	57	c TR 30411 (Pacific Communities)	SFDR	24	DU
a Westridge Commerce Center         High-Cube Warehouse         937.260         TSF           b P06-158 (Gascon)         Commercial Retail         116.360         TSF           c Auto Mall Specific Plan (PAC)         Commercial Retail         304.500         TSF           d ProLogis         Warehousing         367.000         TSF           High-Cube Warehouse         1,901.000         TSF           SEDR         262         DU		d TR 33962 (Pacific Scene Homes)	SFDR	31	DU
b P06-158 (Gascon) Commercial Retail 116.360 TSF c Auto Mall Specific Plan (PAC) Commercial Retail 304.500 TSF d ProLogis Warehousing 367.000 TSF High-Cube Warehouse 1,901.000 TSF SEDR 262 DU		e TR 30998 (Pacific Communities)	SFDR	47	DU
c Auto Mall Specific Plan (PAC)  d ProLogis  Commercial Retail  Warehousing High-Cube Warehouse 1,901.000 TSF  SEDR 262 DU		a Westridge Commerce Center	High-Cube Warehouse	937.260	TSF
58 d ProLogis         Warehousing High-Cube Warehouse SEDR         367.000 TSF           SEDR         262 DU		b P06-158 (Gascon)	Commercial Retail	116.360	TSF
d ProLogis  High-Cube Warehouse 1,901.000 TSF  SEDR 262 DU		c Auto Mall Specific Plan (PAC)	Commercial Retail	304.500	TSF
High-Cube Warehouse 1,901.000 TSF  SEDR 262 DU	58	d Drologic	Warehousing	367.000	TSF
SFDR 262 DU		a ProLogis	High-Cube Warehouse	1,901.000	TSF
10 10 45 V 4 15 TOWO UCCCO)		o TD 25922 (Stown Dasses)		262	DU
e TR 35823 (Stowe Passco)  Apartments  216  DU		e in 55623 (Slowe Passco)	Apartments	216	DU
59 TR 36340 SFDR 275 DU	59	TR 36340	SFDR	275	DU



### Table 4 (Page 4 of 7)

TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
	a TR 31771 (Sanchez)	SFDR	25	DU
60	b TR 34397 (Winchester Associates)	SFDR	52	DU
	c TR 32645 (Winchester Associates)	SFDR	54	DU
61	Lowe's (Moreno Beach Marketplace)	Home Improvement Store	175.000	TSF
	a Convenience Store/ Fueling Station	Gas Station w/ Market	30.750	TSF
	b Senior Assisted Living	Assisted Living Units	139	DU
	c TR 31590 (Winchester Associates)	SFDR	96	DU
62	d TR 32548 (Gabel, Cook & Associates)	SFDR	107	DU
62	e 26th Corp. & Granite Capitol	SFDR	32	DU
	f TR 32218 (Whitney)	SFDR	63	DU
	g Moreno Marketplace	Commercial Retail	93.788	TSF
	h Medical Plaza	Medical Offices	311.633	TSF
	a Moreno Medical Campus	Medical Offices	80.000	TSF
63	b Aqua Bella Specific Plan	SFDR	2,922	DU
63	c TR 34329 (Granite Capitol)	SFDR	90	DU
	d Cresta Bella	General Office	30.000	TSF
		SFDR	860	DU
		Condo/Townhomes	1,920	DU
		Elementary School	1,200	STU
	a Villages of Lakeview	Commercial Retail	100.000	TSF
	a villages of Lakeview	Soccer Complex	12	Fields
		City Park	8.900	AC
		County Park	8.100	AC
64		Regional Park	107.100	AC
		SFDR	847	DU
		Condo/Townhomes	686	DU
		Apartments	467	DU
	b Motte Lakeview Ranch	Elementary School	650	STU
		Middle School	300	STU
		Commercial Retail	120.000	TSF
		Regional Park	177.000	AC
		Commercial Retail	255.000	AC
65	Gateway Area Specific Plan	General Office	510.000	AC
	Sateway Area Specific Flair	Business Park	595.000	AC
		Residential	340.000	AC
66	Moreno Valley Industrial Center (Industrial Area SP)	General Light Industrial	354.810	TSF
67	Centerpointe Business Park	General Light Industrial	356.000	TSF
68	ProLogis/Rolling Hills Ranch Industrial	Heavy Industrial	2,565.684	TSF
69	P05-0493	Logistics	597.370	TSF
70	P07-1028, -0102; and P09-0416, -0418, -0419	General Light Industrial	652.018	TSF



# Table 4 (Page 5 of 7)

TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
		General Light Industrial	42.222	TSF
71	America (Kalibar Davialan magat DD22025	Heavy Industrial	409.312	TSF
/1	Amstar/Kaliber Development, PP22925	Commercial Retail	10.000	TSF
		General Office	258.102	TSF
72	TR 31305 / Richmond American	Residential	87	DU
73	TR 32505 / DR Horton	Residential	71	DU
74	TR 34329 / Granite Capitol	Residential	90	DU
75	TR 31814 / Moreno Valley Investors	Residential	60	DU
76	TR 33771 / Creative Design Associates	Residential	12	DU
77	TR 35663 / Kha	Residential	12	DU
78	TR 22180 / Young Homes	Residential	87	DU
79	TR 32515	Residential	161	DU
80	TR 32142	Residential	81	DU
81	Heartland	Residential	922	DU
82	San Michele Industrial Center (Industrial Area SP)	General Light Industrial	865.960	TSF
83	Hidden Canyon	General Light Industrial	2,890.000	TSF
84	Starcrest, P011-0005; 08-11-0006	General Light Industrial	454.088	TSF
85	Commercial Medical Plaza	Medical Offices	311.633	TSF
86	Mountain Bridge Regional Commercial Community	Commercial	1,853.251	TSF
87	Jack Rabbit Trail	Residential	2,000	DU
88	The Preserve / Legacy Highlands SP	Commercial	595.901	TSF
00	The Preserve / Legacy Highlands 3P	Residential	3,412	DU
89	South Perris Industrial Phase 1	Logistics	787.700	TSF
90	South Perris Industrial Phase 2	Logistics	3,448.734	TSF
91	South Perris Industrial Phase 3	Logistics	3,166.857	TSF
		Gas Station w/ Market	17	VFP
92	CUP03315	Fast Food w/o Drive Thru	5.600	TSF
		High-Turnover Restaurant	6.500	TSF
93	PP23342	Industrial Park	180.600	TSF
94	TR30592	SFDR	131	DU
95	First Nandina Logistics Center	High-Cube Warehouse	1,450.000	TSF
96	Rider Street Quarry	Quarry	2,500.000	AC
		SFDR	521.000	DU
97	Park West Specific Plan	Elementary School	750.000	STU
		Neighborhood Park	5.000	AC
	The Venue	Commercial Retail	642.627	TSF
	Retail on San Jacinto	Commercial Retail	217.800	TSF
98		Fast Food w/ Drive Thru	4.500	TSF
	Retail on Redlands	Pharmacy w/ Drive Thru	14.000	TSF
		Specialty Retail	31.500	TSF



### Table 4 (Page 6 of 7)

TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
	South Perris Metrolink Station	Light Rail Transit Station	680.000	SP
100	IDS 04-0464	High-Cube Warehouse	1,686.760	TSF
101	TTM 32708 (50% Complete)	SFDR	238.000	DU
	PM 34199	Gen. Light Industrial	46.500	TSF
	DPR 05-0387	Gen. Light Industrial	9.854	TSF
102	DPR 05-0452	Warehousing	31.200	TSF
	TPM 34697	Gen. Light Industrial	47.400	TSF
	DPR 06-0396	Warehousing	159.823	TSF
103	PP 20711	Manufacturing	20.000	AC
		Shopping Center	108.900	TSF
		Industrial Park	1,336.700	TSF
		Large Industrial Park	3,269.000	TSF
104	March Business Center - South Campus	General Office Building	140.600	TSF
104	Water Business Center - South Campus	Manufacturing	215.600	TSF
		Warehousing	1,379.200	TSF
		Park	50.000	AC
		R&D	1,611.800	TSF
105	Ben Clark Training Facility	Students	5,045.000	STU
103	Defi Clark Training Facility	Employees	354.000	EMP
106	PP 20103	Gen. Light Industrial	290.985	TSF
107	Nuevo Business Park	Gen. Light Industrial	357.156	TSF
10,	Tracto Basiness Fark	Warehousing	1,767.618	TSF
_	P06-0160	Gen. Light Industrial	316.224	TSF
109	P06-1408	Retail	75.300	TSF
		Office	131.000	TSF
110	Office, Magnon & Panattoni	Warehousing	1,400.000	TSF
		Warehousing	300.000	TSF
		Warehousing	216.000	TSF
		Office	37.939	TSF
111	P06-0591	Warehousing	782.188	TSF
		Manufacturing	168.294	TSF
-	Meridian (March Business Park SP)	Business Park	41,917.000	TSF
_	Majestic Freeway Business Center	High-Cube Warehouse	1,200.248	TSF
	Modular Logistics Center	High-Cube Warehouse	1,109.378	TSF
	Moval Assemblage	High-Cube Warehouse	456.337	TSF
	Blanding Assemblage	High-Cube Warehouse	707.880	TSF
	Integra Pacific	High-Cube Warehouse	864.000	TSF
118	Bella Vista Apartments	Apartments	220	DU
119	Moreno Valley Logistics	High-Cube Warehouse	1,351.770	TSF
		General Light Industrial	385.748	TSF



#### Table 4 (Page 7 of 7)

TAZ	Project Name	Land Use <sup>1</sup>	Quantity	Units <sup>2</sup>
120	TTM 33410 Box Springs	SFDR	142	DU
121	March JPA Freeway Business Center	High-Cube Warehouse	709.083	TSF

<sup>&</sup>lt;sup>1</sup> SFDR = Single Family Detached Residential; R&D = Retail & Development



<sup>&</sup>lt;sup>2</sup> DU = Dwelling Units; TSF = Thousand Square Feet; SP = Spaces; VFP = Vehicle Fueling Positions; STU = Students EMP = Employees; RMS = Rooms

<sup>&</sup>lt;sup>3</sup> Source: Cactus Avenue and Commerce Center Drive Commercial Center TIA, Urban Crossroads, Inc., December 9, 2008 (Revised).

<sup>&</sup>lt;sup>4</sup> Source: March Lifecare Campus Specific Plan Traffic Impact Analysis, Mountain Pacific, Inc., May 2009 (Revised).

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## APPENDIX 3.1:

**EXISTING TRAFFIC COUNTS - APRIL 2015** 



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County of Riverside N/S: Private Driveway E/W: Oleander Avenue Weather: Clear

File Name: CRVDWOLAM Site Code : 05115195 Start Date : 4/14/2015 Page No : 1

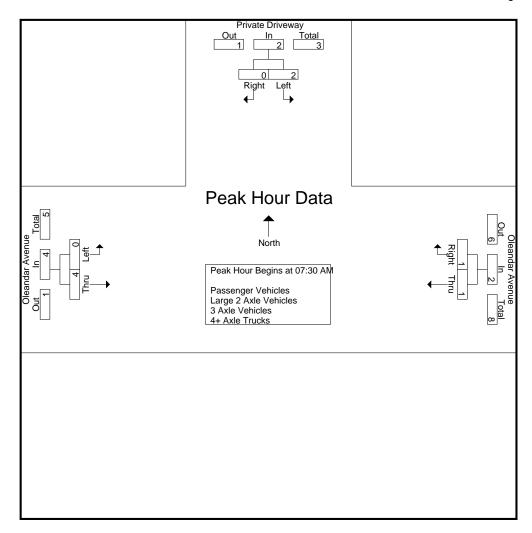
Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks											
	Pri	vate Drivev	vay	Ol	eandar Ave	nue	Ole	eandar Ave	nue		
	5	Southbound	d d		Westbound	l		Eastbound	k		
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total	
07:00 AM	0	0	0	0	0	0	0	1	1	1	
07:15 AM	0	0	0	0	1	1	0	0	0	1	
07:30 AM	0	0	0	0	0	0	0	1	1	1	
07:45 AM	0	0	0	0	0	0	0	1	1	1_	
Total	0	0	0	0	1	1	0	3	3	4	
08:00 AM	1	0	1	1	1	2	0	0	0	3	
08:15 AM	1	0	1	0	0	0	0	2	2	3	
08:30 AM	0	0	0	0	0	0	0	1	1	1	
08:45 AM	0	0	0	0	0	0	0	11	1	1_	
Total	2	0	2	1	1	2	0	4	4	8	
Grand Total	2	0	2	1	2	3	0	7	7	12	
Apprch %	100	0		33.3	66.7		0	100			
Total %	16.7	0	16.7	8.3	16.7	25	0	58.3	58.3		
Passenger Vehicles	0	0	0	1	1	2	0	7	7	9	
% Passenger Vehicles	0	0	0	100	50	66.7	0	100	100	75	
Large 2 Axle Vehicles	2	0	2	0	1	1	0	0	0	3	
% Large 2 Axle Vehicles	100	0	100	0	50	33.3	0	0	0	25	
3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0_	
4+ Axle Trucks	0	0	0	0	0	0	0	0	0	0	
% 4+ Axle Trucks	0	0	0	0	0	0	0	0	0	0	

		Private Driveway Southbound			Oleandar Avenue Westbound			Oleandar Avenue Eastbound		
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Int	tersection Be	gins at 07:3	0 AM							
07:30 AM	0	0	0	0	0	0	0	1	1	1
07:45 AM	0	0	0	0	0	0	0	1	1	1
08:00 AM	1	0	1	1	1	2	0	0	0	3
08:15 AM	1	0	1	0	0	0	0	2	2	3
Total Volume	2	0	2	1	1	2	0	4	4	8
% App. Total	100	0		50	50		0	100		
PHF	.500	.000	.500	.250	.250	.250	.000	.500	.500	.667

County of Riverside N/S: Private Driveway E/W: Oleander Avenue Weather: Clear

Site Code : 05115195 Start Date : 4/14/2015 Page No : 2

File Name: CRVDWOLAM



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

reak noul loi cacil A	pproacri begi	115 al.							
	07:30 AM			07:15 AM			07:30 AM		
+0 mins.	0	0	0	0	1	1	0	1	1
+15 mins.	0	0	0	0	0	0	0	1	1
+30 mins.	1	0	1	0	0	0	0	0	0
+45 mins.	1	0	1	1	1_	2	0	2	2
Total Volume	2	0	2	1	2	3	0	4	4
% App. Total	100	0		33.3	66.7		0	100	
PHF	.500	.000	.500	.250	.500	.375	.000	.500	.500

County of Riverside N/S: Private Driveway E/W: Oleander Avenue Weather: Clear

File Name: CRVDWOLAM Site Code: 05115195 Start Date : 4/14/2015 Page No : 1

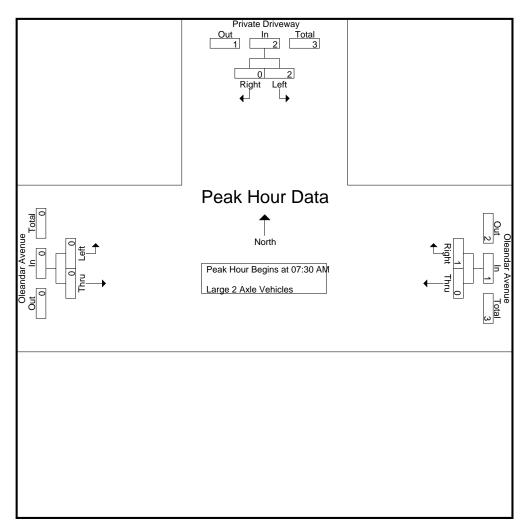
Groups Printed- Large 2 Ayle Vehicles

				ips Printed-	Large 2 Axl	e Vehicles				
	Priv	ate Drivev	vay	OI	eandar Ave	nue	Ol	eandar Ave	nue	
	S	outhbound	d d		Westbound	ł		Eastbound		
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
 Total	0	0	0	0	0	0	0	0	0	0
08:00 AM	1	0	1	0	1	1	0	0	0	2
08:15 AM	1	0	1	0	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0
 Total	2	0	2	0	1	1	0	0	0	3
Grand Total	2	0	2	0	1	1	0	0	0	3
Apprch %	100	0		0	100		0	0		
Total %	66.7	0	66.7	0	33.3	33.3	0	0	0	

	Pr	ivate Drivev	way	0	leandar Ave	enue	Oleandar Avenue			
		Southbound	d		Westbound	d		Eastbound	b	
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis Fr	om 07:30 Al	VI to 08:15 A	AM - Peak 1 d	of 1						
Peak Hour for Entire Ir	ntersection B	egins at 07	:30 AM							
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
08:00 AM	1	0	1	0	1	1	0	0	0	2
08:15 AM	1	0	1	0	0	0	0	0	0	1_
Total Volume	2	0	2	0	1	1	0	0	0	3
% App. Total	100	0		0	100		0	0		
PHF	.500	.000	.500	.000	.250	.250	.000	.000	.000	.375

Weather: Clear

File Name: CRVDWOLAM Site Code : 05115195 Start Date : 4/14/2015 Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 Peak Hour for Each Approach Begins at:

reak noul loi Each A	oproach begi	115 al.							
	07:30 AM			07:30 AM			07:30 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	1	0	1	0	1	1	0	0	0
+45 mins.	1	0	1	0	0	0	0	0	0
Total Volume	2	0	2	0	1	1	0	0	0
% App. Total	100	0		0	100		0	0	
PHF	.500	.000	.500	.000	.250	.250	.000	.000	.000

County of Riverside N/S: Private Driveway E/W: Oleander Avenue Weather: Clear

File Name: CRVDWOLAM Site Code: 05115195 Start Date : 4/14/2015 Page No : 1

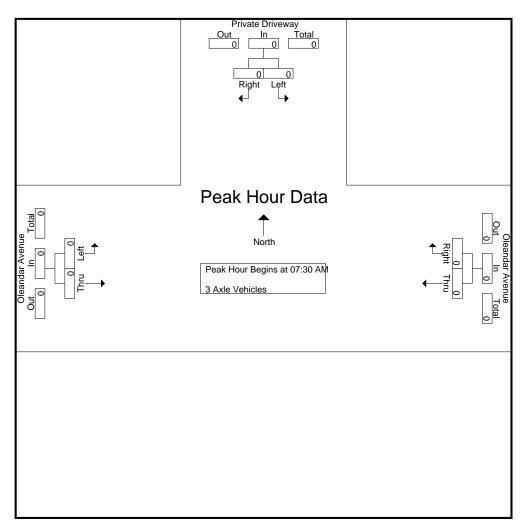
Printed - 3 Avla Vehicle

	Dr	ivate Drivev		roups Printe	eandar Ave		ΟΙ	eandar Ave	nue	
		Southbound		OI.	Westbound			Eastbound		
O. 1-				<b>-</b>			1 6			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0_
Total	0	0	0	0	0	0	0	0	0	0
MA 00:80	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0		
Total %										

	Pr	ivate Drivev	vay	Ol	leandar Ave	enue	Oleandar Avenue			
		Southbound	d		Westboun	d		Eastbound	d	
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis Fr	om 07:30 Al	M to 08:15 A	AM - Peak 1 o	of 1	_					
Peak Hour for Entire Ir	tersection B	Begins at 07	:30 AM							
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0_
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Weather: Clear

File Name: CRVDWOLAM Site Code : 05115195 Start Date : 4/14/2015 Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 Peak Hour for Each Approach Begins at:

reak noul loi cacil A	pproacri begii	15 al.							
	07:30 AM			07:30 AM			07:30 AM		
+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	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	0	0	0	0	0
% App. Total	0	0		0	0		0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000

County of Riverside N/S: Private Driveway E/W: Oleander Avenue Weather: Clear

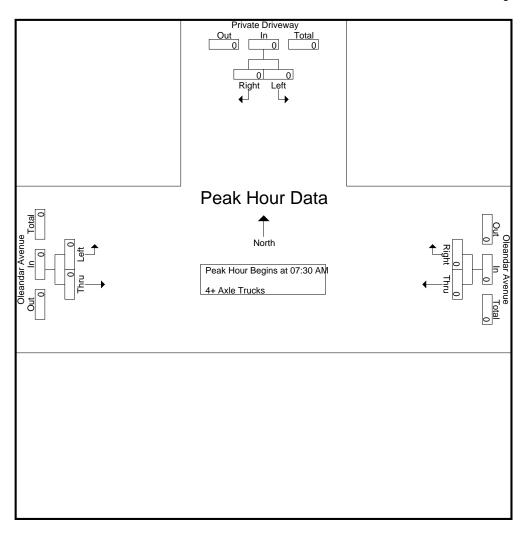
File Name: CRVDWOLAM Site Code: 05115195 Start Date : 4/14/2015 Page No : 1

	Pr	ivate Drivev		roups Printe	eandar Ave		ΟΙ	leandar Ave	nue	
		Southbound		OI.	Westbound			Eastbound		
a										
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0_
Total	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0		
Total %										

	Pr	ivate Drivev	way	0	leandar Ave	nue	0	leandar Ave	enue	
		Southbound	d		Westbound	d		Eastbound	b	
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis Fr	om 07:30 A	M to 08:15 A	AM - Peak 1 d	of 1	_					
Peak Hour for Entire Ir	ntersection E	Begins at 07	:30 AM							
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0_
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Weather: Clear

File Name: CRVDWOLAM Site Code : 05115195 Start Date : 4/14/2015 Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1 Peak Hour for Each Approach Begins at:

reak noul loi cacil A	pproacri begii	15 al.							
	07:30 AM			07:30 AM			07:30 AM		
+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	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	0	0	0	0	0
% App. Total	0	0		0	0		0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000

County of Riverside N/S: Private Driveway E/W: Oleander Avenue Weather: Clear

% 3 Axle Vehicles

% 4+ Axle Trucks

4+ Axle Trucks

File Name: CRVDWOLPM Site Code: 05115195 Start Date: 4/14/2015

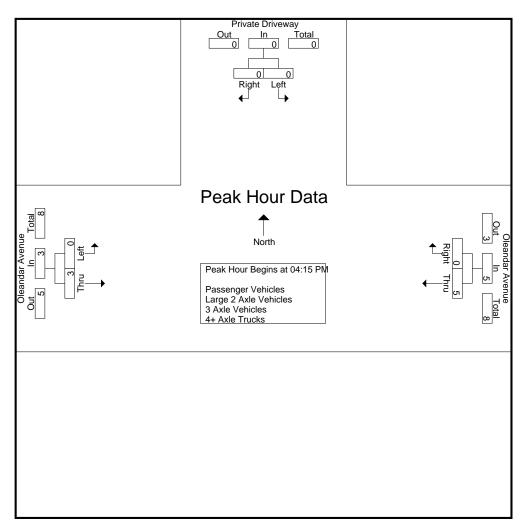
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks Private Driveway Oleandar Avenue Oleandar Avenue Southbound Westbound Eastbound App. Total Thru App. Total App. Total Int. Total Start Time Left Right Right Left Thru 04:00 PM 04:15 PM 04:30 PM 04:45 PM Total 05:00 PM 05:15 PM 05:30 PM 05:45 PM Total **Grand Total** Apprch % Total % 66.7 66.7 33.3 33.3 Passenger Vehicles % Passenger Vehicles Large 2 Axle Vehicles % Large 2 Axle Vehicles 3 Axle Vehicles 

		ivate Drivew Southbound	,	Ol	leandar Ave		Ol	eandar Ave		
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis Fro	m 04:00 PM	to 05:45 PN		1						
Peak Hour for Entire In	tersection Be	gins at 04:1	5 PM							
04:15 PM	0	0	0	1	0	1	0	0	0	1
04:30 PM	0	0	0	1	0	1	0	2	2	3
04:45 PM	0	0	0	2	0	2	0	0	0	2
05:00 PM	0	0	0	1	0	1	0	1	1	2
Total Volume	0	0	0	5	0	5	0	3	3	8
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.625	.000	.625	.000	.375	.375	.667

Weather: Clear

File Name: CRVDWOLPM Site Code : 05115195 Start Date : 4/14/2015 Page No : 2



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

reak noul loi cacil A	pproacri begii	15 al.							
	04:00 PM			04:15 PM			04:00 PM		
+0 mins.	0	0	0	1	0	1	0	1	1
+15 mins.	0	0	0	1	0	1	0	0	0
+30 mins.	0	0	0	2	0	2	0	2	2
+45 mins.	0	0	0	1	0	1	0	0	0
Total Volume	0	0	0	5	0	5	0	3	3
% App. Total	0	0		100	0		0	100	
PHF	.000	.000	.000	.625	.000	.625	.000	.375	.375

County of Riverside N/S: Private Driveway E/W: Oleander Avenue Weather: Clear

File Name: CRVDWOLPM Site Code: 05115195 Start Date : 4/14/2015 Page No : 1

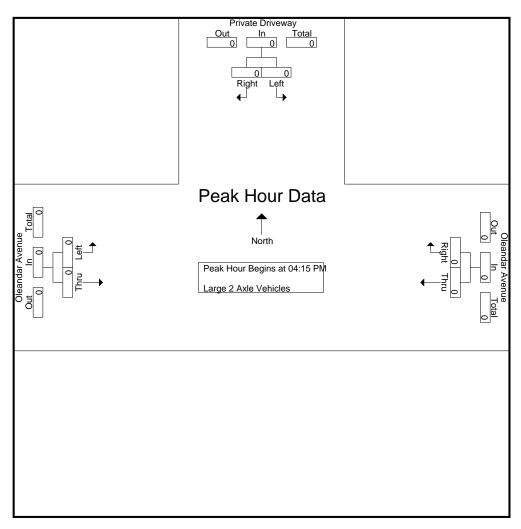
Groups Printed- Large 2 Ayle Vehicles

			Grou	<u>ps Printed- I</u>	_arge 2 Axle	e Vehicles				
	Priv	ate Drivew	vay	Ole	eandar Aver	nue	Ol	eandar Ave	nue	
	S	Southbound	ı k		Westbound			Eastbound		
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
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
Total	0	0	0	0	0	0	0	0	0	0
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
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0		
Total %										
	04:00 PM 04:15 PM 04:30 PM 04:45 PM Total 05:00 PM 05:15 PM 05:30 PM 05:45 PM Total Grand Total Apprch %	Start Time	Southbound   Start Time	Private Driveway   Southbound	Private Driveway Southbound   Start Time   Left   Right   App. Total   Thru	Private Driveway Southbound         Oleandar Aver Westbound           Start Time         Left         Right         App. Total         Thru         Right           04:00 PM         0         0         0         0         0         0           04:15 PM         0         0         0         0         0         0         0           04:30 PM         0         <	Southbound   Westbound   Start Time   Left   Right   App. Total   Thru   Right   App. Total	Private Driveway   Southbound   Westbound   Start Time   Left   Right   App. Total   Thru   Right   App. Total   Left	Private Driveway Southbound         Oleandar Avenue Westbound         Oleandar Avenue Eastbound           Start Time         Left         Right         App. Total         Thru         Right         App. Total         Left         Thru           04:00 PM         0	Private Driveway Southbound         Oleandar Avenue Westbound         Oleandar Avenue Eastbound           Start Time         Left         Right         App. Total         Thru         Right         App. Total         Left         Thru         App. Total           04:00 PM         0

	Pr	ivate Drive	way	0	leandar Ave	enue	0	leandar Ave	enue	
		Southboun	d		Westboun	d	Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis Fr	om 04:15 P	M to 05:00 I	PM - Peak 1 o	of 1	-					
Peak Hour for Entire Ir	ntersection E	Begins at 04	:15 PM							
04:15 PM	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Weather: Clear

File Name: CRVDWOLPM Site Code : 05115195 Start Date : 4/14/2015 Page No : 2



Peak Hour Analysis From 04:15 PM to 05:00 PM - Peak 1 of 1 Peak Hour for Each Approach Begins at:

reak noul loi cacil A	pproacri begii	15 al.							
	04:15 PM			04:15 PM			04:15 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	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	0	0	0	0	0
% App. Total	0	0		0	0		0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000

County of Riverside N/S: Private Driveway E/W: Oleander Avenue Weather: Clear

File Name: CRVDWOLPM Site Code: 05115195 Start Date : 4/14/2015 Page No : 1

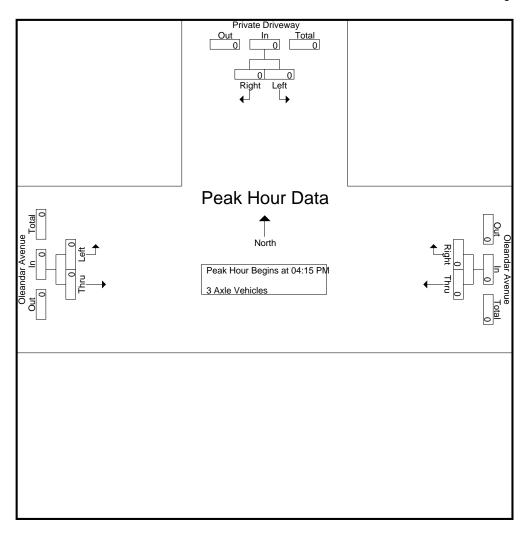
Groups Printed- 3 Avla Vahicles

	Pri	vate Drivev		roups Printe Ole	eandar Avei		Ol	eandar Ave	nue	
		Southbound			Westbound	l		Eastbound	l	
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
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_
Total	0	0	0	0	0	0	0	0	0	0
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
05:30 PM	0	0	0	0	0	0	0	0	0	0
 05:45 PM	0	0	0	0	0	0	0	0	0	0_
Total	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0		
Total %										

	Pr	ivate Drive	way	0	leandar Ave	enue	0	leandar Ave	enue	
		Southboun	d		Westboun	d	Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis Fr	om 04:15 P	M to 05:00 I	PM - Peak 1 o	of 1	-					
Peak Hour for Entire Ir	ntersection E	Begins at 04	:15 PM							
04:15 PM	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Weather: Clear

File Name: CRVDWOLPM Site Code : 05115195 Start Date : 4/14/2015 Page No : 2



Peak Hour Analysis From 04:15 PM to 05:00 PM - Peak 1 of 1 Peak Hour for Each Approach Begins at:

reak noul loi cacil A	pproacri begii	15 al.							
	04:15 PM			04:15 PM			04:15 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	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	0	0	0	0	0
% App. Total	0	0		0	0		0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000

County of Riverside N/S: Private Driveway E/W: Oleander Avenue Weather: Clear

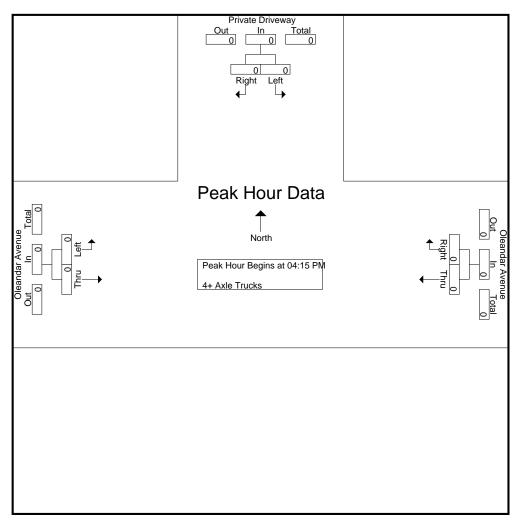
File Name: CRVDWOLPM Site Code: 05115195 Start Date : 4/14/2015 Page No : 1

	Dr	ivate Drivev		roups Printe	eandar Ave		Ο	leandar Ave	nuo	
				Oi			O I			
		Southboung			Westbound			Eastbound		
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
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
Total	0	0	0	0	0	0	0	0	0	0
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
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0		
Total %										

	Pr	ivate Drivev	way	Ol	leandar Ave	enue	0	leandar Ave	enue	
		Southbound	d		Westboun	d	Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis Fr	om 04:15 Pl	M to 05:00 F	PM - Peak 1 d	of 1	_					
Peak Hour for Entire Ir	ntersection B	Begins at 04	:15 PM							
04:15 PM	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0_
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Weather: Clear

File Name: CRVDWOLPM Site Code : 05115195 Start Date : 4/14/2015 Page No : 2



Peak Hour Analysis From 04:15 PM to 05:00 PM - Peak 1 of 1 Peak Hour for Each Approach Begins at:

reak noul loi cacil A	pproacri begii	15 al.							
	04:15 PM			04:15 PM			04:15 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	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	0	0	0	0	0
% App. Total	0	0		0	0		0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000



Date: 4/14/2015 Weather: Clear

#### PEDESTRIANS

	North Leg Private Driveway	East Leg Oleander Avenue	South Leg Private Driveway	West Leg Oleander Avenue	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	2	0	0	0	2
7:45 AM	0	0	0	0	0
8:00 AM	1	0	0	0	1
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	Ö	0	0
TOTAL VOLUMES:	3	0	0	0	3

Γ	North Leg Private Driveway	East Leg Oleander Avenue	South Leg Private Driveway	West Leg Oleander Avenue	TOTAL
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



Date: 4/14/2015 Weather: Clear

#### BICYCLES

	North Leg Private Driveway	East Leg Oleander Avenue	South Leg Private Driveway	West Leg Oleander Avenue	TOTAL
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 Private Driveway	East Leg Oleander Avenue	South Leg Private Driveway	West Leg Oleander Avenue	TOTAL
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

> County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

File Name: CRVHAHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

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

193 157 168 130 648 72 88 87 87 68 315 963 39 44 35 59 82 68 102 63 315 474 7007 9 Harley Knox Boulevard 0 50 RTOR 00-N 0000 50 Eastbound Right 16.7 0000 100 0.1 5 83.3 0.5 00  $\alpha$ 4 80 8 0000 0000 000000 84 75 106 76 341 4 4 4 4 1 54.2 933 94 24 2.4 522 Thru | Right | RTOR 2.5 81 68 102 62 313 33 35 35 36 37 Harvill Avenue Northbound 25 106 338 338 512 98.1 53.2 485 4 4 4 4 4 94.7 0000 42.9 57.1 3.0.6 0.3 33.3 66.7 26 44 37 19 108 79 58 48 293 43.5 385 91.7 Harley Knox Boulevard 0 0 Right RTOR 100 0000 0000 Westbound 26 6.2 2.7 24 92.3 104 76 48 43 271 90.9 39.6 350 20 5.2 381 9 w w w 0 7 5 87. 5 0 RTOR 0000 0000 Harvill Avenue Southbound Right 31.2 0.5 100 00 68.8 7355 81.8 18.2 07:00 AM 07:15 AM 07:30 AM 08:00 AM 08:15 AM 08:30 AM 08:45 AM Total **Grand Total** % 4+ Axle Trucks 07:45 AM Total Apprch % % Large 2 Axle Vehicles % Passenger Vehicles 4+ Axle Trucks Start Time Total % Passenger Vehicles Large 2 Axle Vehicles 3 Axle Vehicles % 3 Axle Vehicles

Harvill Avenue	ne		Harl	rley Knox	ley Knox Boulevard			Harvill Avenue	wenue		H	arley Knox	Harley Knox Boulevard		
Southbound	West	West	West	اک	Vestbound	_		Northbound	puno	_		Eastbound	onnd		
Left Thru Right App. Total Left Thru	Left		Thr	_	Right   App. Total	Total	Left	Thru	Right   App. Total	o. Total	Left	Thru	Right   App. Total		Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1	eak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:00 AM	_														
0 1 0 1 104	1 104	104		<del>-</del>	က	108	0	7	82	84	0	0	0	0	193
2 1 0 3 76	3   76	9/		0	က	26	0	0	75	22	0	0	0	0	157
2 1 0 3 48	3 48	48		က	7	28	0	0	106	106	0	_	0	_	168
3 0 0 3 43	3 43	43		2	3	48	1	0	75	92	0	2	1	3	130
7 3 0 10 271	10 271	271		9	16	293	_	7	338	341	0	က	_	4	648
70 30 0 92.5	92.5	92.5	- 1	7	5.5		0.3	9.0	99.1		0	75	25		
583 750 000 833 651		651		200	571	678	250	250	707	804	000	375	250	333	830

File Name: CRVHAHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

File Name: CRVHAHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

m m − m 0 ω 0 0 4 <del>L</del> 56.8 Inclu. Total 2 43.2 0000 4.8 000-Harley Knox Boulevard Thru | Right | RTOR 000 0000 Eastbound 0000 0000 000 0000 100 00 0 0000 0000 000 42.9 0 % 9 Thru Right RTOR ω 15 00 T 0 V Groups Printed- Large 2 Axle Vehicles Harvill Avenue Northbound 5 55.6 23.8 0 % 0000 33.3 14.3 0000 0 7 0 0 0 4.8 Left 2 0 0 3 42.9 Harley Knox Boulevard Thru Right RTOR 0000 0000 Westbound 000 4.8 77.8 33.3 000 Right RTOR 0000 0000 Harvill Avenue Southbound 000 000 0 0000 0 000 100 9.5 00 Grand Total Apprch % Total % 08:00 AM 08:15 AM 08:30 AM 07:00 AM 07:15 AM 07:30 AM 07:45 AM Total 08:45 AM Total Start Time

Harley Knox Boulevard Eastbound	al Left Thru Right App. Total Int. Total			0 0 0 0 0	2 0 0 0 0 3	1 0 0 0 0 1	0 1 0 1 3	3 0 1 0 1 10	0 100 0	
Harvill Avenue Northbound	Right App. Total			0	2	_	0	3	100	
Harvill	Left Thru			0	0 0	0	0	0 0	0	
ulevard	Right App. Total			0	0	0	0 2	0 2	0	11.
Harley Knox Boulevard Westbound	Thru			_	0	0	0	1	20	
	Fotal Left	l of 1		0	1	0	0	1 4	80	
venue	Thru Right App. Total	45 AM - Peak	t 07:00 AM	0	0	0	0	0	0	
Harvill Avenue Southbound	Thru	3 AM to 07:	nn Begins a	0	0	0	0	0	0	
	Left	-rom 07:00	Intersectio	0	_	0	0	1	100	
	Start Time	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	07:15 AM	07:30 AM	07:45 AM	Total Volume	% App. Total	!!!!

File Name: CRVHAHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Harley Knox Boulevard
Out In Total
5 5 10 Right Thru Left Peak Hour Data Peak Hour Begins at 07:00 AM Harvill Avenue
Out In Total
0 11 Large 2 Axle Vehicles North Right Harley Knox Boulevard
Out In Total

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

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

File Name: CRVHAHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

0 T O T 4 4  $\infty$ 80 Inclu. Total Exclu. Total 20 0000 0000 0 0 Harley Knox Boulevard Thru Right RTOR 0000 0000 Eastbound 0000 0000 000 0000 0000 000 Left 0000 0000 000 4 -0-က 20 Thru | Right | RTOR | App. Total 0000 -00-N 2 Harvill Avenue Northbound Groups Printed- 3 Axle Vehicles 00 0 92 0000 0000 000 Left 0 0000 0 000 က -000 4 20 App. Total Harley Knox Boulevard Thru Right RTOR 0000 0000 0 Westbound 0000 0000 000 0000 0000 000 100 0000 0000 0 Right RTOR 0000 0000 0 Harvill Avenue Southbound 0 00 000 0000 0 0000 0 000 0000 0000 000 07:00 AM 07:15 AM 07:30 AM 07:45 AM Grand Total Apprch % Total % 08:00 AM 08:15 AM 08:30 AM 08:45 AM Start Time Total Total

	Int. Total			_	_	_	_	4		1.00
				0	0	0	0	0		000.
Harley Knox Boulevard Eastbound	Right   App. Total			0	0	0	0	0	0	000
arley Knox Bou Eastbound	Thru			0	0	0	0	0	0	000
Ĭ	Left			0	0	0	0	0	0	000
	Right   App. Total			0	_	0	0	1		.250
Avenue	Right			0	_	0	0	1	100	.250
Harvill Avenue Northbound	Thru			0	0	0	0	0	0	000
	Left			0	0	0	0	0	0	000
	p. Total			_	0	_	_	3		.750
Knox Boulevard Vestbound	Right   App. Total			0	0	0	0	0	0	000.
Harley Knox Bou Westbound	Thru			0	0	0	0	0	0	000
На	Left			-	0	_	_	3	100	.750
	. Total	k 1 of 1		0	0	0	0	0		000
/enue	Thru   Right   App. Total	15 AM - Pea	07:00 AM	0	0	0	0	0	0	000.
Harvill Avenue Southbound	Thru	4M to 07:4	Begins at	0	0	0	0	0	0	000
	Left	1 00:20 mo.	ntersection	0	0	0	0	0	0	000.
	Start Time	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	07:15 AM	07:30 AM	07:45 AM	Total Volume	% App. Total	PHF

File Name: CRVHAHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Harley Knox Boulevard
Out In Total
1 3 4 Right Thru Left Harvill Avenue In Total Peak Hour Data Peak Hour Begins at 07:00 AM Out In 0 North 3 Axle Vehicles Right Harley Knox Boulevard
Out In Total

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County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

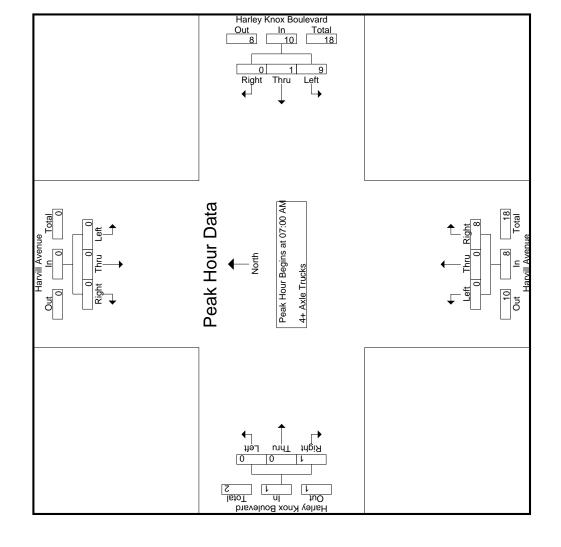
File Name: CRVHAHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

22 3 8 8 3 7 9 7 6 5 75.9 Inclu. Total 4 24.1 Exclu. Total 0000 2.4 000-Harley Knox Boulevard Thru | Right | RTOR 000 0000 Eastbound 100 0000 000 0000 0000 Left 0000 0000 000 9 43.9 8 2 - 2 0 - 0 to 0 D Thru | Right | RTOR 2 7 7 0 12 T 0 0 T Harvill Avenue Northbound Groups Printed- 4+ Axle Trucks 18 100 43.9 0 7 - 5 8 720 9 0000 0000 000 Left 0 0000 0 000 4 - w 6 7 9 8 7 7 53.7 Harley Knox Boulevard Thru Right RTOR 0000 0000 Westbound 0000 4.5 2.4 4.5 2.4 0000 20 90.9 48.8 0000 0000 0 Right RTOR 0000 0000 0 Harvill Avenue Southbound 0 000 0000 0 0000 0 0000 0000 000 Grand Total Apprch % Total % 07:00 AM 07:15 AM 07:30 AM 07:45 AM 08:00 AM 08:15 AM 08:30 AM Total 08:45 AM Total Start Time

	Int. Total			2	9	2	6	19		.528
	Total			0	0	0	_	1		.250
Harley Knox Boulevard Eastbound	Right   App.			0	0	0	_	1	100	.250
ley Knox Bou Eastbound	Thru			0	0	0	0	0	0	000
Har	Left			0	0	0	0	0	0	000
	App. Total			0	7	_	2	8		400
/enue vund	Right   A			0	7	_	2	8	100	.400
Harvill Avenue Northbound	Thru			0	0	0	0	0	0	000
	Left			0	0	0	0	0	0	000
	p. Total			7	4	_	က	10		.625
Knox Boulevard Vestbound	Right App			0	0	0	0	0	0	000
	Thru			0	0	0	_	1	10	.250
Harley \	Left			7	4	_	7	6	06	.563
	. Total	< 1 of 1		0	0	0	0	0		000
venue ound	Right App	45 AM - Peal	t 07:00 AM	0	0	0	0	0	0	000
Harvill Avenue Southbound	Thru	4M to 07:	Begins at	0	0	0	0	0	0	000
	Left	om 07:00 /	ntersection	0	0	0	0	0	0	000
	Start Time	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	07:15 AM	07:30 AM	07:45 AM	Total Volume	% App. Total	HHE

File Name: CRVHAHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

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County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

> County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

File Name: CRVHAHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

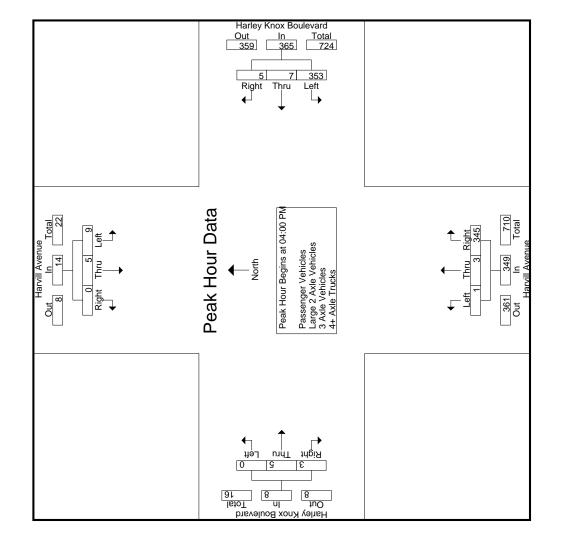
Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

1386 181 188 189 736 169 180 157 144 650 Inclu. Total 68 75 61 53 257 27.9 71 64 66 78 78 279 536 2 14.3 14.3 3 21.4 0.8 ω ∠ ← ∞ 7 20 Harley Knox Boulevard 33.3 33.3 Right RTOR 0 4 4 0 8 0000 Eastbound 3 27.3 0.2 33.3 0 F O W 0000 33.3 72.7 0.6 5 62.5 12.5 S 0000 0000 00000 73 77 85 60 295 644 46.5 1104 93.9 91 91 87 80 349 Thru | Right | RTOR 94.9 68 75 60 53 53 2.1 71 62 65 78 276 532 Harvill Avenue Northbound 638 99.1 46 594 93.1 293 90 90 80 80 Left 100 R6 80 95 104 365 95 101 67 82 345 710 51.2 650 91.5 Harley Knox Boulevard 0 0 0 Thru Right RTOR 0000 0000 Nestbound 1.1 37.5 93 101 65 82 341 694 97.7 50.1 640 92.2 84 76 93 100 353 20 90.9 4 7 0 Right RTOR 100 0000 0 - 0 Harvill Avenue Southbound 100 0.1 5 23.8 0.4 2 0000 3 1.1 O ന ന ന ത 0 0 0 0 დ ← 100 04:00 PM 04:15 PM 04:30 PM 04:45 PM 05:00 PM 05:15 PM 05:30 PM 05:45 PM Total **Grand Total** Total Apprch % % 4+ Axle Trucks Start Time Total % Large 2 Axle Vehicles % Large 2 Axle Vehicles 4+ Axle Trucks Passenger Vehicles % Passenger Vehicles 3 Axle Vehicles % 3 Axle Vehicles

		Harvill ,	Harvill Avenue		Ϋ́	Harley Knox	Knox Boulevard			Harvill Avenue	\venue		Ŧ	rley Knox	Harley Knox Boulevard		
		South	Southbound			Westbound	puno			Northbound	puno			Eastbound	puno		
Start Time	Left	Thru	Thru   Right   App. Total	). Total	Left	Thru	Right App. Total	o. Total	Left	Thru	Right   App. Total	Total	Left	Thru	Right   App. Total		Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1	From 04:00	) PM to 05	5:45 PM - Pea	k 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM	e Intersection	n Begins	at 04:00 PM														
04:00 PM	0	0	0	0	84	_	_	98	0	0	91	91	0	_	0	_	178
04:15 PM	က	7	0	2	9/	4	0	80	0	_	06	91	0	က	2	2	181
04:30 PM	က	7	0	2	93	_	_	92	_	7	84	87	0	0	_	_	188
04:45 PM	က	_	0	4	100	<del>-</del>	က	104	0	0	80	80	0	_	0	_	189
Total Volume	6	2	0	14	353	7	2	365	-	3	345	349	0	2	3	8	736
% App. Total	64.3	35.7	0		96.7	1.9	1.4		0.3	0.9	98.9		0	62.5	37.5		
PHF	.750	.625	000.	.700	.883	.438	.417	778.	.250	.375	.948	.959	000	.417	.375	.400	.974

File Name:CRVHAHKPM Site Code:05115195 Start Date:4/14/2015 Page No :2

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County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

File Name: CRVHAHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

4 m 0 m <del>4</del> 85.3 40040 29 Indu. Total 14.7 Exclu. Total 000 0 6.9 000-Harley Knox Boulevard Thru Right RTOR 0000 0000 Eastbound 0000 0000 000 000 100 6.9 000 Left 0000 0000 000 က − m 0 0 Thru Right RTOR 000 2 4 Groups Printed- Large 2 Axle Vehicles Harvill Avenue Northbound က 000 100 0000 0000 000 Left 0 0000 0 000 0 2 4 2 3 6 4 4 4 6 65.5 Harley Knox Boulevard Thru Right RTOR 0000 0000 Westbound 0000 0000 0 000 10.5 6.9 89.5 58.6 0000 Right RTOR 0000 0000 Harvill Avenue Southbound 000 0000 100 3.4 000 0000 0 0000 000 Grand Total Apprch % Total % 04:00 PM 04:15 PM 04:30 PM 04:45 PM 05:00 PM 05:15 PM 05:30 PM 05:45 PM Start Time Total Total

	Int. Total			4	3	7	2	14		.700
				0	0	0	_	1		.250
Harley Knox Boulevard Eastbound	Right App. Total			0	0	0	0	0	0	000
arley Knox Bou Eastbound	Thru			0	0	0	_	-	100	.250
<u>Ÿ</u>	Left			0	0	0	0	0	0	000
	Right App. Total			_	_	_	0	3		.750
Avenue	Right			_	_	_	0	3	100	.750
Harvill Avenue Northbound	Thru			0	0	0	0	0	0	000
	Left			0	0	0	0	0	0	000
	b. Total			က	7	_	က	6		.750
Knox Boulevard Vestbound	Right App. Total			0	0	0	0	0	0	000.
Harley Knox Bou Westbound	Thru			0	0	0	_	-	11.1	.250
На	Left			က	7	_	7	8	88.9	.667
	. Total	k 1 of 1		0	0	0	_	1		.250
enue ound	Thru Right App. Total	5 PM - Pea	04:00 PM	0	0	0	0	0	0	000.
Harvill Avenue Southbound	Thru	PM to 04:4	Begins at	0	0	0	_	1	100	.250
	Left	om 04:00 F	ntersection	0	0	0	0	0	0	000.
	Start Time	Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 04:00 PM	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total Volume	% App. Total	PHF

File Name: CRVHAHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Peak Hour Data

Peak Hour Begins at 04:00 PM

Peak Hour Data

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

File Name: CRVHAHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

		-					ı									
		Inclu. Total	3	2	9	_	15		4	က	7	_	10	25		9.79
		Exclu. Total	-	_	က	0	2		7	က	_	_	7	12		32.4
		App. Total	0	_	0	0	_	-	0	0	0	0	0	_		4
	ulevard d	70R	0	_	0	0	1		0	0	0	0	0	_		
	Harley Knox Boulevard Eastbound	Right	0	_	0	0	_		0	0	0	0	0	_	100	4
	larley k Ea	Thru	0	0	0	0	0		0	0	0	0	0	0	0	0
	_	Left	0	0	0	0	0		0	0	0	0	0	0	0	0
		App. Total	_	7	2	0	8	-	7	က	7	_	8	16		64
"	nue	OR	_	0	က	0	4		7	က	<del>-</del>	_	7	7		
/ehicles	Harvill Avenue Northbound	Right	-	_	2	0	7		7	က	7	_	80	15	93.8	09
3 Axle \	Har	Thru	0	_	0	0	-		0	0	0	0	0	_	6.2	4
inted- 3		Left	0	0	0	0	0		0	0	0	0	0	0	0	0
Groups Printed- 3 Axle Vehicles		App. Total	2	_	_	_	2	-	7	0	0	0	2	7		28
0	Harley Knox Boulevard Westbound	RTOR A	0	0	0	0	0		0	0	0	0	0	0		
	y Knox Boul Westbound	Right	-	0	0	0	_		0	0	0	0	0	~	14.3	4
	⊣arley ł W	Thru	0	_	0	0	1		0	0	0	0	0	~	14.3	4
	_	Left	-	0	_	_	3		7	0	0	0	7	2	71.4	20
		RTOR App. Total	0	_	0	0	1	-	0	0	0	0	0	_		4
	nd bd	TOR ,	0	0	0	0	0		0	0	0	0	0	0		
	Harvill Avenue Southbound	Right	0	0	0	0	0		0	0	0	0	0	0	0	0
	Harv	Thru	0	_	0	0	-		0	0	0	0	0	~	100	4
		. Fett	0	0	0	0	0		0	0	0	0	0	0	0	0
		Start Time	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total		05:00 PM	05:15 PM	05:30 PM	05:45 PM	Total	Grand Total	Apprch %	Total %

	Int. Total			က	2	9	_	15		.625
þ	Right App. Total			0	_	0	0	1		.250
Harley Knox Boulevard Eastbound	Right			0	_	0	0	-	100	.250
arley Knox Bou Eastbound	Thru			0	0	0	0	0	0	000
I	Left			0	0	0	0	0	0	000
	p. Total			_	7	2	0	8		.400
venue	Right App. Total			_	_	2	0	7	87.5	.350
Harvill Avenue Northbound	Thru			0	<del>-</del>	0	0	1	12.5	.250
	Left			0	0	0	0	0	0	.000
	App. Total			7	_	_	_	2		.625
ey Knox Boulevard Westbound	Right Ap			_	0	0	0	1	20	.250
rley Knox Bou Westbound	Thru			0	<del>-</del>	0	0	-	20	.250
Harle	Left			_	0	<b>~</b>	_	3	09	.750
	o. Total	lk 1 of 1		0	_	0	0	1		.250
venue	Thru   Right   App. Total	45 PM - Pea	t 04:00 PM	0	0	0	0	0	0	.000
Harvill Avenue Southbound	Thru	PM to 04:	Begins at	0	_	0	0	1	100	.250
	Left	rom 04:00	ntersection	0	0	0	0	0	0	000.
	Start Time	Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 04:00 PM	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total Volume	% App. Total	PHF

File Name: CRVHAHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Harley Knox Boulevard
Out In Total
7 5 12 Right Thru Left Harvill Avenue Peak Hour Data Peak Hour Begins at 04:00 PM North 3 Axle Vehicles Out Right Harley Knox Boulevard
Out In Total

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

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

File Name: CRVHAHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

31 3 9 9 9 27 82.9 58 Inclu. Total 17.1 Exclu. Total 0 - 0 0 0 3.4 0 0 Harley Knox Boulevard Thru Right RTOR - 0 0 0000 Eastbound 0000 1.7 1,7 0000 0 00 Left 0000 0000 000 37.9 4 ε ο ε e − e z e Thru | Right | RTOR 0000 2 T 0 8 T Ξ Harvill Avenue Northbound Groups Printed- 4+ Axle Trucks 22 100 37.9 0 3 13 0 N 0000 0000 000 Left 0 000 0 000 2 9 9 7 73272 34 58.6 Harley Knox Boulevard Thru Right RTOR 0000 0000 0 Westbound 0000 0000 0 000 5.9 32 94.1 55.2 2 2 2 2 5 0000 0000 0 Right RTOR 0000 0000 0 Harvill Avenue Southbound 0 000 0000 0 0000 0 0000 0000 000 Grand Total Apprch % Total % 04:00 PM 04:15 PM 04:30 PM 04:45 PM 05:00 PM 05:15 PM 05:30 PM 05:45 PM Start Time Total Total

		Harvill Avenue	Avenue		Ha	rley Knox	Harley Knox Boulevard			Harvill Avenue	\venue		Ŧ	rley Knox	Harley Knox Boulevard	
		Southbound	punoc			Westbound	punc			Northbound	puno			Eastbound	puno	
Start Time	Left	Thru	Thru Right App. Total	. Total	Left	Thru	Right App	o. Total	Left	Thru	Right App. Total	Total	Left	Thru	Right App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1	rom 04:00	PM to 04	:45 PM - Peal	k 1 of 1												
Peak Hour for Entire Intersection Begins at 04:00 PM	ntersection	n Begins	at 04:00 PM													
04:00 PM	0	0	0	0	7	_	0	က	0	0	9	9	0	0	0	ი —
04:15 PM	0	0	0	0	2	0	0	2	0	0	4	4	0	0	_	10
04:30 PM	0	0	0	0	2	_	0	9	0	0	က	က	0	0	0	6
04:45 PM	0	0	0	0	က	0	0	က	0	0	0	0	0	0	0	က
Total Volume	0	0	0	0	15	2	0	17	0	0	13	13	0	0	1	31
% App. Total	0	0	0		88.2	11.8	0		0	0	100		0	0	100	
FH	000	000	000	000	.750	.500	000	.708	000	000	542	542	000	000	250	775

File Name: CRVHAHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Harley Knox Boulevard
Out In Total
13 17 30 Right Thru 15 Left Harvill Avenue In Total Peak Hour Data Peak Hour Begins at 04:00 PM Out In 0 North 4+ Axle Trucks Right Harley Knox Boulevard

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

County of Riverside N/S: Harvill Avenue E/W: Harley Knox Road Weather: Clear

Location: County of Riverside
N/S: Harvill Avenue
E/W: Harley Knox Boulevard



Date: 4/14/2015 Weather: Clear

## PEDESTRIANS

	North Leg Harvill Avenue	East Leg Harley Knox Boulevard	South Leg Harvill Avenue	West Leg Harley Knox Boulevard	TOTAL
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	1	1
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	1	1

	North Leg Harvill Avenue	East Leg Harley Knox Boulevard	South Leg Harvill Avenue	West Leg Harley Knox Boulevard	TOTAL
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	1	0	0	1	2
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:	1	0	0	1	2

Location: County of Riverside
N/S: Harvill Avenue
E/W: Harley Knox Boulevard



Date: 4/14/2015 Weather: Clear

## BICYCLES

	North Leg Harvill Avenue	East Leg Harley Knox Boulevard	South Leg Harvill Avenue	West Leg Harley Knox Boulevard	TOTAL
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 Harvill Avenue	East Leg Harley Knox Boulevard	South Leg Harvill Avenue	West Leg Harley Knox Boulevard	TOTAL
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

N/S: Harvill Avenue E/W: Oleander Avenue County of Riverside Weather: Clear

File Name: CRVHAOLAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

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

9.69 191 152 158 136 637 70 88 86 88 312 949 4 0 4 0 0 39.3 14.3 2 - 1 5 27 Oleandar Avenue 000 0000 Eastbound Right 25.9 0.7 42.9 040 N 0 0 0 N 14.3 00000 0000 0000 00 0 0 4 0 0 74.1 20 4 56.1 496 85 78 106 80 349 93.2 532 0 RTOR 0000 0000 Harvill Avenue Northbound Right 0 0 0 00000 0.8 523 98.3 55.1 489 85 77 106 77 345 41 48 47 42 78 93.5 80 20 1.2 Ξ 0 Oleandar Avenue Right RTOR 100 0000 002-6 Westbound 72.7 100 0000 27.3 0.3 3 100 0000 00000 352 92.9 105 20 50 45 39.9 22 38 30 17 107 0 0000 0000 Harvill Avenue Right 2:9 11.2 100 357 94.2 37.6 332 93 104 68 47 42 261 18 27 13 96 ω o ω 4 0 2.9 0 + 18.2 81. 08:00 AM 08:15 AM 08:30 AM 08:45 AM 07:00 AM 07:15 AM 07:30 AM 07:45 AM Total Total **Grand Total** Apprch % Large 2 Axle Vehicles % Large 2 Axle Vehicles Total % Passenger Vehicles % Passenger Vehicles

		Harvill Avenue	Venue			Oleandar Avenue	Avenue			Harvill Avenue	\venue			Oleandar Avenue	Avenue		
		Southbound	ponua			Mesiponia	ound			Northbound	ound			Eastbound	onua		
Start Time	Left	Thru	Thru   Right   App. Total	o. Total	Left	Thru	Right   App. Total	ρ. Total	Left	Thru	Right App	App. Total	Left	Thru	Right   App. Total	o. Total	Int. Total
ysis Froi	m 07:00 µ	4M to 08.	Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1	ak 1 of 1													
Intire Inte	ersection	Begins a	Peak Hour for Entire Intersection Begins at 07:00 AM														
07:00 AM	0	104	_	105	0	0	0	0	0	82	0	82	_	0	0	_	191
07:15 AM	0	89	4	72	0	0	0	0	_	77	0	78	_	0	_	7	152
07:30 AM	_	47	7	20	0	0	_	_	0	106	0	106	_	0	0	_	158
07:45 AM	0	42	က	45	0	0	0	0	_	77	2	80	7	0	4	=	136
Total Volume	_	261	10	272	0	0	_	-	2	345	2	349	10	0	2	15	637
% App. Total	0.4	96	3.7		0	0	100		9.0	98.9	9.0		2.99	0	33.3		
PHF	250	627	625	648	000	000	250	250	500	814	250	823	357	000	313	341	834

0 100

0000

0

0 0

0 0

% 4+ Axle Trucks

4+ Axle Trucks

3 Axle Vehicles % 3 Axle Vehicles

File Name: CRVHAOLAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Oleandar Avenue
ut In Total
1 4 Out 3 Right 0 Thru Left Peak Hour Data Peak Hour Begins at 07:00 AN 615 Total Total 628 Passenger Vehicles Large 2 Axle Vehicles 3 Axle Vehicles 4+ Axle Trucks Harvill Avenue 266 349 [ Out In Out In 356 272 North Right Oleandar Avenue
Out In Total
TS 15 21

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

N/S: Harvill Avenue E/W: Oleander Avenue County of Riverside Weather: Clear

File Name: CRVHAOLAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

Inclu. Total Exclu. Total 0 - - 0 2 **-0** 8 Oleandar Avenue 0000 0000 Eastbound 0000 1 25 2.7 00 000 0000 0000 0 -L 0 2 0 0 0 0 <u>0</u> 0 5 4 2 5 Right | RTOR 0000 0000 Groups Printed- Large 2 Axle Vehicles Harvill Avenue Northbound 0000 000 4.3 91.3 56.8 0 0 0 0 <u>0</u> 0 0 0000 0000 Right | RTOR Oleandar Avenue 0000 0000 0 Westbound 000 0 000 000 0000 0000 0 7 - 8 9 9 Right | RTOR 0000 0000 Harvill Avenue Southbound 000 0000 0 000 80 21.6 **-04** 7 7 0 4 0000 00000 20 20 5.4 07:00 AM 07:15 AM 07:30 AM 07:45 AM 08:00 AM 08:15 AM 08:30 AM Apprch % Total % Total **Grand Total** Start Time 08:45 AM Total

2 8 3 2 5

100 37

10.8

ω ro 4 4 6

	Int. Total			2	2	3	8	21		.656
	Right   App. Total			0	_	_	0	2		.500
Oleandar Avenue Eastbound	Right	)		0	0	0	0	0	0	000
Oleanda Eastl	Thru			0	0	0	0	0	0	000
	Left			0	_	_	0	2	100	.500
	Right   App. Total			5	2	_	5	13		.650
Harvill Avenue Northbound	Right /	)		0	0	0	1	-	7.7	.250
Harvill A	Thru			4	7	_	4	11	84.6	.688
	Left			_	0	0	0	-	7.7	.250
	pp. Total			0	0	0	0	0		000
Avenue ound	Right   App. Total	1		0	0	0	0	0	0	000
Oleandar Avenue Westbound	Thru			0	0	0	0	0	0	000
	Left			0	0	0	0	0	0	000
	p. Total	ak 1 of 1		0	7	_	3	9		.500
venue	Thru Right App. Total	45 AM - Pe	t 08:00 AM	0	0	0	0	0	0	000
Harvill Avenue Southbound	Thru	AM to 08:	n Begins a	0	7	_	-	4	2.99	.500
	Left	-rom 07:00	Intersection	0	0	0	2	2	33.3	.250
	Start Time	Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 08:00 AM	08:00 AM	08:15 AM	08:30 AM	08:45 AM	Total Volume	% App. Total	PHF

27

File Name: CRVHAOLAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

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

File Name: CRVHAOLAM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

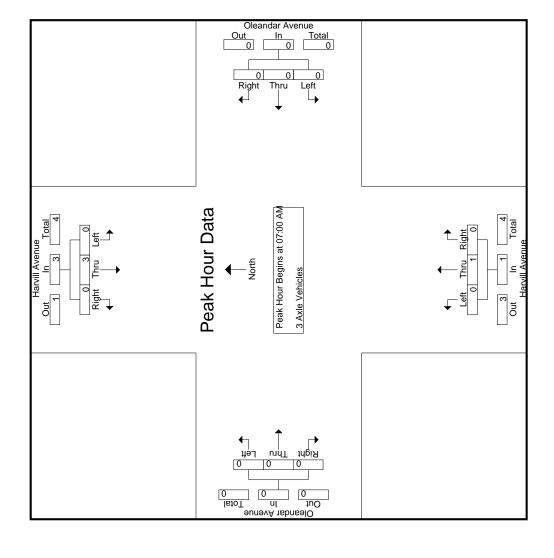
County of Riverside N/S: Harvill Avenue E/W: Oleander Avenue Weather: Clear

			Total	7	_	_	0	4	7	_	0	0	3	7		100
			I Indu. Total	_	_	_	_	_	_	_	_		_	_		_
			Exclu. Total	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
	nue		RTOR ,	0	0	0	0	0	0	0	0	0	0	0		
	<b>Oleandar Avenue</b>	Eastbound	Right R	0	0	0	0	0	0	0	0	0	0	0	0	0
	Olear	Ĕ	Thru	0	0	0	0	0	0	0	0	0	0	0	0	0
			Left	0	0	0	0	0	0	0	0	0	0	0	0	0
			App. Total	0	_	0	0	_	_	_	0	0	2	<u>e</u>		45.9
	enc	рc	RTOR   A	0	0	0	0	0	0	0	0	0	0	0		
ehicles	Harvill Avenue	Northbound	Right	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Axle Vehicles	Harv	No	Thru	0	_	0	0	-	_	_	0	0	2	က	100	42.9
inted- 3			Left	0	0	0	0	0	0	0	0	0	0	0	0	0
Groups Printed-			App. Total	0	0	0	0	0	0	0	0	0	0	0		0
Ю	enne	q	RTOR	0	0	0	0	0	0	0	0	0	0	0		
	andar Avenue	Westbound	Right F	0	0	0	0	0	0	0	0	0	0	0	0	0
	Olean	We	Thru R	0	0	0	0	0	0	0	0	0	0	0	0	0
			Left	0	0	0	0	0	0	0	0	0	0	0	0	0
			App. Total	2	0	_	0	က	_	0	0	0	1	4		57.1
	e e	-	RTOR	0	0	0	0	0	0	0	0	0	0	0		
	Harvill Avenue	Southbound	Right   R	0	0	0	0	0	0	0	0	0	0	0	0	0
	Harvil	Sout	Thru R	2	0	_	0	က	_	0	0	0	_	4	100	57.1
			Left T	0	0	0	0	0	0	0	0	0	0	0	0	0
			Start Time L	07:00 AM	07:15 AM	07:30 AM	07:45 AM	Total	08:00 AM	08:15 AM	08:30 AM	08:45 AM	Total	Grand Total	Apprch %	Total %

		Harvill	Harvill Avenue Southbound			Oleandar Avenue Westbound	Avenue			Harvill Avenue Northbound	venue			Oleandar Avenue Eastbound	Avenue	
Start Time	Left	Thru	Thru Right App. Total	p. Total	Left	Thru	Right App. Total	ر. Total	Left	Thru	Right App. Total	p. Total	Left	Thru	Right App. Total	al Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1	From 07:00	AM to 0	8:45 AM - Pea	ak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:00 AM	Intersection	n Begins	at 07:00 AM													
07:00 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0 2
07:15 AM	0	0	0	0	0	0	0	0	0	_	0	_	0	0	0	0
07:30 AM	0	_	0	_	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	3	0	3	0	0	0	0	0	_	0	-	0	0	0	0 4
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0	
DHE	000	375	000	375	000	000	000	000	000	250	000	250	000	000	000	200

File Name: CRVHAOLAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

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



File Name: CRVHAOLAM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

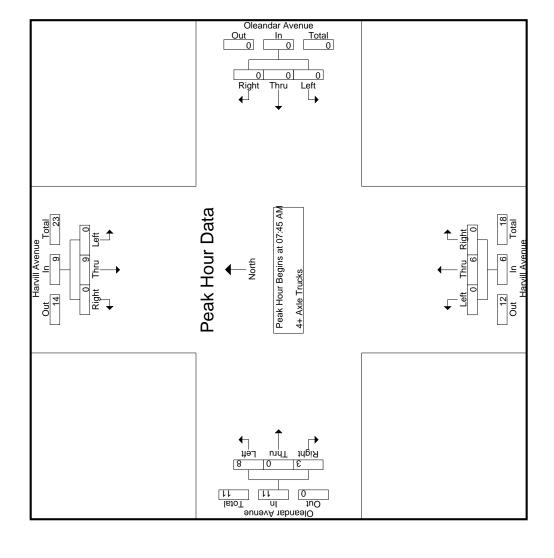
County of Riverside N/S: Harvill Avenue E/W: Oleander Avenue Weather: Clear

	ı	_			_		١.								
		Inclu. Total	1	က	2	1	17	4	2	9	က	18	35		01
		Exclu. Total	0	0	0	_	-	0	0	0	0	0	_		c
		App. Total	0	0	0	7	7	2	0	7	_	2	12		0,0
enne	ور	RTOR	0	0	0	_	-	0	0	0	0	0	_		
Oleandar Avenue	Eastbound	Right	0	0	0	က	က	0	0	0	0	0	က	25	0
Olear	Ш̈	Thru	0	0	0	0	0	0	0	0	0	0	0	0	•
		Left	0	0	0	4	4	2	0	7	_	2	თ	22	1
		App. Total	1	_	_	_	4	_	_	က	_	9	10		0
nue	na	RTOR	0	0	0	0	0	0	0	0	0	0	0		
Harvill Avenue	Northbound	Right	0	0	0	0	0	0	0	0	0	0	0	0	•
Har	ž	Thru	-	_	_	_	4	_	_	က	_	9	10	100	
		Left	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		
enue	pu	RTOR	0	0	0	0	0	0	0	0	0	0	0		
Oleandar Avenue	Westbound	Right	0	0	0	0	0	0	0	0	0	0	0	0	
Olea	>	Thru	0	0	0	0	0	0	0	0	0	0	0	0	•
		Left	0	0	0	0	0	0	0	0	0	0	0	0	
		App. Total	0	7	_	က	9	_	4	_	_	7	13		
en .	ō	RTOR 4	0	0	0	0	0	0	0	0	0	0	0		
Harvill Avenue	Southbound	Right	0	0	0	0	0	0	0	0	0	0	0	0	,
Har	So	Thru	0	7	_	က	9	_	4	-	-	7	13	100	
			0	0	0	0	0	0	0	0	0	0	0	0	•
		Start Time	07:00 AM	07:15 AM	07:30 AM	07:45 AM	Total	08:00 AM	08:15 AM	08:30 AM	08:45 AM	Total	Grand Total	Apprch %	

	Int. Total			1	4	2	9	26		591
	Right App. Total			7	7	0	2	11		.393
Oleandar Avenue Eastbound	Right /	)		က	0	0	0	3	27.3	.250
Oleandar Ave Eastbound	Thru			0	0	0	0	0	0	000
	Left			4	7	0	2	8	72.7	.500
	Right App. Total			_	_	_	3	9		200
Avenue	Right /			0	0	0	0	0	0	000
Harvill Avenue Northbound	Thru			_	_	_	က	9	100	.500
	Left			0	0	0	0	0	0	000
	App. Total			0	0	0	0	0		000
Avenue	Right A	1		0	0	0	0	0	0	000
Oleandar Avenue Westbound	Thru			0	0	0	0	0	0	000
	Left			0	0	0	0	0	0	000
	o. Total	1k 1 of 1		က	~	4	_	6		.563
venue	Thru Right App. Total	45 AM - Pea	t 07:45 AM	0	0	0	0	0	0	000
Harvill Avenue Southbound	Thru	AM to 08:4	Begins at	က	_	4	_	6	100	.563
	Left	.00:20 mo.	ntersection	0	0	0	0	0	0	000
	Start Time	Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 07:45 AM	07:45 AM	08:00 AM	08:15 AM	08:30 AM	Total Volume	% App. Total	HHH

File Name: CRVHAOLAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

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N/S: Harvill Avenue E/W: Oleander Avenue County of Riverside Weather: Clear

File Name: CRVHAOLPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

8.00 0 0 0 0 0 0 175 167 167 178 176 696 161 183 155 138 637 1333 2.9 18 46.2 0 8 8 2 4 404 4 38 Oleandar Avenue RTOR 0 - 0 0 -0000 9 Eastbound Right 10.5 00 0 4 4 0 6 Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks 0000000000 0000 0000 89.5 2.6 34 47.1 69 77 84 57 287 579 95.2 45.6 809 RTOR 0000 0000 0 Harvill Avenue Northbound Right 0 0 0 3 2 100 68 74 83 56 281 88 77 75 78 78 318 599 98.5 44.9 570 95.2 0.2 Left 100 3 85.7 7 Oleandar Avenue Right RTOR 8 00 0000 Westbound 61.5 0.6 87.5 000 9 7.7 30.8 0.3 0000 87 99 66 80 80 631 93.5 50.6 78 76 92 342 674 100 0000 0 0 0 Harvill Avenue Southbound Right 1.6 81.8 86 97 63 79 325 98.1 49.6 619 93.6 35 94 98 336 9 661 0000 0000 0.3 100 05:00 PM 05:15 PM 05:30 PM 05:45 PM 04:00 PM 04:15 PM 04:30 PM 04:45 PM Total Total **Grand Total** Apprch % Total % Passenger Vehicles % Passenger Vehicles

		Harvill,	Harvill Avenue			Oleandar Avenue	Avenue			Harvill Avenue	\venue			Oleandaı	Oleandar Avenue		
		South	Southbound			Westbound	puno			Northbound	puno			Eastbound	puno		
Start Time	Left	Thru	Thru   Right   App. Total	pp. Total	Left	Thru	Right   App. Total	pp. Total	Left	Thru	Right /	App. Total	Left	Thru	Right   App. Total	p. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1	From 04:00	) PM to 05	5:45 PM - Pe	eak 1 of 1			1								1		
Peak Hour for Entire Intersection Begins at 04:30 PM	Intersection	n Begins	at 04:30 PN	1													
04:30 PM	0	91	_	95	_	0	_	2	0	75	_	92	∞	0	0	-	178
04:45 PM	0	94	7	96	0	0	0	0	0	78	0	78	7	0	0	7	176
05:00 PM	0	98	_	87	0	_	0	_	0	89	_	69	4	0	0	4	161
05:15 PM	0	26	2	66	0	0	က	က	0	74	က	77	7	0	7	4	183
Total Volume	0	368	9	374	_	_	4	9	0	295	2	300	16	0	2	18	869
% App. Total	0	98.4	1.6		16.7	16.7	66.7		0	98.3	1.7		88.9	0	11.1		
HHE	000	.948	.750	944	.250	.250	.333	.500	000	.946	.417	.962	.500	000	.250	.563	954

35.9

0 0

4

17.6 12 35.3

0 0 0

14.3

0 0 0

20

8.2

Large 2 Axle Vehicles % Large 2 Axle Vehicles 3 Axle Vehicles % 3 Axle Vehicles

21 3.1

21 23 3.2

0000

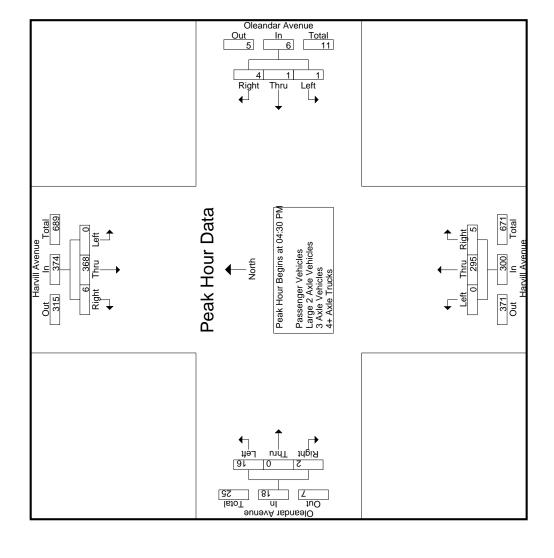
% 4+ Axle Trucks

4+ Axle Trucks

0 0

File Name: CRVHAOLPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

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



File Name: CRVHAOLPM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

County of Riverside N/S: Harvill Avenue E/W: Oleander Avenue Weather: Clear

		Indu. Total	4	က	4	4	15		9	2	7	က	16		31		100
		Exclu. Total	0	0	0	0	0		0	0	0	0	0		0		0
		App. Total E	0	0	0	0	0		0	0	0	0	0	-	0		0
	enne,	0 R	0	0	0	0	0		0	0	0	0	0		0		
	Oleandar Avenue Fastbound	Right	0	0	0	0	0		0	0	0	0	0		0	0	0
	Olear	Thru	0	0	0	0	0		0	0	0	0	0		0	0	0
		Left	0	0	0	0	0		0	0	0	0	0		0	0	0
		App. Total	2	0	7	-	2	,	_	က	0	0	4	-	<u>ი</u>		59
ses	nue d	9 R	0	0	0	0	0		0	0	0	0	0		0		
e Vehic	Harvill Avenue	Right	0	0	0	0	0		0	0	0	0	0		0	0	0
e 2 Axl	Harv	Thru	2	0	7	_	2		<del>-</del>	က	0	0	4		တ	100	53
d- Larg		Left	0	0	0	0	0		0	0	0	0	0		0	0	0
Groups Printed- Large 2 Axle Vehicles		App. Total	0	7	0	0	2		0	0	0	0	0	-	7		6.5
Gro	enne	70R	0	0	0	0	0		0	0	0	0	0		0		
	leandar Avenue Westhound	Right	0	_	0	0	_		0	0	0	0	0		_	20	3.2
	Olean	Thru	0	0	0	0	0		0	0	0	0	0		0	0	0
		. Feft	0	_	0	0	_		0	0	0	0	0		_	20	3.2
		RTOR App. Total	2	_	7	3	8		2	7	7	က	12	-	20		64.5
	one or	RTOR	0	0	0	0	0		0	0	0	0	0		0		
	Harvill Avenue Southbound	Right	0	0	<del>-</del>	0	_		<del>-</del>	0	0	0	7		7	10	6.5
	Harv	Thru	2	_	<del>-</del>	က	7		4	7	7	က	11		9	8	58.1
		. Feft	0	0	0	0	0		0	0	0	0	0		0	0	0
		Start Time	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total		05:00 PM	05:15 PM	05:30 PM	05:45 PM	Total	. !	Grand Total	Apprch %	Total %

				-		7								-	ν	Г
		HarvIII	HarvIII Avenue			Oleandar Avenue	Avenue			HarvIII Avenue	4venue			Oleandai	Oleandar Avenue	
		South	Southbound			Westbound	pund			Northbound	punoc			Eastbound	puno	
Start Time	Left	Thru	Thru Right App. Total	pp. Total	Left	Thru	Right   App. Total	p. Total	Left	Thru	Right	App. Total	Left	Thru	Right   App. Total	al Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1	From 04:30	) PM to 0	5:15 PM - P	eak 1 of 1												
Peak Hour for Entire Intersection Begins at 04:30 PM	Intersectio	in Begins	at 04:30 PN	_												
04:30 PM	0	, —	_	2	0	0	0	0	0	2	0	2	0	0	0	0   4
04:45 PM	0	က	0	က	0	0	0	0	0	_	0	_	0	0	0	4
05:00 PM	0	4	_	2	0	0	0	0	0	<del>-</del>	0	_	0	0	0	9
05:15 PM	0	7	0	2	0	0	0	0	0	3	0	3	0	0	0	0 5
Total Volume	0	10	2	12	0	0	0	0	0	7	0	7	0	0	0	0 19
% App. Total	0	83.3	16.7		0	0	0		0	100	0		0	0	0	
PHF	000	.625	200	009	000	000	000	000	000	.583	000	.583	000	000	000.	0 792

File Name: CRVHAOLPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Oleandar Avenue
It In Total
0 Out Right Left 0 Thru Peak Hour Data Peak Hour Begins at 04:30 PM Total 19 17 Total Harvill Avenue Large 2 Axle Vehicles Out In 7 North 10 Out Right Oleandar Avenue
Out In Total

2 0 2

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

File Name: CRVHAOLPM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

County of Riverside N/S: Harvill Avenue E/W: Oleander Avenue Weather: Clear

										Groups Printed- 3 Axle Vehicles	rinted-	3 Axle	Vehicle	S								
		_	Harvill Avenue	enne			Olea	andar Aver	wenue			Ha	Harvill Avenue	nue			Olea	Oleandar Avenue	enne			
			Southbound	nud				Westbound	nua		f	Z	Northbound	9		_	Ш	Eastbound	<u>0</u>			
Start Time	Left	Thru	J Right	RTOR	App. Total	Left	Thru	l Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Indu. Total
04:00 PM	0		1 0	0	_	0	0	0	0	0	0	-	0	0	1	0	0	0	0	0	0	2
04:15 PM	0		0	0	_	0	0	0	0	0	0	0	0	0	0	7	0	0	0	2	0	က
04:30 PM	0	_	0	0	J	0	0	0	0	0	0	4	0	0	4	7	0	0	0	2	0	•
04:45 PM	0	_	0	0	J	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	_
Total	0	.,	2 0	0	2	0	0	0	0	0	0	2	0	0	5	4	0	0	0	4	0	<del>,</del>
05:00 PM	0	•	0	0	_	<u> </u>	0	0	0	0	0	0	0	0	0	<del>-</del>	0	0	0	_	0	2
05:15 PM	0	_	0	0	J	0	0	0	0	0	0	7	0	0	7	_	0	0	0	_	0	က
05:30 PM	0	_	0	0	J	0	0	0	0	0	0	က	0	0	က	0	0	_	0	_	0	4
05:45 PM	0	_	0 0	0	ی	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	2	0	0	2	7	0	_	0	က	0	6
Grand Total	0	.,	3 0	0	က	0		0	0	0	0	10	0	0	10	9	0	_	0	7	0	20
Apprch %	0	9	0			0	0	0			0	100	0			85.7	0	14.3				
Total %	0	15	0		15	0	0	0		0	0	20	0		20	30	0	2		35	0	100

		Harvill	Harvill Avenue			Oleandar Avenue	Ανουιο			Harvill Avenue	allow			Oleandar Avenue	Ανουιο	Γ	
		South	Southbound			Westbound	onud			Northbound	ound			Eastbound	onuq		
Start Time	Left	Thru	Thru Right App. Total	ρ. Total	Left	Thru	Right Ap	App. Total	Left	Thru	Right A	App. Total	Left	Thru	Right App. Total		Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1	From 04:30	PM to 0	5:15 PM - Pe	ak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM	Intersection	n Begins	at 04:30 PM														
04:30 PM	0	,0	0	0	0	0	0	0	0	4	0	4	7	0	0	7	9
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	_	2
05:15 PM	0	0	0	0	0	0	0	0	0	2	0	2	7	0	0	-	3
Total Volume	0	-	0	-	0	0	0	0	0	9	0	9	4	0	0	4	11
% App. Total	0	100	0		0	0	0		0	100	0		100	0	0		
PHF	000	.250	000	.250	000	000	000	000	000	375	000	375	.500	000	.000	.500	.458

File Name: CRVHAOLPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Oleandar Avenue
It In Total
0 Right Left 0 Thru Peak Hour Data Peak Hour Begins at 04:30 PM Total 11 7 Total Out In 10 North 3 Axle Vehicles Out Right Oleandar Avenue

Nut In Total

August August

Out

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

File Name: CRVHAOLPM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

County of Riverside N/S: Harvill Avenue E/W: Oleander Avenue Weather: Clear

			Inclu. Total	7	10	4	က	24	2	œ	2	က	21	45	0	3																
			Exclu. Total In	0	0	0	0	0	0	0	0	0	0	0	Ó	>																
		Eastbound	App. Total E	4	7	_	0	7	2	7	7	_	7	4		31.1																
	Oleandar Avenue		RTOR /	0	0	0	0	0	0	0	0	0	0	0																		
			stboun	Right	0	0	0	0	0	0	7	0	0	2	7	14.3	<del>4</del> .															
	Olean	Ea	Thru	0	0	0	0	0	0	0	0	0	0	0	0 0	>																
			Left	4	7	_	0	7	7	0	7	_	2	12	85.7	7.07																
		Northbound	Northbound	App. Total	_	က	_	0	2	2	_	_	_	2	10		7.77															
	ne			Northbound	RTOR A	0	0	0	0	0	0	0	0	0	0	0																
Trucks	Harvill Avenue				thboun	thboun	thboun	thboun	Right	0	0	0	0	0	0	0	0	0	0	0	0 0	0										
+ Axle					Thru	-	က	_	0	2	2	_	_	_	2	10	100	7.77														
inted- 4			Left	0	0	0	0	0	0	0	0	0	0	0	0 0	0																
Groups Printed- 4+ Axle Trucks		Westbound	App. Total	0	0	0	0	0	0	0	0	0	0	0	(	_ o																
g	nue		Westbound	RTOR	0	0	0	0	0	0	0	0	0	0	0																	
	Oleandar Avenue			Right	0	0	0	0	0	0	0	0	0	0	0	0	0															
	Olean			Thru	0	0	0	0	0	0	0	0	0	0	0	0 0	>															
			Left	0	0	0	0	0	0	0	0	0	0	0	0 0	>																
			App. Total	2	2	7	က	12	_	2	7	_	6	21	1	40./																
	Ф	Southbound	Southbound	Southbound	Southbound	Southbound	Southbound	Southbound	Southbound	Southbound									RTOR App	0	0	0	0	0	0	0	0	0	0	0		
	Harvill Avenue										Right RT	0	0	0	0	0	0	0	0	0	0	0	0 0	>								
											Sout	Sout	Sout	Sout	Sout	Thru Ri	2	2	7	က	12	_	2	7	_	6	21	100	0.7			
			Left	0	0	0	0	0	0	0	0	0	0	0	00	O 4																
			Start Time L	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total	05:00 PM	05:15 PM	05:30 PM	05:45 PM	Total	Grand Total	Apprch %	l otal %																

	Int. Total			4	3	2	8	20		.625
	Right App. Total			_	0	2	2	2		.625
Deandar Avenue Eastbound	Right A	)		0	0	0	2	2	40	.250
Oleandar Ave	Thru			0	0	0	0	0	0	000
	Left			_	0	7	0	3	09	375
	App. Total			_	0	7	_	4		.500
venue	Right Ap			0	0	0	0	0	0	000.
Harvill Avenue Northbound	Thru			_	0	7	-	4	100	.500
	Left			0	0	0	0	0	0	000
	App. Total			0	0	0	0	0		000
Avenue	Right Ap			0	0	0	0	0	0	000.
Oleandar Avenue Westbound	Thru			0	0	0	0	0	0	000
	Left			0	0	0	0	0	0	000
	o. Total	ık 1 of 1		7	က	_	2	1		.550
venue	Thru Right App. Total	15 PM - Pea	: 04:30 PM	0	0	0	0	0	0	000
Harvill Avenue Southbound	Thru	PM to 05:7	Begins at	7	က	_	2	7	100	.550
	Left	rom 04:30	ntersection	0	0	0	0	0	0	000
	Start Time	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	04:45 PM	05:00 PM	05:15 PM	Total Volume	% App. Total	HHH

File Name: CRVHAOLPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Peak Hour Data

Peak Hour Data

Peak Hour Data

At Akle Tucks

At Akke Tucks

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

Location: County of Riverside N/S: Harvill Avenue E/W: Oleander Avenue



Date: 4/14/2015 Weather: Clear

## PEDESTRIANS

_	North Leg Harvill Avenue	East Leg Oleander Avenue	South Leg Harvill Avenue	West Leg Oleander Avenue	TOTAL
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	Ō	Ö	Ö	0
TOTAL VOLUMES:	0	0	0	0	0

	North Leg Harvill Avenue	East Leg Oleander Avenue	South Leg Harvill Avenue	West Leg Oleander Avenue	TOTAL
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	1	1
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	1	1

Location: County of Riverside N/S: Harvill Avenue E/W: Oleander Avenue



Date: 4/14/2015 Weather: Clear

## BICYCLES

	North Leg Harvill Avenue	East Leg Oleander Avenue	South Leg Harvill Avenue	West Leg Oleander Avenue	TOTAL
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	Ō	Ö	1	1
TOTAL VOLUMES:	0	0	0	1	1

	North Leg Harvill Avenue	East Leg Oleander Avenue	South Leg Harvill Avenue	West Leg Oleander Avenue	TOTAL
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

N/S: I-215 Southbound Ramps E/W: Harley Knox Road County of Riverside

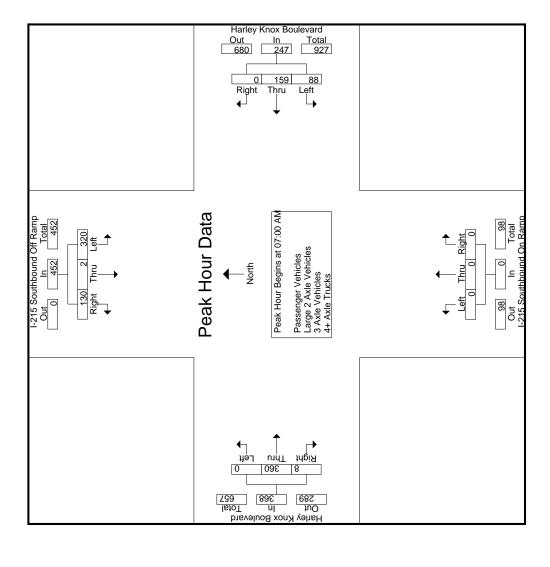
Weather: Clear

File Name: CRV215SHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

	1-215	Southbou	I-215 Southbound Off Ramp		H	Irley Knox	Harley Knox Boulevard		1-215	Southbou	I-215 Southbound On Ramp		<sup>光</sup> 	arley Knox	Harley Knox Boulevard		
		Southbound	punoc			Westbound	puno			Northbound	puno			Eastbound	puno		
Start Time	Left	Thru	Thru   Right   App. Total	. Total	Left	Thru	Right App. Total	p. Total	Left	Thru	Right   App. Total	، Total	Left	Thru	Right   App. Total		Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1	From 07:00	AM to 08	:45 AM - Peak	k 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM	Intersection	n Begins ε	at 07:00 AM														
07:00 AM	73	0	23	96	21	83	0	104	0	0	0	0	0	84	-	82	285
07:15 AM	79	0	35	114	23	44	0	29	0	0	0	0	0	80	0	8	261
07:30 AM	72	7	39	113	26	18	0	44	0	0	0	0	0	110	2	112	269
07:45 AM	96	0	33	129	18	14	0	32	0	0	0	0	0	86	2	9	252
Total Volume	320	2	130	452	88	159	0	247	0	0	0	0	0	360	8	368	1067
% App. Total	70.8	0.4	28.8		35.6	64.4	0		0	0	0		0	97.8	2.2		
шПППППППППППППППППППППППППППППППППППППП	833	250	833	876	846	470	000	594	000	000	000	000	000	818	400	221	036

File Name: CRV215SHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

County of Riverside N/S: I-215 Southbound Ramps E/W: Harley Knox Road Weather: Clear



County of Riverside N/S: I-215 Southbound Ramps E/W: Harley Knox Road Weather: Clear

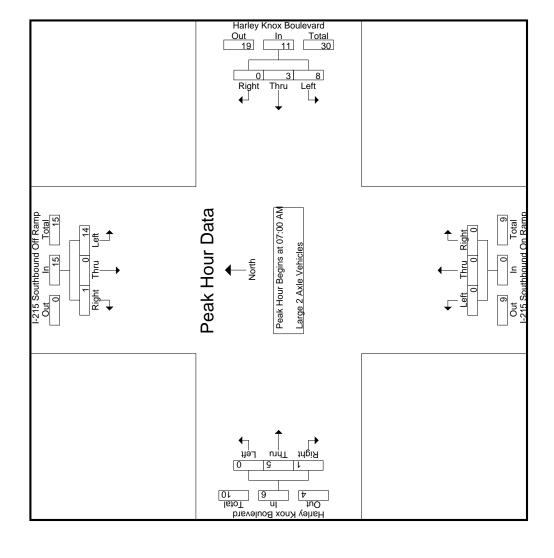
File Name: CRV215SHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

	Inclu. Total	8	7	∞	တ	32	13	9	7	13	39	71	
	Exclu. Total	0	0	_	_	2	0	0	0	_	~	က	
ס	App. Total	_	2	_	2	9	3	_	_	2	7	13	
oulevar od	RTOR	0	0	0	_	_	0	0	0	0	0	_	
y Knox Boul Eastbound	Right	0	0	0	_	_	0	0	0	0	0	~	7.7
Harley Knox Boulevard Eastbound	Thru	-	7	_	_	2	က	<del>-</del>	_	7	7	12	92.3
_	Left	0	0	0	0	0	0	0	0	0	0	0	0
dme	App. Total	0	0	0	0	0	0	0	0	0	0	0	
JON R	RTOR	0	0	0	0	0	0	0	0	0	0	0	
I-215 Southbound On Ramp Northbound	Right	0	0	0	0	0	0	0	0	0	0	0	0
15 Soul	Thru	0	0	0	0	0	0	0	0	0	0	0	0
<u>-</u> 2	Left	0	0	0	0	0	0	0	0	0	0	0	0
g	App. Total	က	~	7	2	11	4	_	7	2	6	20	
oulevar nd	RTOR	0	0	0	0	0	0	0	0	0	0	0	
y Knox Boul Westbound	Right	0	0	0	0	0	0	0	0	0	0	0	0
Harley Knox Boulevard Westbound	Thru	2	0	0	_	3	0	0	0	_	~	4	20
	Left	-	_	7	4	8	4	_	7	_	8	16	80
dun	App. Total	4	4	2	2	15	9	4	4	6	23	38	
J Off Re	RTOR	0	0	_	0	_	0	0	0	_	_	7	
Southbound O	Right	0	0	_	0	_	~	0	0	7	3	4	10.5
I-215 Southbound Off Ramp Southbound	Thru	0	0	0	0	0	0	0	0	0	0	0	0
<u>7</u>	Left	4	4	4	7	14	2	4	4	7	20	34	89.5
	Start Time	07:00 AM	07:15 AM	07:30 AM	07:45 AM	Total	08:00 AM	08:15 AM	08:30 AM	08:45 AM	Total	Grand Total	Apprch %

Westbound         Northbound         Eastbound         Eastbound         Eastbound           1         Thru         Right         App. Total         Left         Thru         Right         App. Total         Left         Thru           1         2         0         3         0         0         0         0         1           2         0         0         0         0         0         0         2         0         1           4         1         0         5         0         0         0         0         1         1           8         3         0         11         0         0         0         0         0         0         0           500         375         .000         .550         .000         .000         .000         .000         .625		1-215	Southbou	I-215 Southbound Off Ramp		Ha	Harley Knox	Knox Boulevard		1-215	Southbou	215 Southbound On Ramp		Ha	rley Knox	Harley Knox Boulevard		
ak 1 of 1			Southb	punoc			Westbo	puno			Northb	puno			Eastbo	punc		
ak1 of 1  4	Start Time	Left	Thru	Right App	. Total	Left	Thru	Right Ap	p. Total	Left	Thru	Right App	ر. Total	Left	Thru	Right   App. Total		Int. Total
4         1         2         0         3         0         0         0         0         0         0         1         0         1         1         0	our Analysis	From 07:00	AM to 07:	:45 AM - Pea	k 1 of 1													
4         0         0         0         0         0         0         0         0         1         2         0	<b>Jour for Entire</b>	Intersection	Begins a	at 07:00 AM														
4         0         0         1         0         1         1         0         0         0         0         0         0         1         1         0	07:00 AM	4	0	0	4	_	7	0	က	0	0	0	0	0	_	0	_	80
4         0         1         5         2         0         0         0         0         0         0         0         1           2         0         0         0         0         0         0         0         0         1           14         0         1         15         8         3         0         11         0         0         0         0         0         1           93.3         0         6.7         75.7         27.3         0         0         0         0         0         0         0         83.3           875         .000         .250         .375         .000         .550         .000         .000         .000         .000         .000         .625	07:15 AM	4	0	0	4	_	0	0	_	0	0	0	0	0	7	0	7	7
2         0         0         0         0         0         0         0         1           14         0         1         1         1         1         0	07:30 AM	4	0	_	2	7	0	0	7	0	0	0	0	0	_	0	_	∞
14         0         1         0	07:45 AM	7	0	0	7	4	_	0	2	0	0	0	0	0	_	_	7	6
93.3 0 6.7 72.7 27.3 0 0 0 0 0 0 83.3 875 000 250 750 500 375 000 550 000 000 000 000 625	otal Volume	14	0	1	15	8	3	0	11	0	0	0	0	0	2	1	9	32
875 .000 .250 .750 .500 .375 .000 .550 .000 .000 .000 .000 .000	App. Total	93.3	0	6.7		72.7	27.3	0		0	0	0		0	83.3	16.7		
	PHF	.875	000	.250	.750	.500	.375	000	.550	000	000	000.	000.	000	.625	.250	.750	.889

File Name: CRV215SHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

County of Riverside N/S: I-215 Southbound Ramps E/W: Harley Knox Road Weather: Clear



File Name: CRV215SHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

	<u>-</u> 7	15 Sou	I-215 Southbound Off Ramp	d Off Ra	ımp		Harley Knox Boulevard	(nox Bo	ulevard		1-21	5 South	punoqu	I-215 Southbound On Ramp	0	I	arley K	Harley Knox Boulevard	levard			
		Ø	Southbound	pur	-		,Š	Westbound	ō			ž	Northbound	ъ			́в	Eastbound	_			
Start Time	Left	Thru	Right RTOR	RTOR	App. Total	Left	Thru	Right	ror	App. Total	Left	Thru	Right   F	RTOR Ap	App. Total	Left	Thru	Right R	RTOR A	App. Total	Exclu. Total	Indu. Total
07:00 AM	7	0	-	-	80	က	0	0	0	က	0	0	0	0	0	0	0	0	0	0	-	1
07:15 AM	9	0	0	0	9	2	0	0	0	7	0	0	0	0	0	0	_	0	0	_	0	6
07:30 AM	7	0	_	_	3	_	0	0	0	_	0	0	0	0	0	0	0	0	0	0	_	4
07:45 AM	<del>-</del>	0	_	0	2	_	0	0	0	_	0	0	0	0	0	0	0	0	0	0	0	က
Total	16	0	က	7	19	7	0	0	0	7	0	0	0	0	0	0	-	0	0	-	2	27
08:00 AM	_	0	0	0	~	2	~	0	0	<u>е</u>	0	0	0	0	0	0	~	0	0	_	0	2
08:15 AM	က	0	0	0	က	0	0	0	0	0	0	0	0	0	0	0	_	0	0	_	0	4
08:30 AM	7	0	0	0	2	_	0	0	0	_	0	0	0	0	0	0	0	0	0	0	0	က
08:45 AM	10	0	0	0	10	_	0	0	0	_	0	0	0	0	0	0	_	0	0	_	0	12
Total	16	0	0	0	16	4	_	0	0	2	0	0	0	0	0	0	3	0	0	3	0	24
Grand Total	32	0	က	7	35		_	0	0	12	0	0	0	0	0	0	4	0	0	4	7	51
Apprch %	91.4	0	8.6			91.7	8.3	0			0	0	0			0	100	0				
Fotal %	62.7	C	5.0		686		c	_		700	c	c	c		•	c	1	(		1	0	0

	Int. Total			1	6	4	က	27		.614
0	Right App. Total			0	_	0	0	1		.250
Harley Knox Boulevard Eastbound	Right /	,		0	0	0	0	0	0	000
Harley Kno East	Thru			0	_	0	0	-	100	.250
_	Left			0	0	0	0	0	0	000
dw	Right App. Total			0	0	0	0	0		000.
-215 Southbound On Ramp Northbound	Right <sup>≠</sup>			0	0	0	0	0	0	000
5 Southbor North	Thru			0	0	0	0	0	0	000
1-21	Left			0	0	0	0	0	0	000
	pp. Total			က	2	_	_	7		.583
Knox Boulevard Vestbound	Right App. Total			0	0	0	0	0	0	000
Harley Knox Bou Westbound	Thru			0	0	0	0	0	0	000
Ï	Left			က	7	_	_	7	100	.583
<del>ر</del>	pp. Total	ak 1 of 1		00	9	က	7	19		.594
nd Off Ran ound	Right Ag	45 AM - Pe	t 07:00 AM	_	0	_	_	3	15.8	.750
I-215 Southbound Off Ramp Southbound	Thru Right App. Total	AM to 07:	n Begins at	0	0	0	0	0	0	000
1-215	Left	rom 07:00	Intersection	7	9	7	_	16	84.2	.571
	Start Time	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	07:15 AM	07:30 AM	07:45 AM	Total Volume	% App. Total	PHF

File Name: CRV215SHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Haufely Knox Boulevarid

Out

North

Haufely Knox Boulevarid

Out

North

North

North

Left

Thu Right

Out

North

North

North

Left

Thu Right

Left

Thu Right

Out

North

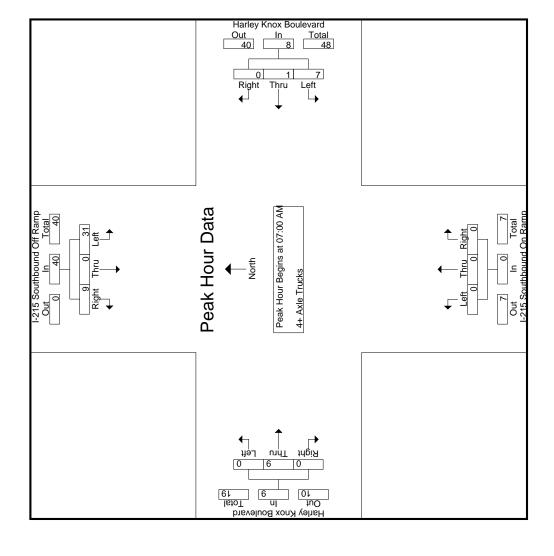
Nort

File Name: CRV215SHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

	ı		ı				١.					l _			
		Inclu. Total	11	19	80	19	25	10	21	20	1	62	119		
		Exclu. Total	0	0	0	_	1	_	_	2	0	4	2		
		App. Total	0	က	0	9	6	_	7	9	7	10	19		
oulevar	pu	RTOR	0	0	0	0	0	0	0	0	0	0	0		
Harley Knox Boulevard	Eastbound	Right	0	0	0	0	0	_	_	0	_	3	က	15.8	
Harley	Ē	Thru	0	က	0	9	6	0	<del>-</del>	9	0	7	16	84.2	
		Left	0	0	0	0	0	0	0	0	0	0	0	0	
amp		App. Total	0	0	0	0	0	0	0	0	0	0	0		
d On R	Ind	RTOR	0	0	0	0	0	0	0	0	0	0	0		
-215 Southbound On Ramp	Northbound	Right	0	0	0	0	0	0	0	0	0	0	0	0	
15 Sou	Z	Thru	0	0	0	0	0	0	0	0	0	0	0	0	
꼬		Left	0	0	0	0	0	0	0	0	0	0	0	0	
d I-215 Southbound		App. Total	_	7	2	က	8	8	2	4	2	14	22		
oulevar	nd	RTOR	0	0	0	0	0	0	0	0	0	0	0		
Harley Knox Boulevard	Westbound	Right	0	0	0	0	0	0	0	0	0	0	0	0	
Harley	<u> </u>	Thru	0	0	0	_	_	0	<del>-</del>	_	0	2	က	13.6	
		Left	_	7	7	7	7	က	4	က	7	12	19	86.4	
dmi		App. Total	10	4	9	10	40	9	14	10	8	38	78		
Off Ra	nd	RTOR	0	0	0	_	_	_	<del>-</del>	7	0	4	2		
hbounc	Southbound	Right	2	4	_	7	6	7	9	7	-	11	20	25.6	
I-215 Southbound Off Ramp	SC	Thru	0	0	0	0	0	0	0	0	0	0	0	0	
1-2		Left	ω	10	2	∞	31	4	∞	∞	7	27	28	74.4	
		Start Time	07:00 AM	07:15 AM	07:30 AM	07:45 AM	Total	08:00 AM	08:15 AM	08:30 AM	08:45 AM	Total	Grand Total	Apprch %	

	Int. Total			1	19	∞	19	25		.750
				0	က	0	9	6		375
Harley Knox Boulevard Eastbound	Right   App. Total			0	0	0	0	0	0	000
rrley Knox Bou Eastbound	Thru			0	က	0	9	6	100	375
He	Left			0	0	0	0	0	0	000
dw	Right App. Total			0	0	0	0	0		000
I-215 Southbound On Ramp Northbound	Right /			0	0	0	0	0	0	000
Southboo Northb	Thru			0	0	0	0	0	0	000
1-215	Left			0	0	0	0	0	0	000
	p. Total			_	7	7	က	8		667
Knox Boulevard Vestbound	Right App. Total			0	0	0	0	0	0	000
Harley Knox Bou Westbound	Thru			0	0	0	_	1	12.5	250
H	Left			_	7	7	7	7	87.5	875
0	. Total	k 1 of 1		10	4	9	10	40		714
I-215 Southbound Off Ramp Southbound	Thru Right App. Total	45 AM - Pea	t 07:00 AM	7	4	_	7	6	22.5	563
Southbound Off Southbound	Thru	AM to 07:	Begins a	0	0	0	0	0	0	000
1-215	Left	rom 07:00	Intersection	∞	10	2	∞	31	77.5	775
	Start Time	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	07:15 AM	07:30 AM	07:45 AM	Total Volume	% App. Total	HHG.

File Name: CRV215SHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2



County of Riverside N/S: I-215 Southbound Ramps E/W: Harley Knox Road Weather: Clear

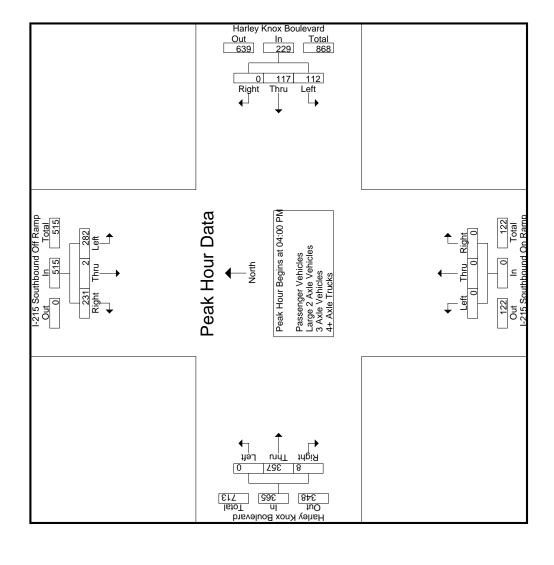
File Name: CRV215SHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No:1

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			Indu. Total	258	273	295	283	1108	243	247	241	216	947	1	2026		93.4	0	O	0	0	0	0	0	0
			Exclu. Total	12	17	21	22	72	26	18	16	14	74		146		9.9	0	0	0	0	0	0	0	0
			App. Total E	88	83	96	91	365	9/	9/	87	61	300	1	665		32.3	615	92.5	12	1.8	15	2.3	23	3.5
	vard			0	0	0	0	0	0	0	0	0	0	,	_				0		0		0		0
	Boule	punc	It RTOR			7		8	0	_	_	_	3		_	7	2	œ	7	2	2	0	0	_	_
cks	Harley Knox Boulevard	Eastbound	ı Right											•		1.7	0.5		72.7		18.2				9.1
kle Tru	Harle		Thru	88	86	8	88	357	76	75	86	9	297	i	65	98.3	31.8	209	92.8	10	1.5	15	2.3	22	3.4
- 4+ A			Left	0	0	0	0	0	0	0	0	0	0	_	_	0	0	0	0	0	0	0	0	0	0
hicles	dر		App. Total	0	0	0	0	0	0	0	0	0	0	(	>		0	0	0	0	0	0	0	0	0
Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks	I-215 Southbound On Ramp	-	RTOR   A	0	0	0	0	0	0	0	0	0	0	(	>				0		0		0		0
les - 3 '	) puno	Northbound	Right   R	0	0	0	0	0	0	0	0	0	0	(	>	0	0	0	0	0	0	0	0	0	0
Vehic	Southb	Nort	Thru Ri	0	0	0	0	0	0	0	0	0	0	(	>	0	0	0	0	0	0	0	0	0	0
2 Axle	1-215		Left Th	0	0	0	0	0	0	0	0	0	0	,	>	0	0	0	0	0	0	0	0	0	0
- Large				9:	22	09	_	229	- <del>7</del>	9	47	98	183	_	412		20	000	.2	8	1.9	10	2.4	4	4.
hicles	5		App. Total	7	u,	U		22	4)	7	7	(,)	18		4		.,	380	92.2		1		2		က
ger Ve	ouleva	nd	RTOR	0	0	0	0	0	0	0	0	0	0	(	>				0		0		0		0
Passen	Knox Boulevard	estbound	Right	0	0	0	0	0	0	0	0	0	0	(	>	0	0	0	0	0	0	0	0	0	0
	Harley P	We	Thru		21	34	40	117	33	28	25	27	113	0	730	55.8	11.2	212	92.2	2	2.2	9	5.6	7	က
Groups Printed-	_		Left	24	31	56	31	112	21	18	22	6	20		187	44.2	8.9	168	92.3	3	1.6	4	2.2	7	3.8
G.			App. Total	123	132	139	121	515	113	125	107	119	464	-	6/6		47.6	982	87.3	42	3.7	16	4.1	82	9.7
	I-215 Southbound Off Ramp			2	7	_	2	2	9	œ	16	4	4	,	٥						4.1		4.		6.2
	JJO pur	puno	nt RTOR			6 21		1 72					7 74		8 146	ø.	3	2	6 88.4	9		2	4	2	
	outhboo	Southbound	u   Right	1	0	99 (	- 5	2 231	3	7	) 42		5 227	,			3 22.3	7 415		) 16	3.5	_	0.4		5.5
	215 Sc		Thr		U	U		2	(1)	U		2	2	'		0.7	0.3	-	100	0	0	0	0	0	0
			Left	65	79	73	65	282	51	53	65	63	232	; -	514	52.5	25	431	83.9	20	3.9	12	2.3	51	9.9
			Start Time	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total	05:00 PM	05:15 PM	05:30 PM	05:45 PM	Total	- - -	Grand Lotal	Apprch %	Total %	Passenger Vehicles	% Passenger Vehicles	Large 2 Axle Vehicles	% Large 2 Axle Vehicles	3 Axle Vehicles	% 3 Axle Vehicles	4+ Axle Trucks	% 4+ Axle Trucks

		Int. Total			258	273	295	283	1109		.940
		pp. Total			68	68	96	91	365		.951
Harley Knox Boulevard	pund	Right   App. Total			0	က	7	က	8	2.2	.667
ırley Knox	Eastbound	Thru			83	98	94	88	357	97.8	.949
유		Left			0	0	0	0	0	0	000
dw		Right   App. Total			0	0	0	0	0		000.
I-215 Southbound On Ramp	puno	Right   A			0	0	0	0	0	0	000
Southbou	Northbound	Thru			0	0	0	0	0	0	000
1-215		Left			0	0	0	0	0	0	000
		o. Total			46	25	09	7.1	229		908.
Knox Boulevard	punc	Right   App. Total			0	0	0	0	0	0	000
Harley Knox	Westbound	Thru			22	21	34	40	117	51.1	.731
光		Left			24	31	56	31	112	48.9	.903
0		o. Total	ık 1 of 1		123	132	139	121	515		.926
I-215 Southbound Off Ramp	puno	Thru Right App. Total	45 PM - Pea	t 04:00 PM	22	53	99	55	231	44.9	.875
Southbou	Southbound	Thru	PM to 05:	n Begins a	,–	0	0	_	2	0.4	.500
1-215		Left	rom 04:00	ntersection	92	26	73	65	282	54.8	.892
		Start Time	Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 04:00 PM	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total Volume	% App. Total	PHF

File Name: CRV215SHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

County of Riverside N/S: I-215 Southbound Ramps E/W: Harley Knox Road Weather: Clear



> County of Riverside N/S: I-215 Southbound Ramps E/W: Harley Knox Road Weather: Clear

File Name: CRV215SHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

10 4 10 00 8 9 8 4 26 90.3 26 Inclu. Total Exclu. Total 9.7 21.4 00040 9 12 7007 Harley Knox Boulevard Right RTOR 0000 0000 Eastbound 2 16.7 3.6 10 83.3 17.9 2 30 20000 000 0000 000 0 0000 I-215 Southbound On Ramp Thru | Right | RTOR 0000 0000 Groups Printed- Large 2 Axle Vehicles Northbound 000 0 0000 000 0000 0000 000 Left 0 000 0 000 20802 ω 14.3 Harley Knox Boulevard Thru Right RTOR 0000 0000 0 Vestbound 0 0000 0 000 62.5 8.9 3 37.5 5.4 64.3 36 7 I-215 Southbound Off Ramp Thru Right RTOR 4 0077 N Southbound 44.4 28.6 0 0 0 000 0000 000 55.6 35.7 7 0007 20 Grand Total Apprch % Total % 05:00 PM 05:15 PM 05:30 PM 05:45 PM 04:00 PM 04:15 PM 04:30 PM 04:45 PM Total Total Start Time

	Int. Total			7	2	4	10	30		.682
7	Right   App. Total			7	0	0	4	9		.375
Harley Knox Boulevard Eastbound	Right   A			0	0	0	_	1	16.7	.250
arley Kno Eastt	Thru			7	0	0	က	2	83.3	.417
Ï	Left			0	0	0	0	0	0	000
amp	Right   App. Total			0	0	0	0	0		000
I-215 Southbound On Ramp Northbound	Right			0	0	0	0	0	0	000
Southbound O Northbound	Thru			0	0	0	0	0	0	000
I-215	Left			0	0	0	0	0	0	000
	App. Total			0	_	0	7	3		375
Knox Boulevard Vestbound	Right A			0	0	0	0	0	0	000
Harley Knox Bou Westbound	Thru			0	0	0	_	1	33.3	250
H	Left			0	_	0	<del>-</del>	2	2.99	200
0	o. Total	lk 1 of 1		တ	4	4	4	21		583
I-215 Southbound Off Ramp Southbound	Left   Thru   Right   App. Total	:45 PM - Pea	at 04:00 PM	3	_	2	က	6	42.9	750
Southbound Off Southbound	Thru	PM to 04:	Begins a	0	0	0	0	0	0	000
1-215		rom 04:00	Intersection	9	က	7	_	12	57.1	200
	Start Time	Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 04:00 PM	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total Volume	% App. Total	HH

File Name: CRV215SHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Peak Hour Data

Peak Hour Data

Peak Hour Data

Peak Hour Begins at 04:00 PM

Peak Hour Data

County of Riverside N/S: I-215 Southbound Ramps E/W: Harley Knox Road Weather: Clear

County of Riverside N/S: I-215 Southbound Ramps E/W: Harley Knox Road Weather: Clear

File Name: CRV215SHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

Groups Printed- 3 Axle Vehicles

9 4 8 8 39 95.1 Inclu. Total 4.9 Exclu. Total 38.5 7007 ω 15 Harley Knox Boulevard Thru Right RTOR 0000 0000 Eastbound 0 0000 000 100 232  $\infty$ 15 000 0000 000 0 0000 I-215 Southbound On Ramp Thru Right RTOR 0000 0000 Northbound 000 0 0000 000 000 0 0000 000 Left 0 000 0 000 0000 25.6 Harley Knox Boulevard Thru Right RTOR 0000 0000 Westbound 0 0 000 60 15.4 40 10.3 35.9 9 4 I-215 Southbound Off Ramp Thru Right RTOR 000 000 Southbound 14.3 5.1 0000 0 0 000 0 12 85.7 30.8 0 2 - 0007 Grand Total Apprch % Total % 04:00 PM 04:15 PM 04:30 PM 04:45 PM 05:00 PM 05:15 PM 05:30 PM 05:45 PM Total Total Start Time

	Int. Total			7	2	7	2	21		.750
7	Right   App. Total			_	_	4	_	7		438
Harley Knox Boulevard Eastbound	Right   ₽	,		0	0	0	0	0	0	000
arley Kno Eastt	Thru			_	_	4	_	7	100	438
Ï	Left			0	0	0	0	0	0	000
amp	App. Total			0	0	0	0	0		000
I-215 Southbound On Ramp Northbound	Right			0	0	0	0	0	0	000
Southbound O Northbound	Thru			0	0	0	0	0	0	000
1-215	Left			0	0	0	0	0	0	000
	App. Total			2	_	7	0	8		400
Knox Boulevard Vestbound	Right			0	0	0	0	0	0	000
Harley Knox Bou Westbound	Thru			က	0	7	0	2	62.5	417
На	Left			7	_	0	0	3	37.5	375
0	o. Total	lk 1 of 1		_	က	_	_	9		200
I-215 Southbound Off Ramp Southbound	Left Thru Right App. Total	:45 PM - Pea	at 04:00 PM	0	0	0	<b>~</b>	1	16.7	250
Southbound Off Southbound	Thru	PM to 04	Begins a	0	0	0	0	0	0	000
1-215		rom 04:00	ntersection	-	က	_	0	2	83.3	417
	Start Time	Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 04:00 PM	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total Volume	% App. Total	HHE

File Name: CRV215SHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Peak Hour Data

Right Thru Left

North

North

Schribbund Off Ramp

Right Thru Left

A Akie Vehicles

Schribbund Off Ramp

Right Thru Left

A Schribbund Off Ramp

Right Thru Left

Total

Schribbund Off Ramp

Right Thru Left

A Schribbund Off Ramp

Right Thru Left

Total

Schribbund Off Ramp

North

Total

Schribbund Off Ramp

A Schribbund Off Ramp

Right Thru Left

Total

Schribbund Off Ramp

North

Total

Schribbund Off Ramp

North

Total

Harley Knox Boulevard
Out In Total
12 8 20

File Name: CRV215SHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

County of Riverside N/S: 1-215 Southbound Ramps E/W: Harley Knox Road

Weather: Clear

18 17 17 61 11 16 25 25 25 92.6 Inclu. Total Exclu. Total 20.4 6 4 4 4 6 0 0 0 <u>0</u> Harley Knox Boulevard Right RTOR 0000 0000 Eastbound 0000 4.3 -00 22 95.7 19.5 3000 0 W 0000 0000 000 0000 0 I-215 Southbound On Ramp Thru Right RTOR 0000 0000 Northbound Groups Printed- 4+ Axle Trucks 000 0 0000 000 0000 0000 000 Left 0 000 0 000 9 4 12.4 Harley Knox Boulevard Thru Right RTOR 0000 0000 Westbound 0000 000 0 000 50 50 6.2 67.3 98 8 2 9 38 I-215 Southbound Off Ramp Thru Right RTOR 4 0 % - 4 2 Southbound 25 32.9 22.1 9 0000 0 0 0 000 6 7 8 28 6 6 6 23 45.1 67.1 5 Grand Total Apprch % Total % 05:00 PM 05:15 PM 05:30 PM 05:45 PM 04:00 PM 04:15 PM 04:30 PM 04:45 PM Total Total Start Time

	Int. Total			18	15	17	1	61		.847
_	App. Total			2	က	2	0	13		.650
Harley Knox Boulevard Eastbound	Right			0	0	0	0	0	0	000
larley Kno Eastt	Thru			2	က	2	0	13	100	.650
	Left			0	0	0	0	0	0	000
dw	App. Total			0	0	0	0	0		000.
-215 Southbound On Ramp Northbound	Right A			0	0	0	0	0	0	000
Southbound O Northbound	Thru			0	0	0	0	0	0	000
1-21	Left			0	0	0	0	0	0	000
	App. Total			2	က	_	_	10		.500
Knox Boulevard Vestbound	Right A			0	0	0	0	0	0	000
Harley Knox Bou Westbound	Thru			_	7	~	<del>-</del>	2	20	.625
Ĭ	Left			4	_	0	0	2	20	.313
٩	p. Total	ak 1 of 1		<b>∞</b>	<u></u>	7	10	38		.864
I-215 Southbound Off Ramp Southbound	Thru   Right   App. Total	45 PM - Pe	: 04:00 PM	2	7	4	2	10	26.3	.625
Southbound Of Southbound	Thru	PM to 04:	Begins at	0	0	0	0	0	0	000
1-215	Left	rom 04:00	ntersection	9	7	7	∞	28	73.7	.875
	Start Time	Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 04:00 PM	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total Volume	% App. Total	PHF

File Name: CRV215SHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Harley Knox Bonlevard

A HAVIE Trucks

Wight Thru Right

Harley Knox Boulevard

A HAVIE Trucks

Harley Knox Boulevard

A HAVIE Trucks

A HAVIE

Location: County of Riverside
N/S: I-215 Southbound Ramps
E/W: Harley Knox Boulevard



Date: 4/14/2015 Weather: Clear

## PEDESTRIANS

	North Leg I-215 Southbound Ramps	East Leg Harley Knox Boulevard	South Leg I-215 Southbound Ramps	West Leg Harley Knox Boulevard	TOTAL
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 Harley Knox Boulevard	South Leg I-215 Southbound Ramps	West Leg Harley Knox Boulevard	TOTAL
4:00 PM	0	0	0	0	0
4:15 PM	1	0	0	0	1
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:	1	0	0	0	1

Location: County of Riverside
N/S: I-215 Southbound Ramps
E/W: Harley Knox Boulevard



Date: 4/14/2015 Weather: Clear

## BICYCLES

	North Leg I-215 Southbound Ramps	East Leg Harley Knox Boulevard	South Leg I-215 Southbound Ramps	West Leg Harley Knox Boulevard	TOTAL
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 Harley Knox Boulevard	South Leg I-215 Southbound Ramps	West Leg Harley Knox Boulevard	TOTAL
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

> City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

File Name: PER215NHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

		Inclu. Total	346	310	313	309	1278	192	186	211	193	782	2060		91.7	0	0	0	0	0	0	0	C
		Exclu. Total	28	21	21	41	111	16	9 9	22	22	9/	187		8.3	0	0	0	0	0	0	0	c
_		App. Total	153	158	181	182	674	60	0 6	117	102	404	1078		52.3	919	85.3	20	4.6	33	3.1	9/	7
Harley Knox Boulevard	p	RTOR	0	0	0	0	0	C	0	0	0	0	0				0		0		0		c
Knox B	Eastbound	Right	0	0	0	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<
Harley		Thru	112	119	131	126	488	55	8 29	8	73	268	756	70.1	36.7			42	5.6	31	4.1	62	0
		Left	4	39	20	26	186	27	3 i	49	29	136	322	29.9	15.6	298	92.5	8	2.5	2	9.0	14	7
dmr		App. Total	24	14	17	35	06	20	14	21	29	84	174		8.4	273	87.2	12	3.8	8	2.6	20	9
d Off Ra	pur	RTOR	22	4	4	29	62	5	5	9 2	20	99	139				87.1		4.3		2.2		Ú
I-215 Northbound Off Ramp	Northbound	Right	24	4	4	34	98	7.	9	19	22	99	152	87.4	7.4	133	87.5	9	3.9	4	2.6	6	4
215 Nor	Z	Thru	0	0	0	0	0	_	. 0	· <del>-</del>	က	2	2	2.9	0.2	2	100	0	0	0	0	0	c
2-		Left	0	0	က	1	4	4	4	· <del>-</del>	4	13	17	9.8	0.8	14	82.4	0	0	1	5.9	2	7
_		App. Total	169	138	115	92	514	8	62	73	62	294	808		39.2	682	79.7	69	8.1	26	က	79	C
oulevar	þ	RTOR	9	7	7	12	32	4	. დ	4	7	16	48				75		14.6		2.1		o
y Knox Boulevard	Nestbound	Right	71	71	73	09	275	54	49	4	37	184	459	56.8	22.3	352	76.7	39	8.5	16	3.5	52	77.0
Harley	\$	Thru	98	29	42	32	239	26	30	29	25	110	349	43.2	16.9	294	84.2	23	9.9	6	2.6	23	Ü
		Left	0	0	0	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	c
dui		App. Total	0	0	0	0	0	C	0	0	0	0	0		0	0	0	0	0	0	0	0	c
On Ra	pu	RTOR	0	0	0	0	0	C	0	0	0	0	0				0		0		0		c
I-215 Northbound On Ramp	Southbound	Right	0	0	0	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	c
15 Nort	ഗ്	Thru	0	0	0	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	c
1-2		Left	0	0	0	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	c
		Start Time	07:00 AM	07:15 AM	07:30 AM	07:45 AM	Total	08:00 AM	08:15 AM	08:30 AM	08:45 AM	Total	Grand Total	Apprch %	Total %	Passenger Vehicles	% Passenger Vehicles	Large 2 Axle Vehicles	% Large 2 Axle Vehicles	3 Axle Vehicles	% 3 Axle Vehicles	4+ Axle Trucks	H

ff Ramp Harley	nd Eastbound	light App. Total Left Thru Right App. Total Int. Total				24 41 112 0 153	24 41 112 0 153 14 39 119 0 158	24 41 112 0 153 14 39 119 0 158 17 50 131 0 181	24 41 112 0 153 14 39 119 0 158 17 50 131 0 181 35 56 126 0 182	24 41 112 0 14 39 119 0 17 50 131 0 35 56 126 0 90 186 488 0	24 41 112 0 153 14 39 119 0 158 17 50 131 0 181 35 56 126 0 182 90 186 488 0 674 1 27.6 72.4 0
thbound Right App. Total	Right App. Total					24	24 14	24 14 17	24 41 71 35	24 17 35 90	24 14 17 35 90
Northbou Left Thru F	Thru					0	00	000	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 3 3 0 0 4 4 0 4.4 0
		op. Total				169	169	169 138 115	169 138 115	169 138 115 92 514	169 138 115 92 514
Vestbound		Right   App. Total				7.1	7 7 7	12 L Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	71 71 73 60	71 71 73 60 275	71 71 73 60 275 53.5
Westb		Thru				86	96 67	98 67 42	98 67 42 32	98 67 42 32 239	98 67 42 32 239 46.5
		Left	1		_	0	00	000	0000	0000	0 0 0 0 0
pur		Thru Right App. Total	5 AM - Peak 1 of 1	7:00 AM		0 0	0 0	000	0000	0 0 0 0	00000
Southbound		Thru	0 AM to 08:45	on Begins at 0	,	0	00	000	0000	0000	00000
		Left	From 07:00	Intersectio	c	>	<b>&gt;</b> 0	000	000	0000	0000
		Start Time	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		07:15 AM	07:15 AM 07:30 AM	07:15 AM 07:30 AM 07:45 AM	07:15 AM 07:30 AM 07:45 AM Total Volume	07:15 AM 07:30 AM 07:45 AM Total Volume % App. Total

File Name: PER215NHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

> City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

File Name: PER215NHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

17 11 16 57 13 13 20 61 90.1 Inclu. Total 6.6 42.4 22 4 7 5 6 7 6 10 28 20 Harley Knox Boulevard Thru | Right | RTOR 0000 0000 Eastbound 0000 0000 000 42 84 35.6 8 7 4 8 0 4 0 24 0000 4 I-215 Northbound Off Ramp Thru Right RTOR 0 0 0 0 4 -007 Groups Printed- Large 2 Axle Vehicles Northbound 0 0 0 0 9 5.1 0000 0000 000 Left 0 000 0 000 9 4 9 1 2 9 o **⊳** 9 o 52.5 Harley Knox Boulevard Thru Right RTOR 4 0 Westbound 62.9 33.1 3 2 9 9 37.1 19.5 9 5 0000 I-215 Northbound On Ramp Thru Right RTOR 0000 0000 Southbound 0 0000 00000 0000 000 Grand Total Apprch % Total % 07:00 AM 07:15 AM 07:30 AM 07:45 AM 08:00 AM 08:15 AM 08:30 AM Total 08:45 AM Total

	Int. Total			17		13	16			.838
ard	Right App. Total			9	2	7	4	22		.786
Harley Knox Boulevard Eastbound	Right			0	0	0	0	0	0	000
Harley Kn Eas	Thru			4	က	7	4	18	81.8	.643
	Left			2	7	0	0	4	18.2	.500
dw	Right App. Total			2	2	0	0	4		.500
I-215 Northbound Off Ramp Northbound	Right /			7	7	0	0	4	100	.500
5 Northbound Oi Northbound	Thru			0	0	0	0	0	0	000
1-21	Left			0	0	0	0	0	0	000.
	App. Total			6	4	9	12	31		.646
Knox Boulevard	Right A			7	7	က	9	18	58.1	.643
Harley Knox Bou Westbound	Thru			7	7	က	9	13	41.9	.542
Ĭ 	Left			0	0	0	0	0	0	000
۵	p. Total	ak 1 of 1		0	0	0	0	0		000.
d On Ram und	Right Ap	5 AM - Pe	07:00 AM	0	0	0	0	0	0	000
I-215 Northbound On Ramp Southbound	Left Thru Right App. Total	₹M to 07:4	Begins at	0	0	0	0	0	0	000
1-215	ı	om 07:00 t	ntersection	0	0	0	0	0	0	000.
	Start Time	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	07:15 AM	07:30 AM	07:45 AM	Total Volume	% App. Total	PHF

File Name: PER215NHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Peak Hour Data

Peak Hour Begins at 07:00 AM

Peak Hour Begins at

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

> City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

File Name: PER215NHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

Groups Printed- 3 Axle Vehicles

6 6 6 32 11 8 7 2 31 63 94 Inclu. Total 52.4 16 33 2 4 - 01 -Harley Knox Boulevard Thru Right RTOR 0000 0000 Eastbound 0000 0000 000 93.9 49.2 15 16 Left 000  $\alpha$ 000-7.9 I-215 Northbound Off Ramp Thru Right RTOR Northbound 00 0 80 0000 0000 000 Left 0 0 1.6 9 2 2 2 - 2 2 5 39.7 Harley Knox Boulevard Thru Right RTOR 0000 0 00 Westbound 16 64 25.4 2 8 0000 I-215 Northbound On Ramp Thru Right RTOR 0000 0000 Southbound 0 0000 0000 0000 000 Grand Total Apprch % Total % 07:00 AM 07:15 AM 07:30 AM 07:45 AM 08:00 AM 08:15 AM 08:30 AM Total 08:45 AM Total

	App. lotal   Left - Peak 1 of 1 AM 0 0 0 0 0 0		Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1 Peak Hour Entire Intersection Begins at 07:00 AM  0 0 0 0 0 07:00 AM 0 0 0 0 07:15 AM 0 0 0 0 07:30 AM 0 0 0 0
0	AM 0 0 0 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	egins at 07:00 AM 0 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ntersection Begins at 07:00 AM  0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0
	- Peak 1 of 1 AM 0 0 0 0	1 to 07:45 AM - Peak 1 of 1 9gins at 07:00 AM 0 0 0 0 0 0 0 0 0 0 0 0	rom 07:00 AM to 07:45 AM - Peak 1 of 1  ntersection Begins at 07:00 AM  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0
		to 07:45 AM egins at 07:00 0 0 0 0 0 0	rom 07:00 AM to 07:45 AM ntersection Begins at 07:00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

File Name: PER215NHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Peak Hour Data

Peak Hour Begins at 07:00 AM

A ANIe Vehicles

Peak Hour Begins at 07:00 AM

Pea

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road

Weather: Clear

File Name: PER215NHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

16 20 23 21 86 92.6 17 19 15 76 Inclu. Total Exclu. Total 13 8 35 46.9 o 2 4 4 4 Harley Knox Boulevard Thru Right RTOR 0000 0000 Eastbound 0000 0000 000 62 81.6 38.3 9 2 2 2 8 10001 8 18.4 8.6 0 9 1 7 7 က − ω ω ∞ I-215 Northbound Off Ramp Thru | Right | RTOR က **-0289** 000-Northbound Groups Printed- 4+ Axle Trucks 9 81.8 5.6 0 0 0 က 0 3 8 0 0000 0000 000 18.2 1.2 Left 0 8 4 0 0 2 8 5 5 5 5 5 46.3 Harley Knox Boulevard Thru Right RTOR 0000 Westbound 52 69.3 32.1 7 23 30.7 14.2 0000 I-215 Northbound On Ramp Thru Right RTOR 0000 0000 Southbound 0 0000 0 0000 0000 0000 000 07:00 AM 07:15 AM 07:30 AM 07:45 AM Grand Total Apprch % Total % 08:00 AM 08:15 AM 08:30 AM Total 08:45 AM Total

	Int. Total			17	19	15	25	9/		.760
	op. Total			တ	13	2	4	4		.732
Harley Knox Boulevard Eastbound	Right   App. Total			0	0	0	0	0	0	000
arley Knox Bou Eastbound	Thru			တ	12	2	ω	34	82.9	.708
Ĭ	Left			0	_	0	9	7	17.1	.292
dw	Right   App. Total			0	7	0	_	က		375
-215 Northbound Off Ramp Northbound	Right   ≠			0	7	0	<del>-</del>	က	100	.375
5 Northbound Ol Northbound	Thru			0	0	0	0	0	0	000
1-21	Left			0	0	0	0	0	0	000
q	Right   App. Total			80	4	10	10	32		.800
Knox Boulevard Vestbound	Right			9	7	7	9	21	92.9	.750
Harley Knov Westb	Thru			7	7	က	4	7	34.4	.688
Ï	Left			0	0	0	0	0	0	000
d	p. Total	ak 1 of 1		0	0	0	0	0		000
I-215 Northbound On Ramp Southbound	Left Thru Right App. Total	45 AM - Pe	t 07:00 AM	0	0	0	0	0	0	000
Northbound On Southbound	Thru	AM to 07:	Begins a	0	0	0	0	0	0	000
1-215		rom 07:00	Intersection	0	0	0	0	0	0	000
	Start Time	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	07:15 AM	07:30 AM	07:45 AM	Total Volume	% App. Total	HHL

File Name: PER215NHKAM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Peak Hour Data

Peak Hour Data

Right Thu Left

At Axie Trucks at 07:00 AM

Peak Hour Begins at

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

N/S: I-215 Northbound Ramps E/W: Harley Knox Road City of Perris

Weather: Clear

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

File Name: PER215NHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

0 0 0 0 0 0 0 0 0 319 377 357 1338 273 241 297 231 042 2380 Inclu. Total 23 23 46 119 228 22 5 22 5 23 5 24 5 25 5 8.7 126 131 150 122 529 1163 48.9 1047 156 167 159 152 634 8 Harley Knox Boulevard 0 0 RTOR 0000 0000 Eastbound Thru Right 0000 0000 73 84 95 79 331 750 64.5 31.5 660 88 54 53 59 49 215 413 35.5 17.4 387 53 47 55 43 198 8.8 24 22 46 23 23 91.6 209 I-215 Northbound Off Ramp Thru | Right | RTOR 9.0 2 3 3 4 5 6 7 6 172 Northbound 2 8 4 8 70 91.6 26828 190 66.7 33.3 0.7 81.2 6.2 122 92 119 86 419 105 130 172 182 589 1008 959 90.1 2.3 2.2 5.7 5.7 5.4 Harley Knox Boulevard 92.9 1.8 22 6 7 5 6 ~ 4 4 34 26 **Nestbound** 68 51 74 52 245 612 60.7 25.7 539 88.1 60 12 14 17 45 49 61 67 222 396 39.3 16.6 368 92.9 0000 I-215 Northbound On Ramp 0 0 Right RTOR 0000 0000 Southbound 000 0 0 0 00 0000 0000 000000 04:00 PM 04:15 PM 04:30 PM 04:45 PM 05:00 PM 05:15 PM 05:30 PM 05:45 PM Total Total **Grand Total** Apprch % % 4+ Axle Trucks % Large 2 Axle Vehicles Total % Passenger Vehicles % Passenger Vehicles Large 2 Axle Vehicles 3 Axle Vehicles % 3 Axle Vehicles

	1-21	5 Northbo	I-215 Northbound On Ramp		Harl	arley Knox	ley Knox Boulevard		1-215	Northbou	I-215 Northbound Off Ramp		Har	ley Knox	Harley Knox Boulevard		
		South	Southbound			Westbound	puno			Northbound	puno			Eastbound	pund		
Start Time	Left	Thru	Right App. Total	. Total	Left	Thru	Right App. Total	. Total	Left	Thru	Right   App. Total	Fotal	Left	Thru	Right App. Total		Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of	From 04:00	30 ot MP 0	5:45 PM - Pea	k 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM	Intersectic	n Begins	at 04:00 PM														
04:00 PM	0	,0	0	0	0	45	09	105	_	_	22	24	54	102	0	156	28
04:15 PM	0	0	0	0	0	49	81	130	4	0	18	22	23	114	0	167	318
04:30 PM	0	0	0	0	0	61	111	172	7	0	44	46	26	100	0	159	377
04:45 PM	0	0	0	0	0	29	115	182	0	0	23	23	49	103	0	152	357
Total Volume	0	0	0	0	0	222	367	289	7	-	107	115	215	419	0	634	1338
% App. Total	0	0	0		0	37.7	62.3		6.1	6.0	93		33.9	66.1	0		
HHH	000	000	000	000	000	.828	.798	608	.438	.250		.625	.911	.919	000	.949	.887

File Name: PER215NHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

File Name: PER215NHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

4 / 8 8 / 90.4 Inclu. Total 47 9.6 Exclu. Total 38.3 9 7007 Harley Knox Boulevard Thru | Right | RTOR 0000 0000 Eastbound 0000 0000 000 13 72.2 27.7 0 0 2 5 27.8 10.6 က 0000 10.6 4 I-215 Northbound Off Ramp Thru Right RTOR 4 0000 Groups Printed- Large 2 Axle Vehicles Northbound 0000 0 80 0000 0000 000 Left 0 0 20 02220 51.1 Harley Knox Boulevard Thru Right RTOR 0000 Westbound 19 79.2 40.4 20.8 10.6 I-215 Northbound On Ramp Thru Right RTOR 0000 0000 Southbound 0 0000 0000 0 0000 000 Grand Total Apprch % Total % 04:00 PM 04:15 PM 04:30 PM 04:45 PM 05:00 PM 05:15 PM 05:30 PM 05:45 PM Total Total

	Int. Total			7	9	9	11	30		.682
	Right App. Total			4	4	0	က	11		.688
Harley Knox Boulevard Eastbound	Right A			0	0	0	0	0	0	000
arley Knox Boul Eastbound	Thru			က	က	0	7	8	72.7	.667
I	Left			_	<del>-</del>	0	_	3	27.3	.750
ф	op. Total			0	0	က	_	4		.333
-215 Northbound Off Ramp Northbound	Right   App. Total			0	0	က	_	4	100	.333
Northbound O Northbound	Thru			0	0	0	0	0	0	000
I-215	Left			0	0	0	0	0	0	.000
	p. Total			က	7	က	7	15		.536
Knox Boulevard Westbound	Right App. Total			က	_	7	2	11	73.3	.550
Harley Knox Bou Westbound	Thru			0	<b>-</b>	_	7	4	26.7	.500
H	Left			0	0	0	0	0	0	000.
0	o. Total	ak 1 of 1		0	0	0	0	0		000
I-215 Northbound On Ramp Southbound	Thru Right App. Total	15 PM - Pe	04:00 PM	0	0	0	0	0	0	000.
Northbound Or Southbound	Thru	PM to 04:4	Begins at	0	0	0	0	0	0	000
1-215	Left	om 04:00	ntersection	0	0	0	0	0	0	000
	Start Time	Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 04:00 PM	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total Volume	% App. Total	PHF

File Name: PER215NHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Peak Hour Data

Peak Hour Begins at 04:00 PM

April Data

Peak Hour Begins at 04:00 PM

Peak Hou

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

File Name: PER215NHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

9 9 27 1 1 1 2 2 3 2 4 3 2 86.8 59 Inclu. Total 13.2 Exclu. Total 45.8 12 ω υ 4 ω <u>π</u> 27 Harley Knox Boulevard Thru | Right | RTOR 0000 0000 Eastbound 0000 0000 000 22 81.5 37.3 ω 2 4 δ 4 5 18.5 8.5 3 000 18.6 2 − c 0 a I-215 Northbound Off Ramp Thru Right RTOR 2 0 <del>-</del> 0 8 Northbound Groups Printed- 3 Axle Vehicles 10 90.9 16.9 က ဝ 9 0000 0000 000 Left 0 0 2 3 5 7 35.6 Harley Knox Boulevard Thru Right RTOR 00 00 Westbound 52.4 18.6 0 % 47.6 16.9 0000 I-215 Northbound On Ramp Thru Right RTOR 0000 0000 Southbound 0 0000 0000 0 0000 000 Grand Total Apprch % Total % 04:00 PM 04:15 PM 04:30 PM 04:45 PM 05:00 PM 05:15 PM 05:30 PM 05:45 PM Total Total

	al Int. Total			2	7	9	1	12 27		00 .750
/ard	Right   App. Total							1		009.
Harley Knox Boulevard Eastbound				0	0	0	0	3 0	0	0000.
Harley K Ea	t Thru			0	_	3		4 8	3 66.7	3 .667
	Left			_		.,		7	33.3	.333
Ramp	Right   App. Total			2	0	2	_	2		.625
orthbound Off Northbound	Right			2	0	_	_	4	80	.500
-215 Northbound Off Ramp Northbound	Thru			0	0	0	0	0	0	000
1-21	Left			0	0	~	0	-	20	.250
rd	Right App. Total			5	3	2	0	10		.500
Knox Boulevard Vestbound	Right			0	7	_	0	3	30	375
Harley Kno West	Thru			2	_	_	0	7	70	.350
I	Left			0	0	0	0	0	0	000
dw	Left Thru Right App. Total	eak 1 of 1	5	0	0	0	0	0		000
I-215 Northbound On Ramp Southbound	Right /	:45 PM - F	at 04:00 Pľ	0	0	0	0	0	0	000
5 Northbo South	Thru	) PM to 04	in Begins .	0	0	0	0	0	0	000
1-21		-rom 04:00	Intersectio	0	0	0	0	0	0	000
	Start Time	Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1	Peak Hour for Entire Intersection Begins at 04:00 PM	04:00 PM	04:15 PM	04:30 PM	04:45 PM	Total Volume	% App. Total	쑲

File Name: PER215NHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Harley Knox Boolevard

Out

North

North

North

Harley Rox Boolevard

Out

Harley Rox Boolevard

Out

North

Lots Aske Vehicles

Aske Vehicles

Out

North

Lots Aske Vehicles

Out

North

Lots Aske Vehicles

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North

North

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Lots Aske Vehicles

Out

North

N

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

> City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear

File Name: PER215NHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 1

| Indu. Total | 20 | 21 | 15 | 17 | 73 17 13 13 58 98.5 131 9 2 8 3 54.2 39 Harley Knox Boulevard Thru Right RTOR 0000 0000 Eastbound 0000 0000 000 55 77.5 42 3 2048 28 16 22.5 12.2 0 6 0 0 0 4 3007 I-215 Northbound Off Ramp Thru Right RTOR 0000 0 - 0 0 Northbound Groups Printed- 4+ Axle Trucks 000 0 1.5 1.5 0000 Left 0 33 10 3 5 23 Harley Knox Boulevard Thru Right RTOR 0000 Westbound 43 76.8 32.8 23.2 9 0000 I-215 Northbound On Ramp Thru Right RTOR 0000 0000 Southbound 0 0000 0000 0000 000 Grand Total Apprch % Total % 04:00 PM 04:15 PM 04:30 PM 04:45 PM 05:00 PM 05:15 PM 05:30 PM 05:45 PM Total Total

	I-215 I	Northbou	I-215 Northbound On Ramp		На	Harley Knox	Knox Boulevard		1-215	Northbou	I-215 Northbound Off Ramp	<u>م</u>	Ï	arley Knox	Harley Knox Boulevard		
		Southbound	onna			vvestbound	ouna			Northbound	onna			Eastbound	ound		
1	Start Time Left	Thru	Left Thru Right App. Total	Total	Left	Thru	Right App. Total	p. Total	Left	Thru	Right   App. Total	p. Total	Left	Thru	Right   App. Total		Int. Total
ΙŒ	rom 04:00 F	'M to 04:	Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1	c 1 of 1			,										
<u>-</u>	Peak Hour for Entire Intersection Begins at 04:00 PM	Begins a	t 04:00 PM														
04:00 PM	0	,0	0	0	0	2	4	<u></u>	0	0	_	_	က	7	0	10	20
04:15 PM	0	0	0	0	0	က	80	1	0	0	0	0	က	7	0	9	21
04:30 PM	0	0	0	0	0	_	2	က	0	0	0	0	4	œ	0	12	15
04:45 PM	0	0	0	0	0	_	6	10	0	0	0	0	0	7	0	7	17
Total Volume	0	0	0	0	0	10	23	33	0	0	1	1	10	29	0	39	73
% App. Total	0	0	0		0	30.3	69.7		0	0	100		25.6	74.4	0		
HH	000	000	000.	000	000	.500	639	.750	000	000	.250	.250	.625	906	000.	.813	869

File Name: PER215NHKPM Site Code: 05115195 Start Date: 4/14/2015 Page No: 2

Harley Knox Bonlevard

Peak Hour Data

Peak Hour Begins at 04:00 PM

Harley Knox Bonlevard

Peak Hour Begins at 04:00 PM

Peak

City of Perris N/S: I-215 Northbound Ramps E/W: Harley Knox Road Weather: Clear Location: Perris

N/S: I-215 Northbound Ramps E/W: Harley Knox Boulevard



Date: 4/14/2015 Weather: Clear

## PEDESTRIANS

	North Leg I-215 Northbound Ramps	East Leg Harley Knox Boulevard	South Leg I-215 Northbound Ramps	West Leg Harley Knox Boulevard	TOTAL
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 Northbound Ramps	East Leg Harley Knox Boulevard	South Leg I-215 Northbound Ramps	West Leg Harley Knox Boulevard	TOTAL
4:00 PM	0	0	0	0	0
4:15 PM	1	0	0	0	1
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:	1	0	0	0	1

Location: Perris

N/S: I-215 Northbound Ramps E/W: Harley Knox Boulevard



Date: 4/14/2015 Weather: Clear

## BICYCLES

	North Leg I-215 Northbound Ramps	East Leg Harley Knox Boulevard	South Leg I-215 Northbound Ramps	West Leg Harley Knox Boulevard	TOTAL
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 Northbound Ramps	East Leg Harley Knox Boulevard	South Leg I-215 Northbound Ramps	West Leg Harley Knox Boulevard	TOTAL
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

# APPENDIX 3.2:

EXISTING (2015) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS



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Int Delay, s/veh   2.7
Movement         EBL         EBT         WBT         WBR         SBL         SBR           Vol, veh/h         0         4         1         2         3         0           Conflicting Peds, #/hr         0         0         3         0         0           Sign Control         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - Storage Length         1         0         0         0         O         O         - O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         - O         O         O         O         - O         O         - O<
Vol, veh/h         0         4         1         2         3         0           Conflicting Peds, #/hr         0         0         0         3         0         0           Sign Control         Free         Free         Free         Free         Stop         Stop           RT Channelized         -         None         -         None         -         None           Storage Length         1         -         -         -         0         -         0         -           Veh in Median Storage, #         -         0         0         -         0         -         -         0         -           Grade, %         -         0         0         -         0         -         -         0         -         -         0         -         -         0         -         -         0         -         -         0         -         -         0         -         -         0         0         -         -         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td< td=""></td<>
Vol, veh/h         0         4         1         2         3         0           Conflicting Peds, #/hr         0         0         0         3         0         0           Sign Control         Free         Free         Free         Free         Stop         Stop           RT Channelized         -         None         -         None         -         None           Storage Length         1         -         -         -         0         -         0         -           Veh in Median Storage, #         -         0         0         -         0         -         -         0         -           Grade, %         -         0         0         -         0         -         -         0         -         -         0         -         -         0         -         -         0         -         -         0         -         -         0         -         -         0         0         -         -         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td< td=""></td<>
Conflicting Peds, #/hr         0         0         3         0         0           Sign Control         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - None         - None         - None         - None           Storage Length         1         0         0         - 0         - C           Veh in Median Storage, #         - 0         0         - 0         - C         - C           Grade, %         - 0         0         - 0         - C         <
Sign Control         Free         Free         Free         Free         Free         Stop           RT Channelized         - None         - None         - None         - None           Storage Length         1 - 0
RT Channelized         - None         - None         - None           Storage Length         1         -         -         0         -           Veh in Median Storage, #         -         0         0         -         0         -           Grade, %         -         0         0         -         0         -           Peak Hour Factor         67         67         67         67         67           Heavy Vehicles, %         0         0         0         0         0         0           Mvmt Flow         0         6         1         3         4         0    Major/Minor  Major/Minor  Major1  Major2  Minor2
Veh in Median Storage, #       -       0       0       -       0       -         Grade, %       -       0       0       -       0       -         Peak Hour Factor       67       67       67       67       67         Heavy Vehicles, %       0       0       0       0       0       0         Mvmt Flow       0       6       1       3       4       0     Major/Minor  Major1  Major2  Minor2
Veh in Median Storage, #       -       0       0       -       0       -         Grade, %       -       0       0       -       0       -         Peak Hour Factor       67       67       67       67       67         Heavy Vehicles, %       0       0       0       0       0       0         Mvmt Flow       0       6       1       3       4       0     Major/Minor  Major1  Major2  Minor2
Peak Hour Factor         67         67         67         67         67           Heavy Vehicles, %         0         0         0         0         0         0           Mvmt Flow         0         6         1         3         4         0           Major/Minor         Major1         Major2         Minor2
Heavy Vehicles, %       0       0       0       0       0         Mvmt Flow       0       6       1       3       4       0             Major/Minor       Major1       Major2       Minor2
Mvmt Flow         0         6         1         3         4         0           Major/Minor         Major1         Major2         Minor2
Major/Minor Major1 Major2 Minor2
, ,
,
Stage 1 3 -
Stage 2 6 -
Critical Hdwy 4.1 6.4 6.2
Critical Hdwy Stg 1 5.4 -
Critical Hdwy Stg 2 5.4 -
Follow-up Hdwy 2.2 3.5 3.3
Pot Cap-1 Maneuver 1631 1017 1087
Stage 1 1025 -
Stage 2 1022 -
Platoon blocked, %
Mov Cap-1 Maneuver 1631 1017 1087
Mov Cap-2 Maneuver 931 -
Stage 1 1025 -
Stage 2 1022 -
Approach EB WB SB
HCM Control Delay, s 0 0 8.9
HCM LOS A
Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1
Capacity (veh/h) 1631 931
HCM Lane V/C Ratio 0.005
HCM Control Delay (s) 0 8.9
HCM Lane LOS A A
HCM 95th %tile Q(veh) 0 0

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<b>/</b>	<b>/</b>	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14.54	<b>^</b>	7	ሻሻ	<b>^</b>	7	Ţ	<b>†</b>	77	7	<b>∱</b> ∱	
Volume (veh/h)	0	4	3	294	9	16	1	2	379	8	3	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	5	2	350	11	19	1	2	78	10	4	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	304	1092	483	862	1678	742	2	562	956	21	1164	0
Arrive On Green	0.00	0.29	0.29	0.24	0.44	0.44	0.00	0.30	0.30	0.01	0.31	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1680	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	5	2	350	11	19	1	2	78	10	4	0
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1680	1810	1900	1615	1810	1900	0
Q Serve(g_s), s	0.0	0.1	0.1	9.8	0.2	0.6	0.1	0.1	1.1	0.7	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.1	0.1	9.8	0.2	0.6	0.1	0.1	1.1	0.7	0.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	304	1093	483	862	1678	742	2	562	956	21	1164	0
V/C Ratio(X)	0.00	0.00	0.00	0.41	0.01	0.03	0.40	0.00	0.08	0.47	0.00	0.00
Avail Cap(c_a), veh/h	304	1093	483	862	1678	742	98	562	956	98	1164	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	30.5	23.7	38.5	18.8	13.0	59.9	29.8	9.0	58.9	28.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.0	0.1	35.1	0.0	0.2	5.8	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	0.0	0.1	0.0	4.9	0.1	0.3	0.1	0.0	0.5	0.4	0.0	0.0
LnGrp Delay(d),s/veh	0.0	30.5	23.7	38.7	18.8	13.1	95.0	29.8	9.2	64.7	28.9	0.0
LnGrp LOS		С	С	D	В	В	F	С	Α	Е	С	
Approach Vol, veh/h		7			380			81			14	
Approach Delay, s/veh		28.6			36.8			10.7			54.5	
Approach LOS		С			D			В			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	33.1	40.0	4.7	42.3	14.6	58.5	5.9	41.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	23.5	34.5	6.5	35.5	5.0	53.0	6.5	35.5				
Max Q Clear Time (g_c+I1), s	11.8	2.1	2.1	2.1	0.0	2.6	2.7	3.1				
Green Ext Time (p_c), s	0.5	0.0	0.0	0.2	0.0	0.1	0.0	0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			32.8									
HCM 2010 LOS			С									

	۶	<b>→</b>	•	•	<b>←</b>	4	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b>+</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	₽		ሻ	₽		ሻ	<b>ተ</b> ኈ		ሻ	<b>^</b>	7
Volume (veh/h)	27	0	11	0	0	1	3	364	3	2	284	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	33	0	12	0	0	1	4	439	4	2	342	12
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	56	0	156	2	0	25	10	2739	25	5	2758	1172
Arrive On Green	0.03	0.00	0.10	0.00	0.00	0.02	0.01	0.73	0.73	0.00	0.73	0.73
Sat Flow, veh/h	1810	0	1615	1810	0	1615	1810	3760	34	1810	3800	1615
Grp Volume(v), veh/h	33	0	12	0	0	1	4	222	221	2	342	12
Grp Sat Flow(s),veh/h/ln	1810	0	1615	1810	0	1615	1810	1900	1894	1810	1900	1615
Q Serve(g_s), s	1.6	0.0	0.6	0.0	0.0	0.1	0.2	3.2	3.2	0.1	2.4	0.2
Cycle Q Clear(g_c), s	1.6	0.0	0.6	0.0	0.0	0.1	0.2	3.2	3.2	0.1	2.4	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	56	0	156	2	0	25	10	1384	1380	5	2758	1172
V/C Ratio(X)	0.58	0.00	0.08	0.00	0.00	0.04	0.42	0.16	0.16	0.41	0.12	0.01
Avail Cap(c_a), veh/h	113	0	574	101	0	563	101	1384	1380	101	2758	1172
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.0	0.0	37.0	0.0	0.0	43.7	44.6	3.8	3.8	44.8	3.7	3.4
Incr Delay (d2), s/veh	3.5	0.0	0.1	0.0	0.0	0.2	10.4	0.2	0.2	18.9	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.3	0.0	0.0	0.0	0.1	1.8	1.8	0.1	1.3	0.1
LnGrp Delay(d),s/veh	46.5	0.0	37.1	0.0	0.0	43.9	55.1	4.0	4.0	63.8	3.8	3.4
LnGrp LOS	D		D			D	Ε	Α	Α	Е	Α	Α
Approach Vol, veh/h		45			1			447			356	
Approach Delay, s/veh		44.0			43.9			4.5			4.1	
Approach LOS		D			D			А			А	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.7	71.1	0.0	14.2	5.0	70.8	7.3	6.9				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.6	31.4				
Max Q Clear Time (g_c+l1), s	2.1	5.2	0.0	2.6	2.2	4.4	3.6	2.1				
Green Ext Time (p_c), s	0.0	2.6	0.0	0.0	0.0	2.6	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			6.5									
HCM 2010 LOS			А									
Notes												

User approved pedestrian interval to be less than phase max green.

	ၨ	<b>→</b>	•	•	<b>←</b>	4	1	<b>†</b>	<b>/</b>	<b>/</b>	Ţ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	ሻ	<b>^</b>						र्स	7
Volume (veh/h)	0	382	9	120	163	0	0	0	0	409	2	156
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	406	5	128	173	0				435	2	102
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	934	397	623	2417	0				491	2	440
Arrive On Green	0.00	0.08	0.08	0.69	1.00	0.00				0.27	0.27	0.27
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1802	8	1615
Grp Volume(v), veh/h	0	406	5	128	173	0				437	0	102
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	12.2	0.3	3.1	0.0	0.0				27.8	0.0	5.9
Cycle Q Clear(g_c), s	0.0	12.2	0.3	3.1	0.0	0.0				27.8	0.0	5.9
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	934	397	623	2417	0				493	0	440
V/C Ratio(X)	0.00	0.43	0.01	0.21	0.07	0.00				0.89	0.00	0.23
Avail Cap(c_a), veh/h	0	934	397	623	2417	0				822	0	733
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	0.99	0.99	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	47.2	41.7	12.7	0.0	0.0				41.9	0.0	33.9
Incr Delay (d2), s/veh	0.0	1.4	0.1	0.1	0.1	0.0				6.7	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.6	0.2	1.5	0.0	0.0				14.8	0.0	2.7
LnGrp Delay(d),s/veh	0.0	48.6	41.8	12.8	0.1	0.0				48.6	0.0	34.2
LnGrp LOS		D	D	В	Α					D		С
Approach Vol, veh/h		411			301						539	
Approach Delay, s/veh		48.6			5.5						45.9	
Approach LOS		D			А						D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	46.8	35.0		38.2		81.8						
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5						
Max Green Setting (Gmax), s	20.5	* 30		54.5		54.5						
Max Q Clear Time (g_c+l1), s	5.1	14.2		29.8		2.0						
Green Ext Time (p_c), s	0.7	1.4		2.9		0.8						
Intersection Summary												
HCM 2010 Ctrl Delay			37.0									
HCM 2010 LOS			D									
Notes												

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b>			<b>^</b>	7		ર્ન	7			
Volume (veh/h)	203	587	0	0	279	334	4	0	96	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	221	638	0	0	303	328	4	0	18			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	247	2755	0	0	2126	904	347	0	310			
Arrive On Green	0.27	1.00	0.00	0.00	0.56	0.56	0.19	0.00	0.19			
Sat Flow, veh/h	1810	3800	0	0	3800	1615	1809	0	1615			
Grp Volume(v), veh/h	221	638	0	0	303	328	4	0	18			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	14.1	0.0	0.0	0.0	4.6	13.5	0.2	0.0	1.1			
Cycle Q Clear(g_c), s	14.1	0.0	0.0	0.0	4.6	13.5	0.2	0.0	1.1			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	247	2755	0	0	2126	904	347	0	310			
V/C Ratio(X)	0.90	0.23	0.00	0.00	0.14	0.36	0.01	0.00	0.06			
Avail Cap(c_a), veh/h	550	2755	0	0	2126	904	347	0	310			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.98	0.98	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	42.8	0.0	0.0	0.0	12.7	14.6	39.3	0.0	39.6			
Incr Delay (d2), s/veh	4.5	0.2	0.0	0.0	0.1	1.1	0.1	0.0	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	7.3	0.1	0.0	0.0	2.4	6.3	0.1	0.0	0.5			
LnGrp Delay(d),s/veh	47.3	0.2	0.0	0.0	12.8	15.7	39.4	0.0	40.0			
LnGrp LOS	D	А			В	В	D		D			
Approach Vol, veh/h		859			631			22				
Approach Delay, s/veh		12.3			14.3			39.9				
Approach LOS		В			В			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		92.0			19.9	72.1		28.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		87.0			36.5	47.0		23.0				
Max Q Clear Time (g_c+I1), s		2.0			16.1	15.5		3.1				
Green Ext Time (p_c), s		4.7			0.3	4.6		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			13.6									
HCM 2010 LOS			В									

Intersection							
Int Delay, s/veh	0						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Vol, veh/h	0	3	5	0	0	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	· -	None	
Storage Length	1	-	-	-	0	-	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	67	67	67	67	67	67	
Heavy Vehicles, %	0	0	0	0	0	0	
Mvmt Flow	0	4	7	0	0	0	
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	7	0	-	0	11	7	
Stage 1	-	-		-	7	-	
Stage 2	-	-		-	4	_	
Critical Hdwy	4.1	-	<u>-</u>	-	6.4	6.2	
Critical Hdwy Stg 1	-	-	-	-	5.4	-	
Critical Hdwy Stg 2	-	-	-	-	5.4	-	
Follow-up Hdwy	2.2	-	-	-	3.5	3.3	
Pot Cap-1 Maneuver	1627	-	-	-	1014	1081	
Stage 1	-	-	-	-	1021	-	
Stage 2	-	-	-	-	1024	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1627	-	-	-	1014	1081	
Mov Cap-2 Maneuver	-	-	-	-	929	-	
Stage 1	-	-	-	-	1021	-	
Stage 2	-	-	-	-	1024	-	
Approach	EB		WB		SB		
	LD		VVD		0.5		
HCM Control Delay, s	0		0		0		

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR SE	Ln1	
Capacity (veh/h)	1627	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	-	0	
HCM Lane LOS	Α	-	-	-	Α	
HCM 95th %tile Q(veh)	0	-	-	-	-	

**HCM LOS** 

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<b>/</b>	<b>/</b>	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14.54	<b>^</b>	7	ሻሻ	<b>^</b>	7	Ţ	<b>†</b>	77	7	<b>∱</b> ∱	
Volume (veh/h)	0	6	6	390	14	6	1	4	387	9	7	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	6	3	402	14	6	1	4	114	9	7	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	297	1092	483	885	1710	755	2	552	939	20	1140	0
Arrive On Green	0.00	0.29	0.29	0.24	0.45	0.45	0.00	0.29	0.29	0.01	0.30	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1678	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	6	3	402	14	6	1	4	114	9	7	0
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1678	1810	1900	1615	1810	1900	0
Q Serve(g_s), s	0.0	0.1	0.1	11.3	0.2	0.2	0.1	0.2	1.7	0.6	0.2	0.0
Cycle Q Clear(g_c), s	0.0	0.1	0.1	11.3	0.2	0.2	0.1	0.2	1.7	0.6	0.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	297	1093	483	885	1710	755	2	552	939	20	1140	0
V/C Ratio(X)	0.00	0.01	0.01	0.45	0.01	0.01	0.40	0.01	0.12	0.46	0.01	0.00
Avail Cap(c_a), veh/h	297	1093	483	885	1710	755	75	552	939	98	1140	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	30.5	23.7	38.5	18.2	12.5	59.9	30.3	9.1	59.0	29.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.0	0.0	35.1	0.0	0.3	6.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.1	5.7	0.1	0.1	0.1	0.1	8.0	0.3	0.1	0.0
LnGrp Delay(d),s/veh	0.0	30.5	23.7	38.7	18.2	12.5	95.0	30.3	9.3	65.2	29.5	0.0
LnGrp LOS		С	С	D	В	В	F	С	Α	Е	С	
Approach Vol, veh/h		9			422			119			16	
Approach Delay, s/veh		28.2			37.6			10.7			49.5	
Approach LOS		С			D			В			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	33.8	40.0	4.7	41.5	14.3	59.5	5.8	40.4				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	24.5	34.5	5.0	36.0	5.0	54.0	6.5	34.5				
Max Q Clear Time (g_c+I1), s	13.3	2.1	2.1	2.2	0.0	2.2	2.6	3.7				
Green Ext Time (p_c), s	0.6	0.0	0.0	0.2	0.0	0.0	0.0	0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			32.2									
HCM 2010 LOS			С									

	•	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b></b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	₽			₽		ሻ	Φ₽		ሻ	<b>^</b>	7
Volume (veh/h)	26	0	6	1	1	4	0	313	5	0	396	7
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	27	0	6	1	1	4	0	329	5	0	417	7
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	49	0	65	2	5	19	2	2935	45	2	2987	1269
Arrive On Green	0.03	0.00	0.04	0.00	0.01	0.01	0.00	0.79	0.79	0.00	0.79	0.79
Sat Flow, veh/h	1810	0	1615	1810	333	1332	1810	3733	57	1810	3800	1614
Grp Volume(v), veh/h	27	0	6	1	0	5	0	167	167	0	417	7
Grp Sat Flow(s),veh/h/ln	1810	0	1615	1810	0	1665	1810	1900	1890	1810	1900	1614
Q Serve(g_s), s	1.3	0.0	0.3	0.0	0.0	0.3	0.0	1.9	1.9	0.0	2.4	0.1
Cycle Q Clear(g_c), s	1.3	0.0	0.3	0.0	0.0	0.3	0.0	1.9	1.9	0.0	2.4	0.1
Prop In Lane	1.00		1.00	1.00		0.80	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	49	0	65	2	0	24	2	1494	1486	2	2987	1269
V/C Ratio(X)	0.55	0.00	0.09	0.40	0.00	0.21	0.00	0.11	0.11	0.00	0.14	0.01
Avail Cap(c_a), veh/h	107	0	574	101	0	586	101	1494	1486	101	2987	1269
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	0.0	41.6	44.9	0.0	43.8	0.0	2.3	2.3	0.0	2.3	2.1
Incr Delay (d2), s/veh	3.5	0.0	0.2	34.8	0.0	1.6	0.0	0.2	0.2	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.1	0.0	0.0	0.1	0.0	1.0	1.0	0.0	1.3	0.0
LnGrp Delay(d),s/veh	46.7	0.0	41.8	79.7	0.0	45.4	0.0	2.4	2.4	0.0	2.4	2.1
LnGrp LOS	D		D	Е		D		Α	Α		Α	Α
Approach Vol, veh/h		33			6			334			424	
Approach Delay, s/veh		45.8			51.1			2.4			2.4	
Approach LOS		D			D			А			А	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	0.0	76.2	4.6	9.1	0.0	76.2	7.0	6.8				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.3	31.7				
Max Q Clear Time (q_c+l1), s	0.0	3.9	2.0	2.3	0.0	4.4	3.3	2.3				
Green Ext Time (p_c), s	0.0	2.6	0.0	0.0	0.0	2.6	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			4.6									
HCM 2010 LOS			А									
Notes												

User approved pedestrian interval to be less than phase max green.

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	~	<b>/</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	ሻ	<b>^</b>						र्स	7
Volume (veh/h)	0	393	9	127	133	0	0	0	0	349	2	278
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	418	10	135	141	0				371	2	219
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	2067	879	161	2547	0				429	2	384
Arrive On Green	0.00	1.00	1.00	0.18	1.00	0.00				0.24	0.24	0.24
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1800	10	1615
Grp Volume(v), veh/h	0	418	10	135	141	0				373	0	219
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	0.0	0.0	8.7	0.0	0.0				23.7	0.0	14.3
Cycle Q Clear(g_c), s	0.0	0.0	0.0	8.7	0.0	0.0				23.7	0.0	14.3
Prop In Lane	0.00		1.00	1.00		0.00				0.99		1.00
Lane Grp Cap(c), veh/h	0	2067	879	161	2547	0				431	0	384
V/C Ratio(X)	0.00	0.20	0.01	0.84	0.06	0.00				0.87	0.00	0.57
Avail Cap(c_a), veh/h	0	2067	879	354	2547	0				747	0	666
HCM Platoon Ratio	1.00	2.00	2.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.99	0.99	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	48.5	0.0	0.0				43.9	0.0	40.3
Incr Delay (d2), s/veh	0.0	0.2	0.0	4.4	0.0	0.0				5.3	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0	4.5	0.0	0.0				12.5	0.0	6.5
LnGrp Delay(d),s/veh	0.0	0.2	0.0	53.0	0.0	0.0				49.2	0.0	41.6
LnGrp LOS		A	A	D	A					D		D
Approach Vol, veh/h		428			276						592	
Approach Delay, s/veh		0.2			25.9						46.4	
Approach LOS		Α			С						D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	15.2	70.8		34.1		85.9						
Change Period (Y+Rc), s	4.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	23.5	31.5		49.5		59.5						
Max Q Clear Time (g_c+I1), s	10.7	2.0		25.7		2.0						
Green Ext Time (p_c), s	0.1	2.2		2.8		2.2						
Intersection Summary												
HCM 2010 Ctrl Delay			26.8									
HCM 2010 LOS			С									

	۶	<b>→</b>	•	•	<b>←</b>	•	•	<b>†</b>	~	<b>\</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ř	<b>^</b>			<b>^</b>	7		ર્ન	7			
Volume (veh/h)	248	494	0	0	251	422	8	1	115	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	279	555	0	0	282	449	9	1	21			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	311	2818	0	0	2055	873	286	32	283			
Arrive On Green	0.11	0.50	0.00	0.00	0.54	0.54	0.17	0.17	0.17			
Sat Flow, veh/h	1810	3800	0	0	3800	1614	1636	182	1615			
Grp Volume(v), veh/h	279	555	0	0	282	449	10	0	21			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1614	1818	0	1615			
Q Serve(g_s), s	18.3	9.8	0.0	0.0	4.4	21.2	0.5	0.0	1.3			
Cycle Q Clear(g_c), s	18.3	9.8	0.0	0.0	4.4	21.2	0.5	0.0	1.3			
Prop In Lane	1.00		0.00	0.00		1.00	0.90		1.00			
Lane Grp Cap(c), veh/h	311	2818	0	0	2055	873	318	0	283			
V/C Ratio(X)	0.90	0.20	0.00	0.00	0.14	0.51	0.03	0.00	0.07			
Avail Cap(c_a), veh/h	565	2818	0	0	2055	873	318	0	283			
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.98	0.98	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	52.1	10.3	0.0	0.0	13.7	17.5	41.1	0.0	41.4			
Incr Delay (d2), s/veh	3.7	0.2	0.0	0.0	0.1	2.2	0.2	0.0	0.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	9.5	5.2	0.0	0.0	2.4	9.9	0.3	0.0	0.6			
LnGrp Delay(d),s/veh	55.8	10.4	0.0	0.0	13.8	19.7	41.2	0.0	41.9			
LnGrp LOS	Е	В			В	В	D		D			
Approach Vol, veh/h		834			731			31				
Approach Delay, s/veh		25.6			17.4			41.7				
Approach LOS		С			В			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		94.0			24.1	69.9		26.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		89.0			37.5	48.0		21.0				
Max Q Clear Time (g_c+I1), s		11.8			20.3	23.2		3.3				
Green Ext Time (p_c), s		4.4			0.3	4.2		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			22.2									
HCM 2010 LOS			С									

# APPENDIX 3.3:

EXISTING (2015) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS



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#### Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = Existing (2015) Conditions - Weekday AM Peak Hour

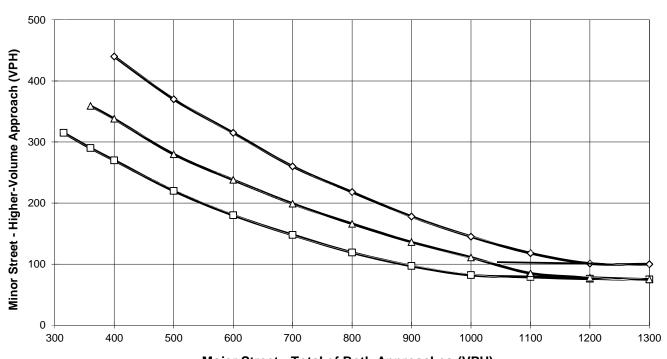
Major Street Name = Oleander Avenue Total of Both Approaches (VPH) = 7

Number of Approach Lanes Major Street = 2

Minor Street Name = Driveway 6 High Volume Approach (VPH) = 3

Number of Approach Lanes Minor Street = 1

#### SIGNAL WARRANT NOT SATISFIED



Major Street - Total of Both Approaches (VPH)

→ 1 Lane (Major) & 1 Lane (Minor)

2+ Lanes (Major) & 1 Lane (Minor) OR 1 Lane (Major) & 2+ Lanes (Minor)

2+ Lanes (Major) & 2+ Lanes (Minor)

→ Major Street Approaches

- - - Minor Street Approaches

\*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane



3.3-1

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#### **APPENDIX 3.4:**

**EXISTING (2015) CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS** 



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	-	•	•	•	ţ	4
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	406	10	128	173	437	166
v/c Ratio	0.26	0.01	0.40	0.07	0.79	0.25
Control Delay	23.4	0.0	34.1	10.2	49.8	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.4	0.0	34.1	10.2	49.8	4.8
Queue Length 50th (ft)	101	0	40	25	311	0
Queue Length 95th (ft)	126	0	64	43	383	44
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	1559	823	324	2351	862	953
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.01	0.40	0.07	0.51	0.17
Intersection Summary						

5/14/2015

# Queues

11: I-215 NB Off Ramp/I-215 NB On Ramp & Harley Knox. Blvd./Harley Knox Blvd.

	•	<b>→</b>	•	•	<b>†</b>	<b>/</b>
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	221	638	303	363	4	104
v/c Ratio	0.76	0.23	0.15	0.30	0.01	0.23
Control Delay	39.2	6.0	14.7	2.4	39.5	9.1
Queue Delay	0.0	0.6	0.0	0.0	0.0	0.0
Total Delay	39.3	6.6	14.7	2.4	39.5	9.1
Queue Length 50th (ft)	158	71	56	0	3	0
Queue Length 95th (ft)	171	105	90	49	13	47
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	577	2755	2059	1195	364	448
Starvation Cap Reductn	9	1626	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.57	0.15	0.30	0.01	0.23
Intersection Summary						

# Queues

10: I-215 SB On Ramp/I-215 SB Off Ramp & Harley Knox Blvd./Harley Knox. Blvd.

	<b>→</b>	•	•	<b>←</b>	ļ	1
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	418	10	135	141	373	296
v/c Ratio	0.22	0.01	0.66	0.06	0.77	0.42
Control Delay	16.5	0.0	69.9	8.2	51.7	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	0.0	69.9	8.2	51.7	5.2
Queue Length 50th (ft)	86	0	111	17	270	0
Queue Length 95th (ft)	112	0	175	34	339	60
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	1931	997	372	2482	783	957
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.01	0.36	0.06	0.48	0.31
Intersection Summary						

5/14/2015

# Queues

11: I-215 NB Off Ramp/I-215 NB On Ramp & Harley Knox. Blvd./Harley Knox Blvd.

	۶	<b>→</b>	•	•	<b>†</b>	<b>/</b>
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	279	555	282	474	10	129
v/c Ratio	0.79	0.20	0.14	0.39	0.03	0.29
Control Delay	46.1	3.0	15.6	2.6	41.6	9.1
Queue Delay	0.2	0.3	0.0	0.0	0.0	0.0
Total Delay	46.3	3.3	15.6	2.6	41.6	9.1
Queue Length 50th (ft)	187	10	53	0	7	0
Queue Length 95th (ft)	79	52	86	53	22	52
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	593	2818	2004	1212	332	438
Starvation Cap Reductn	37	1620	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.46	0.14	0.39	0.03	0.29
Intersection Summary						

# APPENDIX 3.5:

**EXISTING (2015) CONDITIONS BASIC FREEWAY SEGMENT ANALYSIS WORKSHEETS** 

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	North o Caltran	f Harley Knox Bl.
Project Description Knox	Logistics Cen		· · · · · · · · · · · · · · · · · · ·		
✓ Oper.(LOS)			Des.(N)	∐Pla	nning Data
Flow Inputs					_
Volume, V AADT	2544	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.5 1)] 0.980	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	3		f <sub>LW</sub> f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph		70.0	•
Base free-flow Speed, BFFS		mph	FFS	70.0	mph
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> )	N x f <sub>HV</sub> 940	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
S	70.0	mph	x f <sub>p</sub> )		po///////
D = v <sub>p</sub> / S	13.4	pc/mi/ln	S		mph
LOS	В	<b>P</b> • · · · · · · · · · · · · · · · · · ·	$D = v_p / S$ Required Number of Lane	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	el I-215 Southbound South of Harley Knox Bl. Caltrans Existing (2015)	
Project Description Knox	Logistics Cent		· · · · · · · · · · · · · · · · · · ·		
✓ Oper.(LOS)			Des.(N)	∐Pla	nning Data
Flow Inputs					
Volume, V AADT	2186	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 2	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2	
Speed Inputs	1.0		Calc Speed Adj and		
Lane Width		ft	Calc Speed Auj and	113	
Rt-Side Lat. Clearance		π ft			
Number of Lanes, N	3	π	f <sub>LW</sub>		mph
Total Ramp Density, TRD	3	rampa/mi	f <sub>LC</sub>		mph
, ,	70.0	ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l	N x f <sub>uv</sub>		Design (N) Design LOS		
x f <sub>p</sub> ) S	70.0	pc/h/ln mph	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
	10.0 11.4	pc/mi/ln	S		mph
D = v <sub>p</sub> / S		рс/пп/п	$D = v_p / S$		pc/mi/ln
LOS	В		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	North of Caltrans	l I-215 Northbound North of Harley Knox Bl. Caltrans Existing (2015)	
	Logistics Cent	er Phase II TIA	A (JN 09347)			
✓ Oper.(LOS)			Des.(N)	Plar	nning Data	
Flow Inputs						
Volume, V AADT Peak-Hr Prop. of AADT, K	4092	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 4 0		
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width		ft				
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph	
Number of Lanes, N	3		f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	mph	
Base free-flow Speed, BFFS		mph		70.0	тіріі	
LOS and Performanc	e Measures		Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1512 68.9 22.0 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	el I-215 Northbound South of Harley Knox Bl. Caltrans Existing (2015)	
	Logistics Cent	ter Phase II TI/		□ DI-	naina Data
✓ Oper.(LOS)			Des.(N)	⊔Pla	nning Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	3721	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.92 3 0 Level mi	
Coloulata Flaur Adiua	4		Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1368 69.7 19.6 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	5/18/2015		Highway/Direction of Trave From/To Jurisdiction Analysis Year	North o Caltran	f Harley Knox Bl.
	Logistics Certi		· ,	□ Die	nning Data
✓ Oper.(LOS)			Des.(N)	⊔Ріа	nning Data
<b>Flow Inputs</b> Volume, V AADT Peak-Hr Prop. of AADT, K	3855	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 4 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performanc	e Measures	;	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1425 69.4 20.5 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	el I-215 Southbound South of Harley Knox Bl. Caltrans Existing (2015)	
	Logistics Cent	ter Phase II TIA	,		
✓ Oper.(LOS)			Pes.(N)	∐Plar	nning Data
Flow Inputs					
Volume, V AADT	3445	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.985	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft		<del>-</del>	
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph		70.0	pii
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x i x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1267 69.9 18.1 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	rel I-215 Northbound North of Harley Knox Bl. Caltrans Existing (2015)	
	Logistics Cent	ter Phase II TI/		□ DI-	naina Data
✓ Oper.(LOS)			Des.(N)	⊔Pla	nning Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	3247	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.92 4 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and		
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performanc	e Measures	<b>3</b>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1200 70.0 17.1 B	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

General Information			Site Information				
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	l I-215 Northbound South of Harley Knox Bl. Caltrans Existing (2015)		
	Logistics Cent	er Phase II TIA	,				
✓ Oper.(LOS)			Pes.(N)	∐ Plar	Planning Data		
Flow Inputs							
Volume, V AADT	2779	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 3			
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi			
Calculate Flow Adjus	tments						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.985			
Speed Inputs			Calc Speed Adj and				
Lane Width		ft	Care Opera 7 taj ana				
Rt-Side Lat. Clearance		ft	f		mph		
Number of Lanes, N	3		f <sub>LW</sub>		mph		
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub> TRD Adjustment		mph		
FFS (measured)	70.0	mph	FFS	70.0	mph		
Base free-flow Speed, BFFS		mph	773	70.0	тіріі		
LOS and Performanc	e Measures	}	Design (N)				
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1022 70.0 14.6 B	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln		
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

#### APPENDIX 3.6:

EXISTING (2015) CONDITIONS FREEWAY MERGE/DIVERGE ANALYSIS WORKSHEETS



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		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET				
General Infor	mation		<u> </u>	Site Infor							
Analyst CHS Agency or Company Urban Crossroads, Inc. Date Performed 5/19/2015 Analysis Time Period AM Peak Hour			Inc. J	reeway/Dir of Ti unction urisdiction	ravel	I-215 Southbound Harley Knox Off-Ramp Caltrans					
			А	Analysis Year			g (2015)				
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)								
Inputs											
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes, N	3 1					Downstrea Ramp	am Adj	
Yes	On	1	ane Length, L <sub>A</sub>						✓ Yes	<b>✓</b> On	
✓ No	Off	Freeway Volu	Lane Length L <sub>D</sub>	195 2544					□ No □ Off		
L <sub>up</sub> = f	t	Ramp Volume	13	456					L <sub>down</sub> =	1420 ft	
$V_u = V_u$	eh/h	1	-Flow Speed, $S_{FF}$ low Speed, $S_{FR}$	70.0 45.0					V <sub>D</sub> =	98 veh/h	
Conversion to	o pc/h Und	der Base	Conditions								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>	
Freeway	2544	0.92	Level	4	0	0.	980	1.00	28	321	
Ramp	456	0.92	Level	17	0	0.	922	1.00	5	38	
UpStream	00	0.00	Laval	00			077	4.00	4	04	
DownStream	98	0.92 Merge Areas	Level	28	0	0.	877 r	1.00 Diverge Areas	1	21	
Estimation of		merge Areas			Estimation of v <sub>12</sub>						
		/ D \			$V_{12} = V_R + (V_F - V_R)P_{FD}$						
$V_{12} = V_F (P_{FM})$											
L <sub>EQ</sub> = (Equation 13-6 or 13-7)					L <sub>EQ</sub> = (Equation 13-12 or 13-13) P <sub>FD</sub> = 0.665 using Equation (Exhibit 13-7)						
P <sub>FM</sub> = using Equation (Exhibit 13-6)											
V <sub>12</sub> = pc/h V <sub>3</sub> or V <sub>av34</sub> pc/h (Equation 13-14 or 13-17)				, ·=							
V <sub>3</sub> or V <sub>av34</sub>		-	-14 Or 13-17)		V <sub>3</sub> or V <sub>av34</sub> 765 pc/h (Equation 13-14 or 13-17)						
Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No				Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\checkmark$ No							
Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes  No If Yes, $V_{12a} = $ pc/h (Equation 13-16, 13-18, or 13-19)				Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes  No pc/h (Equation 13-16, 13-18, or 13-19)							
Capacity Che					Capacit	tv Ch		<i>.</i>			
, ,	Actual	С	apacity	LOS F?	1		Actual	Са	pacity	LOS F?	
					V <sub>F</sub>		2821	Exhibit 13-8		No	
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>I</sub>	- V <sub>R</sub>	2283	Exhibit 13-8	3 7200	No	
10					V <sub>R</sub>		538	Exhibit 13-1	0 2100	No	
Flow Entering	n Merae In	fluence A	rea				a Dive	rge Influen	ce Area		
	Actual		Desirable	Violation?		_	Actual	Max Desiral		Violation	
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	2	2056	Exhibit 13-8	4400:All	No	
Level of Service Determination (if not F)				Level of Service Determination (if not F)							
$D_R = 5.475 + 0.00734 \text{ v}_R + 0.0078 \text{ V}_{12} - 0.00627 \text{ L}_A$				D <sub>R</sub> = 4.252 + 0.0086 V <sub>12</sub> - 0.009 L <sub>D</sub>							
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 2$	0.2 (pc	/mi/ln)				
LOS = (Exhibit	13-2)				LOS = C	Exhil	oit 13-2)				
Speed Determ					Speed	•		on			
M <sub>S</sub> = (Exibit 13-11)				D <sub>s</sub> = 0.346 (Exhibit 13-12)							
S <sub>R</sub> = mph (Exhibit 13-11)				$S_R = 6$	0.3 mph	(Exhibit	13-12)				
	ibit 13-11)				$S_0 = 7$	6.8 mph	(Exhibit	13-12)			
	ibit 13-13)				S = 64.0 mph (Exhibit 13-13)						
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	RA	MPS AND	RAMP JUNG	CTIONS W	ORKSHE	ET						
General Info				Site Infor								
Analyst CHS Agency or Company Urban Crossroads, Inc. Date Performed 5/19/2015 Analysis Time Period AM Peak Hour		Inc. Ju Ju	Freeway/Dir of Travel Junction Jurisdiction Analysis Year									
Project Description				,	<u> </u>							
Inputs			,									
Upstream Adj Ram	ıp	Freeway Num Ramp Numbe	ber of Lanes, N	3 1				Downstr Ramp	eam Adj			
✓ Yes 🗆 C	)n	'	ane Length, L <sub>A</sub>	260				Yes	On			
□ No     ✓ C	Off	Deceleration L Freeway Volu	ane Length L <sub>D</sub>	2088				☑ No	Off			
- <sub>up</sub> = 1420	ft	Ramp Volume		98				L <sub>down</sub> =	ft			
ир 1120			-Flow Speed, S <sub>FF</sub>	70.0								
/ <sub>u</sub> = 456	veh/h		ow Speed, S <sub>FR</sub>					V <sub>D</sub> =	veh/h			
2	4/		110	45.0								
Conversion	to pc/n Un	der Base (	Conditions		1	1		1				
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	$IF \ x \ f_HV \ x \ f_p$			
Freeway	2088	0.92	Level	1	0	0.995	1.00		2281			
Ramp	98	0.92	Level	28	0	0.877	1.00		121			
UpStream	456	0.92	Level	17	0	0.922	1.00		538			
DownStream												
		Merge Areas			Diverge Areas  Estimation of v <sub>12</sub>							
Estimation (	οτ ν <sub>12</sub>				Estimati	on or v <sub>12</sub>						
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub>	= V <sub>R</sub> + (V <sub>F</sub> - V	' <sub>P</sub> )P <sub>ED</sub>				
L <sub>EQ</sub> = 580.87 (Equation 13-6 or 13-7)					L <sub>EQ</sub> = (Equation 13-12 or 13-13)							
P <sub>FM</sub> = 0.585 using Equation (Exhibit 13-6)					P <sub>FD</sub> = using Equation (Exhibit 13-7)							
/ <sub>12</sub> =	1334	pc/h			$V_{12} = pc/h$							
/ <sub>3</sub> or V <sub>av34</sub>		oc/h (Equatio	n 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub> pc/h (Equation 13-14 or 13-17)							
	17)				Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No							
Is $V_3$ or $V_{av34} > 2$ ,												
Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes  No  If Yes, $V_{12a} = 1334$ pc/h (Equation 13-16, 13-					Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes No If Yes, $V_{12a} = $ pc/h (Equation 13-16, 13-18, or 13-19)							
		13-19)			0	. 01						
Capacity Ch	_	1 0	,	1 100 50	Capacity	/ Checks		•••	1 100 50			
	Actual		apacity	LOS F?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Actu		apacity	LOS F?			
					V <sub>F</sub>	,,	Exhibit 13					
$V_{FO}$	2402	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13					
					$V_R$		Exhibit 1	3-				
Flow Enterin		ofluoneo A	roa		Flow En	torina Div	rerge Influe	nco Aro				
10W LIILEIII	Actual	T.	Desirable	Violation?	I TOW LIT	Actual	Max De		Violation?			
V <sub>R12</sub>	1455	Exhibit 13-8	4600:All	No	V <sub>12</sub>	7 101001	Exhibit 13-8		Violation:			
Level of Ser						Service F	Peterminati		1 F)			
	+ 0.00734 v <sub>R</sub> +						0.0086 V <sub>12</sub> -	<del></del>	,			
		0.0070 v <sub>12</sub> = 0.0	A				3.0000 v <sub>12</sub> -	5.555 L <sub>D</sub>				
	*					c/mi/ln)						
OC - D /E-11					<u> </u>	xhibit 13-2)	· · · · ·					
•					<del>  '                                   </del>	eterminat	tion					
Speed Deter	mination		M <sub>S</sub> = 0.314 (Exibit 13-11)				$D_s = $ (Exhibit 13-12)					
Speed Deter					1	· ·						
<b>Speed Deter</b> M <sub>S</sub> = 0.314 (E					1	oh (Exhibit 13-1	2)					
Speed Determine $M_S = 0.314 (E G_R = 61.2 \text{ mp})$	xibit 13-11)				S <sub>R</sub> = mp	· ·	· ·					
Speed Determine $M_S = 0.314 \text{ (E)}$ $S_R = 61.2 \text{ mp}$ $S_0 = 68.4 \text{ mp}$	xibit 13-11) h (Exhibit 13-11)				S <sub>R</sub> = mp	oh (Exhibit 13-1	2)					

	RA	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET			
General Infor				Site Infor					
Analyst	CHS		F	reeway/Dir of Tr		-215 Northbo	ound		
Agency or Company	Urba	n Crossroads, I		unction		Harley Knox			
Date Performed	5/19	/2015	Jι	urisdiction	(	Caltrans			
Analysis Time Period	d AM F	Peak Hour	A	nalysis Year	[	Existing (201	5)		
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)						
nputs									
Jpstream Adj Ramp		Freeway Num	ber of Lanes, N	3				Downsti	eam Adj
		Ramp Number	r of Lanes, N	1				Ramp	•
✓ Yes ☐ Or	1	Acceleration L	ane Length, L <sub>A</sub>	300				□Yes	On
□ No ☑ Of	f	Deceleration L	ane Length L <sub>D</sub>						
□ NO MO	I	Freeway Volui		3631				✓ No	Off
- <sub>up</sub> = 1395	ft	Ramp Volume		461				L <sub>down</sub> =	ft
ир									
/ <sub>u</sub> = 90 ve	h/h		-Flow Speed, S <sub>FF</sub>	70.0				$V_D =$	veh/h
		<u> </u>	ow Speed, S <sub>FR</sub>	45.0					
Conversion to		der Base (	Conditions			1			
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/Pł	HF x f <sub>HV</sub> x f <sub>p</sub>
Freeway	3631	0.92	Level	3	0	0.985	1.00	+	4006
Ramp	461	0.92	Level	13	0	0.939	1.00	+	534
UpStream	90	0.92	Level	10	0	0.952	1.00	+	103
DownStream	30	0.52	LCVCI	10		0.552	1.00	+	100
50miotroani		Merge Areas					Diverge Areas	<del></del> S	
stimation of					Estimati	on of v <sub>4</sub> .			
	V <sub>12</sub> = V <sub>F</sub>	( D )					-		
_			10.0			V <sub>1</sub> :	$_2 = V_R + (V_F - V_F)$	/ <sub>R</sub> )P <sub>FD</sub>	
-EQ =			13-6 or 13-7)		L <sub>EQ</sub> =		(Equation 1	3-12 or 13	-13)
P <sub>FM</sub> =			ion (Exhibit 13-6	)	P <sub>FD</sub> =		using Equa	tion (Exhibit	13-7)
/ <sub>12</sub> =	2347				V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$		pc/h (Equation	on 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	n 13-14 or 13	3-17)
	17)					. > 2.700 pc/	h? ☐ Yes ☐ N		,
Is $V_3$ or $V_{av34} > 2,70$							<sup></sup> □ Yes □ N		
Is $V_3$ or $V_{av34} > 1.5$							pc/h (Equat		13-18 or
f Yes,V <sub>12a</sub> =		pc/h (Equation 13-19)	on 13-16, 13-		If Yes,V <sub>12a</sub> =		13-19)	1011 10-10,	10-10, 01
Capacity Che		13-19)			Capacity	Chocks	<u> </u>		
supacity one	Actual	1 ^	apacity	LOS F?	Dapacity	Act		Capacity	LOS F?
	Actual	<del>† ĭ</del>	apacity	LOGTE	V <sub>F</sub>	7.0	Exhibit 1		1001:
						77		_	
$V_{FO}$	4540	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 1		
					$V_R$		Exhibit 1	13-	
Flow Entering	n Morgo Ir	fluonco A	roa		Flow En	torina Di	verge Influe	nco Aro	<u> </u>
10W EIREINIG	Actual	1	Desirable	Violation?	I TOW EIT	Actual		esirable	Violation?
V <sub>R12</sub>	2881	Exhibit 13-8	4600:All	No	V <sub>12</sub>	Actual	Exhibit 13-8		v iolation:
				INU		Comitee			)
Level of Serv							Determinati	•	<i>)</i> (
	11	0.0078 V <sub>12</sub> - 0.0	10021 L <sub>A</sub>				+ 0.0086 V <sub>12</sub> -	u.uu9 L <sub>D</sub>	
$O_{R} = 25.8 \text{ (pc/m)}$	i/ln)				$D_R = (p_0)$	c/mi/ln)			
OS = C (Exhibit	13-2)				LOS = (E	xhibit 13-2	)		
Speed Detern	nination				Speed D	etermina	ation		
M <sub>S</sub> = 0.364 (Exi	bit 13-11)				D <sub>s</sub> = (E)	khibit 13-12)			
-	(Exhibit 13-11)					oh (Exhibit 13	-12)		
					I.	oh (Exhibit 13	*		
	(Exhibit 13-11)				1	•	•		
<u>.</u>	(Exhibit 13-13)					oh (Exhibit 13	- 13)		
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General Infor	mation	17/2/14/1	S AND RAM	Site Infor						
		`	-			1045		<u> </u>		
Analyst	CHS			reeway/Dir of Tr			lorthbound			
Agency or Company Date Performed		an Crossroads,		unction urisdiction		-	Knox Off-I	ramp		
		/2015				Caltran				
Analysis Time Period		Peak Hour		nalysis Year		Existin	g (2015)			
Project Description Inputs	Knox Logistics	s Center Phase	e II TIA (JN 09347)							
		Freeway Nur	nber of Lanes, N	3					l	
Upstream Adj R	lamp	1		•					Downstrea Ramp	am Adj
Yes	On	· '	er of Lanes, N	1					l '	
	_ 0		Lane Length, L <sub>A</sub>						✓ Yes	On
✓ No	Off		Lane Length L <sub>D</sub>	280					□No	Off
		Freeway Vol	'	3721						4005 (1
$L_{up} = 1$	t	Ramp Volum	e, V <sub>R</sub>	90					L <sub>down</sub> =	1395 ft
\/ <b>-</b>	oh/h	Freeway Fre	e-Flow Speed, $S_{FF}$	70.0					V <sub>D</sub> =	461 veh
$V_u = V$	eh/h	Ramp Free-F	Flow Speed, S <sub>FR</sub>	45.0					, D	401 VCII
Conversion t	o pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f
Freeway	(ven/nr) 3721	0.92	Level	3	0	_	985	1.00		05
Ramp	90	0.92	Level	10	0	_	952	1.00	-	03
UpStream	30	0.32	LGVGI	10	<del>                                     </del>	1 0.	JJ <u>Z</u>	1.00	<u>'</u>	00
DownStream	461	0.92	Level	13	0	0	939	1.00	5	34
2011104104111		Merge Areas	2010.		<u> </u>	<u> </u>		Diverge Areas		0 1
Estimation o	f V <sub>12</sub>	g			Estimati	ion o	$fv_{42}$			
		/ D \						- \/ + (\/ \/	\D	
	V <sub>12</sub> = V <sub>F</sub>		. 40.7)					$= V_R + (V_F - V_B)$		
L <sub>EQ</sub> =		ation 13-6 o			L <sub>EQ</sub> =			Equation 13-1		
P <sub>FM</sub> =	using	Equation (	(Exhibit 13-6)		P <sub>FD</sub> =		0	.653 using Eq	uation (Exhi	bit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		2	715 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h	(Equation 13	3-14 or 13-17)		$V_3$ or $V_{av34}$		1	390 pc/h (Equ	ation 13-14	4 or 13-1
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h?	es 🗆 No			Is V <sub>3</sub> or V <sub>3V3</sub>	2,7	00 pc/h? [	☐Yes ☑No		
Is $V_3$ or $V_{av34} > 1.5$								☐Yes ☑No		
			3-16, 13-18, or			-		oc/h (Equation	13-16, 13	-18. or 13
If Yes,V <sub>12a</sub> =	13-19		,,		If Yes,V <sub>12a</sub> =			9)		
Capacity Che	ecks				Capacity	y Ch	ecks			
	Actual	(	Capacity	LOS F?			Actual	_	pacity	LOS
					$V_{F}$		4105	Exhibit 13-	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	4002	Exhibit 13-8	7200	No
					V <sub>R</sub>		103	Exhibit 13-1	0 2100	No
Flow Entering	a Morgo li	nfluonco	<u>I</u> Aroa		-	torin		rge Influen		110
TOW LINEIN	Actual		Desirable	Violation?	I IOW LII		Actual	Max Desiral		Violation
V <sub>R12</sub>	7101441	Exhibit 13-8		Violation:	V <sub>12</sub>	$\overline{}$	2715	Exhibit 13-8	4400:All	No
Level of Serv	ica Dotor			I				eterminatio		
D <sub>R</sub> = 5.475 + 0.									-	')
	• • • • • • • • • • • • • • • • • • • •	0.0076 V <sub>12</sub>	- 0.00021 LA					0.0086 V <sub>12</sub> - 0.	LD ED	
D <sub>R</sub> = (pc/mi/lr					1		/mi/ln)			
LOS = (Exhibit						•	oit 13-2)			
Speed Deterr	nination				Speed D					
M <sub>S</sub> = (Exibit 1	3-11)				$D_s = 0.3$	307 (E	xhibit 13	-12)		
s (=x					S <sub>R</sub> = 61	.4 mph	(Exhibit	13-12)		
	1101t 13-11)				- K		`	,		
S <sub>R</sub> = mph (Exh							(Exhibit			
$S_R = mph (Exhapped)$ $S_0 = mph (Exhapped)$	nibit 13-11) nibit 13-11) nibit 13-13)				S <sub>0</sub> = 75	5.3 mph		13-12)		

<b>General Info</b> Analyst Agency or Company Date Performed	rmation		ייי און שווא כ	IP JUNCTI	ONS WO	DRKS	HEET			
Agency or Company				Site Infor						
	CHS	n Crossroads, I		reeway/Dir of Tournetion			outhbound Knox Off-R	amn		
	5/19/	•		urisdiction		Caltran		amp		
Analysis Time Perio		Peak Hour		nalysis Year		Existing				
Project Description	Knox Logistics	Center Phase		•		,	, ,			
Inputs										
Upstream Adj F	Ramp	Freeway Number	per of Lanes, N	3 1					Downstrea Ramp	ım Adj
□Yes	On	1 '	ane Length, L <sub>A</sub>	ı					✓ Yes	<b>☑</b> On
✓ No	Off	Deceleration L	5	195					□No	Off
L <sub>up</sub> =	ft	Freeway Volure Ramp Volume		3855 532					L <sub>down</sub> =	1420 ft
цр		1	Flow Speed, S <sub>FF</sub>	70.0						
$V_u = V$	/eh/h	Ramp Free-Flo		45.0					V <sub>D</sub> =	122 veh/h
Conversion t	to pc/h Und		111							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	3855	0.92	Level	4	0	0.9	980	1.00	42	74
Ramp	532	0.92	Level	13	0	0.9	939	1.00	61	16
UpStream										
DownStream	122	0.92	Level	10	0	0.9	952	1.00	13	39
Fatimatian a		Merge Areas			Fatima	··	<u> </u>	iverge Areas		
Estimation o	T V <sub>12</sub>				Estimat	tion o				
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	$V_R + (V_F - V_F)$	<sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	2 or 13-13	)
P <sub>FM</sub> =	using	Equation (E	xhibit 13-6)		P <sub>FD</sub> =		0.0	325 using Equ	uation (Exhil	bit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		29	02 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13-	14 or 13-17)		$V_3$ or $V_{av34}$		13	72 pc/h (Equ	ation 13-14	or 13-17)
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h? 🗌 Ye:	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>v34</sub> > 2,7	00 pc/h? [	Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$	* V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>v34</sub> > 1.5	* V <sub>12</sub> /2 [	Yes <b>☑</b> No		
If Yes,V <sub>12a</sub> =	pc/h ( 13-19)		16, 13-18, or		If Yes,V <sub>12a</sub>	=	p 19	c/h (Equation 3)	13-16, 13-	18, or 13-
Capacity Che		,			Capacit	ty Che		· /		
	Actual	C	apacity	LOS F?			Actual	Са	pacity	LOS F?
					V <sub>F</sub>		4274	Exhibit 13-8	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{I}$	- V <sub>R</sub>	3658	Exhibit 13-8	3 7200	No
. 0					V <sub>R</sub>		616	Exhibit 13-1	0 2100	No
Flow Enterin	a Merae In	fluence A	rea				a Divei	ge Influen	ce Area	
	Actual		Desirable	Violation?	1011 =1	_	ctual	Max Desirat		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	2	902	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (i	f not F)		Level o	f Serv	rice De	terminatio	n (if not l	F)
$D_R = 5.475 + 0$	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			D <sub>R</sub> = 4	.252 + 0.	0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
	1)				$D_R = 2$	7.5 (pc/	mi/ln)			
D <sub>R</sub> = (pc/mi/lr	13-2)				LOS = C	(Exhib	it 13-2)			
					Speed	•		n		
$D_R = (pc/mi/lr$ LOS = (Exhibit <b>Speed Deteri</b>	mination									
LOS = (Exhibit <b>Speed Deteri</b>					$D_s = 0$	.353 (E	khibit 13-	12)		
LOS = (Exhibit) <b>Speed Determ</b> $M_S = (Exibit)$	l3-11)						khibit 13- (Exhibit			
$LOS = (Exhibit)$ $Speed Deterior$ $M_S = (Exibit)$ $S_R = mph (Exhibit)$	13-11) hibit 13-11)				$S_R = 6$	0.1 mph		13-12)		
LOS = (Exhibit <b>Speed Deterio</b> $M_S = (Exibit 1)$ $S_R = mph (Exhibit 1)$ $S_0 = mph (Exhibit 1)$	l3-11)				$S_R = 6$ $S_0 = 7$	0.1 mph 5.3 mph	(Exhibit	13-12) 13-12)		

Select   Information		RAI	MPS AND	RAMP JUNG	CTIONS W	ORKSHE	ET				
Precent   Description   Desc	General Infor										
Page	Analyst Agency or Company	CHS	n Crossroads,	Inc. Ju	eeway/Dir of Tr nction	avel I					
Property	Date Performed										
December   Freeway Number of Lanes, N   1					nalysis Year		Existing (20	115)			
Preserve   Number of Lanes   N   3		Knox Logistics	Center Phase	II TIA (JN 09347)							
Acceleration Lame Length L <sub>b</sub>   260   2	-		Erooway Num	phor of Lance N	2				Т		
Ves	Jpstream Adj Ramp		•								am Adj
No   Off   Deceleration Lane Length L <sub>p</sub>   Yes   On   Off   Deceleration Lane Length L <sub>p</sub>   Freeway Volume, V <sub>p</sub>   3323   3323	Ves □ Or	า		•	•				ľ	Kamp	
Freeway Volume, V <sub>F</sub>	<u> </u>	•		- "	260					Yes	☐ On
Freeway Volume, V <sub>p</sub>   3323   323   323   323   324   325	☐ No     ✓ Of	f								✓ No	Off
Signature   Sign			Freeway Volu	ime, V <sub>F</sub>	3323						
Size	<sub>-up</sub> = 1420	ft	Ramp Volume	e, V <sub>R</sub>	122				ľ	down =	π
Ramp Free-Flow Speed, S <sub>IR</sub>   45.0   Solutions	/ = 520	oh/h	Freeway Free	e-Flow Speed, S <sub>FF</sub>	70.0				ŀ	V <sub>D</sub> =	veh/h
Coch   V   Veh/hr   PHF	<sub>u</sub> – 532 V	en/n	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					• Б	VC11/11
Coch   V   Veh/hr   PHF	Conversion t	o pc/h Un	der Base	Conditions							
Reeway   3323   0.92   Level   3   0   0.985   1.00   3666		V			%Truck	%Rv	f <sub>HV</sub>		f <sub>n</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>n</sub>
Stimation of v <sub>12</sub>	Ereeway		0.92	Level	3	n			<u>'</u>		
						<del>                                     </del>	_				
Stimation of V12   Stimation of V13   Stimation of V14   Stimation of V15   Stimation of V15   Stimation of V16   Stimation of V17   Stimation of V18   Stimation of	<u> </u>					<del></del>					
Stimation of v <sub>12</sub>	•	302	0.52	LOVOI	10	<b>-</b> -	0.555	- 1.	00		010
$ \begin{array}{c} V_{12} = V_F (P_{FM}) \\ \text{S0} = & 881.11 & (\text{Equation } 13-6 \text{ or } 13-7) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-7) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-7) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-16) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & u$			Merge Areas				<u>'</u>	Diverge	Areas		
$ \begin{array}{c} V_{12} = V_F (P_{FM}) \\ \text{S0} = & 881.11 & (\text{Equation } 13-6 \text{ or } 13-7) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-6) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-7) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-7) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-16) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & \text{using Equation } (\text{Exhibit } 13-14) \\ \text{EM} = & 0.585 & u$	stimation o	f v <sub>12</sub>				Estimati	on of v	12			
Second   S			(P <sub>rv</sub> )								
Second   S	F0 =			13-6 or 13-7)			V				
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$						1					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				don (Exhibit 10-0)				_	Equation	n (Exhibit 1	3-7)
30   30   30   30   30   30   30   30				on 13-14 or 13-							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	7 <sub>3</sub> or V <sub>av34</sub>		pom (Equati	011 10-14 01 10-						3-14 or 13-1	7)
Yes, V <sub>12a</sub> =   2144 pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19, Note of 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-18, or 13-19, Note of 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19, Note of 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19, Note of 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19, Note of 13-19)   Yes, V <sub>12a</sub> =   pc/h (Equation 13-16, 13-18, or 13-19, Note of 1	Is $V_3$ or $V_{av34} > 2,70$	00 pc/h?  Ye	s 🗹 No								
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Is $V_3$ or $V_{av34} > 1.5$	* V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>4</sub> > 1.5 * V <sub>1</sub>				
Capacity Checks	f Yes,V <sub>12a</sub> =	2144	pc/h (Equati	on 13-16, 13-		If Yes,V <sub>12a</sub> =			Equation	13-16, 1	3-18, or
Actual   Capacity   LOS F?   Actual   Capacity   LOS F?	Capacity Che		13-19)			Capacity	/ Check	rs			
$V_{FO} = V_{F} - V_{R} = \frac{\text{Exhibit } 13-8}{10}$ $V_{FO} = V_{F} - V_{R} = \frac{\text{Exhibit } 13-8}{10}$ $V_{R} = \frac{\text{Exhibit } 13-1}{10}$ $V_{R$	Jupusity Circ	1	1 (	Capacity	LOS F?				Can	acity	LOS F?
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$						V <sub>E</sub>					
V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10       V <sub>R</sub>     Exhibit 13- 10       V <sub>R</sub>     Exhibit 13- 10       V <sub>R</sub>       Exhibit 13- 10       V <sub>R</sub>     Exhibit 13- 10       V <sub>R</sub>   Exhibit 13- 10       V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13- 10     V <sub>R</sub>   Exhibit 13-		2005	E 1 11 11 40 0		l		- V-			+	1
VR	v <sub>FO</sub>	3805	Exhibit 13-8		NO NO		*R				<del> </del>
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$						$V_R$		'			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	low Entering	g Merge In	fluence A	\rea		Flow En	tering L	Diverge li	nfluen	ce Area	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$		Actual	Max	Desirable	Violation?						Violation?
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	$V_{R12}$	2283	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhib	oit 13-8		
$\begin{array}{llllllllllllllllllllllllllllllllllll$		ice Detern	nination (	if not F)			Service	e Determ	inatio	ı (if not	<i>F</i> )
$\begin{array}{llllllllllllllllllllllllllllllllllll$				<del></del>			O <sub>R</sub> = 4.25	2 + 0.0086	V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	O <sub>R</sub> = 21.6 (pc/n	ni/ln)	. <u>-</u>			1				_	
		•				1	,	2)			
$\begin{array}{llllllllllllllllllllllllllllllllllll$	•					, ,					
$S_R = 60.6 \text{ mph (Exhibit 13-11)}$ $S_R = mph (Exhibit 13-12)$ $S_0 = 66.3 \text{ mph (Exhibit 13-13)}$ $S_0 = mph (Exhibit 13-12)$ $S_0 = mph (Exhibit 13-13)$ $S_0 = mph (Exhibit 13-13)$	•					<del>  '                                   </del>					
$S_0 = 66.3 \text{ mph (Exhibit 13-11)}$ $S_0 = mph (Exhibit 13-12)$ $S_0 = mph (Exhibit 13-13)$ $S_0 = mph (Exhibit 13-13)$	-	•				1					
= 62.8 mph (Exhibit 13-13) S = mph (Exhibit 13-13)							•	,			
		,				1 '	•	•			
right © 2014 University of Florida, All Rights Reserved HCS2010 <sup>TM</sup> Version 6.65 Generated: 5/19/2015 1	62.8 mph	(Exhibit 13-13)				S = mp	oh (Exhibit 1	13-13)			
	right © 2014 Univers	sity of Florida, All	Rights Reserve	ed		HCS2010 <sup>™</sup>	Version 6.6	55	C	Generated: 5	5/19/2015 10

General Infori		0 7 11 12	10 11111 0011		ORKSHE	<u>. C I</u>			
				Site Infor					
Analyst	CHS			reeway/Dir of Tr		-215 Northboun			
Agency or Company		an Crossroads, I		ınction		Harley Knox On	-катр		
Date Performed		/2015 Daals Have		urisdiction		Caltrans			
Analysis Time Period		Peak Hour		nalysis Year		Existing (2015)			
Project Description Inputs	KIIOX LOGISTICS	Center Phase	1 TIA (JIN 09547)						
		Francisco Numb	per of Lanes, N	3				Ì	
Jpstream Adj Ramp		1						Downstre	am Adj
√Vaa □ On		Ramp Number		1				Ramp	
✓ Yes ☐ On		Acceleration La	ane Length, L <sub>A</sub>	300				☐Yes	On
□ No ☑ Off	i	Deceleration L	ane Length L <sub>D</sub>					✓ No	□ O#
		Freeway Volur	ne, V <sub>F</sub>	2664				INO	Off
<sub>-up</sub> = 1395 1	ft	Ramp Volume		583				L <sub>down</sub> =	ft
<b>"</b>			Flow Speed, S <sub>FF</sub>	70.0				1	
/ <sub>u</sub> = 115 ve	eh/h							V <sub>D</sub> =	veh/h
		Ramp Free-Flo	. 110	45.0					
Conversion to		der Base (	conditions	1	1		i	1	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	fp	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	2664	0.92	Level	2	0	0.990	1.00		2925
Ramp	583	0.92	Level	11	0	0.990	1.00		669
UpStream	115	0.92		9	0	0.948	1.00		131
DownStream	110	0.92	Level	9	U	0.957	1.00		131
JownStream	1	Merge Areas					Diverge Areas		
stimation of		Merge Areas			Fstimati	on of v <sub>12</sub>	Diverge Areas		
					Louman	011 01 112			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	= V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	)P <sub>ED</sub>	
- <sub>EQ</sub> =	853.72	(Equation 1	3-6 or 13-7)		L <sub>EQ</sub> =	12	(Equation 13-		3)
P <sub>FM</sub> =	0.586	using Equati	on (Exhibit 13-6)	)			using Equation		,
/ <sub>12</sub> =	1714	pc/h			P <sub>FD</sub> =			אוו (באוווטונ וי	J-1 )
			on 13-14 or 13-		V <sub>12</sub> =		pc/h		_,
$V_3$ or $V_{av34}$	17)	(=4555			V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation ?		7)
Is $V_3$ or $V_{av34} > 2,700$	0 pc/h?	s 🗹 No				-	☐ Yes ☐ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2 <b>✓</b> Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>		☐ Yes ☐ No		
f Yes,V <sub>12a</sub> =		pc/h (Equation	on 13-16. 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
ryesv. =		13-19)	,		12a		13-19)		
12a <sup>-</sup>	10, 01	10-10)							
.20		10-10)			Capacity	/ Checks			
.20			apacity	LOS F?	Capacity	/ Checks Actua	ıl Ca	pacity	LOS F?
.20	cks		apacity	LOS F?		1			LOS F?
Capacity Che	<b>cks</b> Actual	Ci	apacity		V <sub>F</sub>	Actua	Exhibit 13-	8	LOS F?
120	cks		apacity	LOS F?	V <sub>F</sub> V <sub>FO</sub> = V <sub>F</sub> -	Actua	Exhibit 13- Exhibit 13-	8	LOS F?
Capacity Che	<b>cks</b> Actual	Ci	apacity		V <sub>F</sub>	Actua	Exhibit 13- Exhibit 13- Exhibit 13	8	LOS F?
Capacity Che	Actual 3594	Ci Exhibit 13-8			$V_F$ $V_{FO} = V_F$ $V_R$	Actua	Exhibit 13- Exhibit 13- Exhibit 13 10	8	LOS F?
Capacity Che	Actual 3594  g Merge In	Exhibit 13-8	rea	No	$V_F$ $V_{FO} = V_F$ $V_R$	- V <sub>R</sub>	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 10 Erge Influer	8 8 8 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	
Capacity Che  V <sub>FO</sub> Flow Entering	Actual 3594  Merge In Actual	Exhibit 13-8  offluence A  Max E	<b>rea</b> Desirable	No Violation?	$V_F$ $V_{FO} = V_F \cdot V_R$	Actua	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 10  erge Influer Max Des	8 8 8 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	LOS F?
V <sub>FO</sub>	Actual 3594  G Merge In Actual 2383	Exhibit 13-8  Diffuence A  Max E  Exhibit 13-8	<b>rea</b> Desirable 4600:All	No	$V_{FO} = V_{F}$ $V_{R}$ Flow End	Actual	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 0 erge Influer Max Des Exhibit 13-8	8 8 8 8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9	Violation'
V <sub>FO</sub> Flow Entering V <sub>R12</sub> Level of Servi	Actual 3594  3594  3594  Actual 2383  ice Detern	Exhibit 13-8  Influence A  Max I  Exhibit 13-8  Mination (i	rea Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow End $V_{12}$ Level of	Actual  VR  Actual  Actual	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 10 Erge Influer Max Des Exhibit 13-8 Etermination	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Violation'
V <sub>FO</sub> Flow Entering V <sub>R12</sub> Level of Servi	Actual 3594  Werge In Actual 2383  Actual 2383	Exhibit 13-8  Diffuence A  Max E  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow Enter $V_{12}$ Level of	Actual  Actual  Actual  Service D  D <sub>R</sub> = 4.252 +	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 0 erge Influer Max Des Exhibit 13-8	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $D_R = 21.9 \text{ (pc/min)}$	Actual 3594  3594  Actual 2383  ice Deterr 0.00734 v <sub>R</sub> + villn)	Exhibit 13-8  Influence A  Max I  Exhibit 13-8  Mination (i	rea Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow End $V_{12}$ Level of $D_{R} = (pc)$	Actual  tering Diversity Actual  Service D  OR = 4.252 + c/mi/ln)	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 10 Erge Influer Max Des Exhibit 13-8 Etermination	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Violation
Capacity Che  V <sub>FO</sub> Flow Entering  V <sub>R12</sub> Level of Servi	Actual 3594  3594  Actual 2383  ice Deterr 0.00734 v <sub>R</sub> + villn)	Exhibit 13-8  Influence A  Max I  Exhibit 13-8  Mination (i	rea Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow End $V_{12}$ Level of $D_{R} = (pc)$	Actual  Actual  Actual  Service D  D <sub>R</sub> = 4.252 +	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 10 Erge Influer Max Des Exhibit 13-8 Etermination	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + D_R = 21.9 \text{ (pc/mi)}$	Actual  3594  3594  3594  3594  Actual 2383  ice Detern 0.00734 v R + 111111111111111111111111111111111	Exhibit 13-8  Influence A  Max I  Exhibit 13-8  Mination (i	rea Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{RO} = V_{FO}$ $V_{RO} = V_{FO}$ $V_{RO} = V_{RO}$ $V_{RO} = V_$	Actual  tering Diversity Actual  Service D  OR = 4.252 + c/mi/ln)	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8 Exhibit 13-8 Exhibit 13-8	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $D_R = 21.9 \text{ (pc/mi)}$ $OS = C \text{ (Exhibit)}$ Speed Determ	Actual 3594  G Merge In Actual 2383 ice Deterr 0.00734 v R + villn) 13-2) mination	Exhibit 13-8  Influence A  Max I  Exhibit 13-8  Mination (i	rea Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F \cdot V_R$ Flow Entrol $V_{12}$ Level of $D_R = (p_0 \cdot p_0 \cdot p_0)$ LOS = (E.	Actual  tering Diversity Actual  Service D  OR = 4.252 + c/mi/ln) xhibit 13-2) eterminate	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8 Exhibit 13-8 Exhibit 13-8	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 21.9 \text{ (pc/mi)}$ $OS = C \text{ (Exhibit } C$ Speed Determ $M_S = 0.336 \text{ (Exit)}$	Actual 3594  G Merge In Actual 2383 ice Detern 0.00734 v R + 11/1n) 13-2) Inination Dit 13-11)	Exhibit 13-8  Influence A  Max I  Exhibit 13-8  Mination (i	rea Desirable 4600:All	No Violation?	V <sub>F</sub>   V <sub>FO</sub> = V <sub>F</sub>   V <sub>R</sub>     V <sub>12</sub>     Level of   D <sub>R</sub> = (po LOS = (E. Speed D D <sub>S</sub> = (E. Speed D D D D <sub>S</sub> = (E. Speed D D D D D D D D D D D D D D D D D D	Actual  Tering Diversity Actual  Service D  OR = 4.252 + c/mi/ln)  xhibit 13-2)  etermination  chibit 13-12)	Exhibit 13- Exhibi	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $OS = C$ (Exhibit of Speed Determing) $M_S = 0.336$ (Exit of Sign is considered by the	Actual  3594  3594  3594  3594  3594  Actual 2383  ice Detern 0.00734 v R + 1 i/ln) 13-2) inination  pit 13-11) Exhibit 13-11)	Exhibit 13-8  Influence A  Max I  Exhibit 13-8  Mination (i	rea Desirable 4600:All	No Violation?	$\begin{array}{c} V_F \\ V_{FO} = V_F \\ V_R \end{array}$ Flow End $\begin{array}{c} V_{12} \\ Level \ of \\ D_R = (poly \\ LOS = (E \\ Speed \ D \\ S_R = mp \end{array}$	Actual  VR  Actual  Actual  Actual  Service D  R = 4.252 + c/mi/In)  xhibit 13-2)  etermination  khibit 13-12)  ch (Exhibit 13-12)	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8 Exhibit 13	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Violation'
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $OS = C$ (Exhibit of Speed Determing) $M_S = 0.336$ (Exit of Size of 60.6 mph (Size of 67.4 mph (Size of	Actual 3594  G Merge In Actual 2383 ice Detern 0.00734 v R + 11/1n) 13-2) Inination Dit 13-11)	Exhibit 13-8  Influence A  Max I  Exhibit 13-8  Mination (i	rea Desirable 4600:All	No Violation?	$\begin{array}{c c} & V_F \\ \hline V_{FO} = V_F - \\ \hline V_R \\ \hline \end{array}$	Actual  Tering Diversity Actual  Service D  OR = 4.252 + c/mi/ln)  xhibit 13-2)  etermination  chibit 13-12)	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8 Exhibit 13- Exhibit	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Violation'

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		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Info	rmation			Site Infor						
Analyst	CHS		Fi	reeway/Dir of Tr		I-215 N	lorthbound			
Agency or Company	<i>u</i> Urbaı	n Crossroads,		unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/	2015	Ju	urisdiction		Caltrar				
Analysis Time Perio		eak Hour		nalysis Year		Existin	g (2015)			
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		L							1	
Upstream Adj F	Ramp	Freeway Num Ramp Numbe	ber of Lanes, N	3 1					Downstre Ramp	am Adj
☐ Yes [	On	l '	ane Length, L <sub>A</sub>	·					✓Yes	<b>☑</b> On
✓ No	Off		Lane Length L <sub>D</sub>	280					□No	Off
L <sub>up</sub> =	ft	Freeway Volu Ramp Volume	•	2779 115					L <sub>down</sub> =	1395 ft
			-Flow Speed, S <sub>FF</sub>	70.0					l	
V <sub>u</sub> = v	reh/h		low Speed, S <sub>FR</sub>	45.0					$V_D =$	583 veh/h
Comunication			110	45.0						
Conversion t	o pc/n Und       ∨		Conditions	1	1	1	1		1	
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	_	f <sub>HV</sub>	f <sub>p</sub>		F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	2779	0.92	Level	3	0		985	1.00		066
Ramp	115	0.92	Level	9	0	0.	957	1.00		131
UpStream				ļ.,,				4.00		
DownStream	583	0.92	Level	11	0	0.	948	1.00		669
Estimation o	f v	Merge Areas			Estimat	tion o	of v	Diverge Areas		
LStillation o					LStilla					
	$V_{12} = V_{F}$							· V <sub>R</sub> + (V <sub>F</sub> - '		
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13	-12 or 13-1	3)
P <sub>FM</sub> =	using	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =		0.	677 using E	quation (Exl	nibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		21	119 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		94	17 pc/h (Equ	uation 13-14	4 or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7	00 pc/h? 🗌 Yes	s 🗌 No					00 pc/h?	]Yes ☑No	)	
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5								Yes <b></b> No		
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub>			c/h (Equatio		3-18, or 13-
Capacity Che		<u>'</u>			Capacit	tv Ch		<u> </u>		
	Actual		Capacity	LOS F?		,	Actual		Capacity	LOS F?
					V <sub>F</sub>		3066	Exhibit 13		No
V <sub>FO</sub>		Exhibit 13-8			V <sub>FO</sub> = V <sub>I</sub>		2935	Exhibit 13	3-8 7200	No
, 40		EXHIBIT TO O			V <sub>R</sub>		131	Exhibit 13		No
		<u> </u>								
Flow Enterin		T		Violation?	FIOW EI			rge Influe		_
V <sub>R12</sub>	Actual	Exhibit 13-8	Desirable	Violation?	V <sub>12</sub>	_	Actual 2119	Max Desir Exhibit 13-8		Violation?
	ioo Dotorn		if not E)					terminati		
<b>Level of Serv</b> D <sub>R</sub> = 5.475 + 0										<u>r)</u>
	• •	0.0076 V <sub>12</sub>	0.00027 L <sub>A</sub>					.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/lr	•					0.0 (pc				
LOS = (Exhibit							oit 13-2)			
Speed Deteri	mination				Speed I	Deter	minatio	on		
M <sub>S</sub> = (Exibit 1	3-11)				$D_s = 0$	.310 (E	xhibit 13-	-12)		
	nibit 13-11)				S <sub>R</sub> = 6	1.3 mph	(Exhibit	13-12)		
	nibit 13-11)				S <sub>0</sub> = 7	6.8 mph	(Exhibit	13-12)		
	nibit 13-13)				S = 6	5.4 mph	(Exhibit	13-13)		
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# **APPENDIX 4.1:**

**CUMULATIVE DEVELOPMENT PROJECTS** 

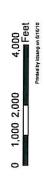


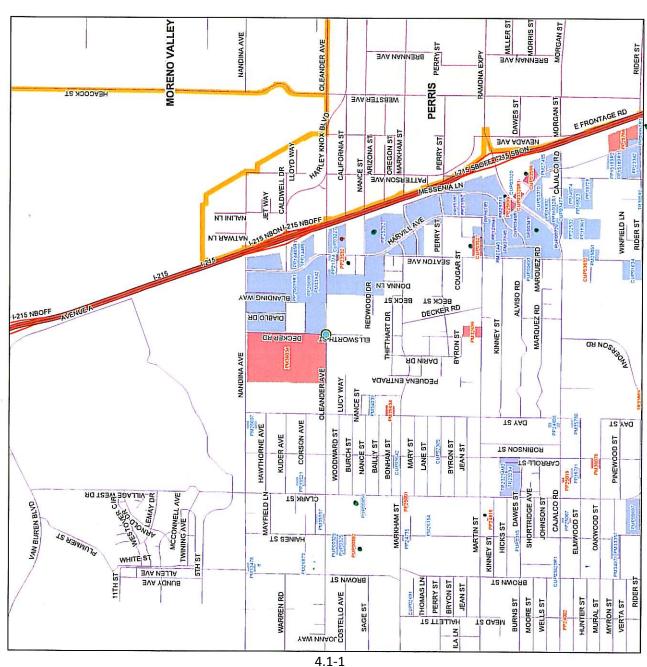
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## Active Cases as of 4/9/2015

	CASE NAME	<u>STATUS</u>	APPLIED DATE	APPROVAL DATE	EXPIRED DATE
	CASE DES	CRIPTION			(c)
	CUP03320R1	DRT	20051221	- 0	20000000
	ALLOW LI	QUOR SALES USE WITHIN EX	ISTING GAS STATION	Existing	
	CUP03527	DRT	20060915	0	20000000
+	8000 SF W	/AREHOUSE/OFFICE/CONCR	ETE MIXING SILO&STOR		
	CUP03599	DRT	20080625	0	20000000
+	TO CONST	RUCT A THREE-STORY 52,79	8 SQ.FT. HOTEL WI		
	CUP03632	DRT	20090915	0	20000000
	COMMUN	IITY AUCTION AND SALES YA	RD 🤸		
	PM32699	DRT	20060223	0	20000000
	SCHED H I	DIVISION OF 5 ACRES INTO (2	2) PARCELS .		
	PM35634	DRT	20071221	0	0
	DIVIDE 1.8	39 ACRES INTO 2 LOTS 🖊			
	PM36034	DRT	20080612	0	20000000
	SCHEDULE	"E" DIVISION OF 100 ACRES	INTO 16 LOTS		•
	PM36078	DRT	20090521	0	20000000
	SUBDIVID	E 2.9 ACRES INTO TWO LOTS	/	7	•
	PP23532	DRT	20080617	0	20000000
+	GAS STATI	ON AND MINI MARKET & RE	TAIL STORES	2000 011110 10000 110001	
	PP24002	DRT	20090225	0	20000000
	PROPOSEI	O FEED STORE			
	PP24818	DRT	20101227	0	20000000
40	1,860 SQ I	T HOUSE CONVERT TO CHU	RCH		
	PP25001	DRT	20110818	0	20000000
	FEED AND	GRAIN SALES			
	PP25019	APPLIED	20110921	0	0
	ADD SMO	KE SHOP/RECYCL COLL FAC/	PROPANE TANK TO EXI		
	PP25699	DRT	20141107	0	2000000
+	PLOT PLAI	N TO CONSTRUCT TWO (2) D	RIVE THRU RESTAURA ·		
	PP25768	DRT	20150226	0	0
	PP TO REN	10ve an existing grain st	ORAGE BINS AND TO		
	PUP00892	BOS	20070713	0	20000000
4	- ADULT RE	SIDENTIAL CARE FACILITY -			
	TR33869	APPLIED	20051005	0	0
	SUBDIVIDE	50.2 AC (3 PARCELS) INTO	39 SFR LOTS		

CASE NAME	STATUS	APPLIED DATE	APPROVAL DATE	EXPIRED DATE
CASE DESC CUP01634		02/01/2009	0	
	APPROVED TO REPLACE RESIN PROCESSING	02/01/2008	0	NA
CUP02305			•	
CUP02308	APPROVED	01/28/2008	0	NA
SUPPRISON				
CUP02691	EXPIRED	12/22/2000	19840904	09/04/1984
	ILE DISMANTLER FACILITY	***		
CUR03227	APPROVED	04/01/1996	19960604	06/04/1998
	NUFACTURING FACILITY		10 Bir - 10	*
CUP03315	APPROVED	05/18/2000	20000725	NA
	I/CONV STORE/2 FAST FOOD/1 D	DINE IN RESTRNT		
GUP03320	APPROVED	08/15/2000	20010206	06/01/2030
CONVENIE	NCE STORE/FAST FOOD RESTAUR	RANT/CAR WASH/	Existing	JITB Kirc. K/76 Gcs
CUR03370	APPROVED	04/03/2002	20030701	07/01/2006 ) w/cw.
TRUCK/GAS	SSTATION COMM CTR SEVERAL E	3LDGS @ 32,000SF		
CUP03425	APPROVED	02/19/2004	20071114	11/14/2009
(4) CONCRE	TE TILT-UP BUILDINGS(TRUCKING			11,1,1003
CUR03468	APPROVED	09/15/2005	20080311	03/11/2010
	GAS STATION, FASTFOOD, CARW.		20000311	03/11/2010
CUP03417	APPROVED	11/14/2005	20080402	04/02/2010
×	XISTING STRUCT FOR OFFICE SP/		20080402	04/02/2010
CUR03620	APPROVED		20120110	04/40/2044
		03/30/2009	20120118	01/18/2014
	ON/CONV STORE/RETAIL BUILDIN			
CÚP03620R1	APPROVED	10/23/2013	20141106	NA
	ER&WINE SALES WITHIN GAS STA			
CUP03642	APPROVED	04/19/2010	20140128	NA
	SE AS CONVENIENT STORE W/PF	ROPANE &ALCOHO		
PM25051	APPROVED	01/25/1990	19910514	05/14/1996
	ROX 4 ACRES INTO 4 PARCELS			
PM26154	APPROVED	07/17/1990	19920225	02/25/1998
SUBDIVIDE	INTO 4 LOTS			
PM26697	APPROVED	05/02/1991	19970211	02/11/2000
SUBDIVIDE	2.12 ACRES INTO TWO PARCELS.	•		
PM26873	APPROVED	04/12/1991	19920707	07/07/1998
DINDE 2.50	ACRES INTO 4 PARCELS	ston to-bolling of special-phonons		
PM27140	APPROVED	09/25/1991	19920526	05/26/1998
×	O TEN INDUSTRIAL PARCELS		13320320	03/20/1330
PM27445		03/25/1992	19930316	03/16/1999
~	ROX 14 ACRES INTO 10 LOTS	00, 20, 2002	1000010	03/ 10/ 1333
PM27485	The state of the s	04/21/1992	10020126	01/25/1000
X	26.73 ACRES INTO 10 INDUSTRIA	ACCOUNT OF THE PROPERTY OF THE	19930126	01/26/1999
			20000725	07/05/000
		05/18/2000	20000725	07/25/2004
	4.45 ACRES INTO 4 COMMERCIA			
PM33357		10/18/2005	20080421	04/21/2015
SCHED H DI	VISION OF 3 AC INTO 3 ONE AC F	PARCELS.		•

	CASE NAME CASE DES	STATUS CRIPTION	APPLIED DATE	APPROVAL DATE	EXPIRED DATE
	PM33478	APPROVED	03/21/2006 B5AC INTO TWO 1-AC PARCELS.	20070730	07/30/2013
	PM33942	APPROVED	07/28/2005 CHEDULE E SUBDIVISION OF 68.85	20080625	06/25/2017
	PM34039 SCHED H I	APPROVED DIVISION OF 3 A	10/03/2005 AC INTO 3 1-AC. MIN PARCELS	20061113	11/13/2014
	PM34971 SCHED H I	APPROVED DIVISION OF 2.2	05/31/2007 9 AC INTO 2 SFR PARCELS.	20080616	06/16/2015
4	PM35557 Schedule	APPROVED  H subdivision of	08/13/2007 f 2.5ac into two parcels	20080722	07/22/2015
	PM35780 SCHED H I	APPROVED DIVISION OF 2.0	09/20/2007 2 ACRES INTO TWO PARCELS.	20080630	06/30/2015
+	PP09997R1 REV.PP AD	APPROVED D 10,000 SQFT	02/19/1997 MAINT BLD. 2400 SQFT OFFICE	19970424	NA
+		APPROVED .2,800 SQ FT M	08/10/2000 AINT BLDG W/OUTDOOR STORAGE	20010502	NA
	PLOT PLAI	APPROVED N FOR PLANNED	09/25/1991 D INDUSTRIAL DEVELOPMENT FOR 8	19920309	03/09/1994
	PP14485 CONSTRUC	APPROVED	12/19/1995 UCTION	19960122	01/22/1999
	PP14485R1 HEAVY EQ	APPROVED UIPMENT AUCT	08/20/2001 FION YARD	20021104	NA
	PP14974 STEEL BUI	APPROVED LDING FABRICA	04/25/1997 TION	19970630	06/30/1999
		APPROVED E ANT'S/EXPAN	02/28/2002 D LEASE AREA-SEE DESCRIPTION	20020812	NA
		APPROVED DKW EMERGEN	07/03/2007 CY GENERATOR W/IN FACILITY	20070809 Non-traffic	NA
	/	APPROVED	10/30/1997	19971201	12/01/1999
,			09/01/2000 MMUNICATION MONOPOLE	Non-traffic	NA
		APPROVED FT IND BUILDIN	10/11/2000 G (18,570 WAREHOUSE 930 OFF	20001212	12/12/2002
	PR16823 TO CONST	APPROVED RUCT A 22,000	11/17/2000 SQ FT MANUFACTURING FACILITY	20010208	02/08/2006
+0		APPROVED TAL MANUFACT	02/02/2001 TURING, 12,000 SQ FT STEEL BLDG	20010423	NA
	PP16932R1 ADD RECY	APPROVED	10/17/2008 ION CENTER TO A 12,000 S.F. P	20110711	07/12/2013
		APPROVED ARCHIVES & RE	10/28/2003 ECORDS ADMIN. WAREHOUSE FAC.	20041215	NA
	PR19521 HAY AND F	APPROVED EED STORE	06/11/2004	20061113	11/13/2008

	CASE NAME	STATUS	APPLIED DATE	APPROVAL DATE	EXPIRED DATE
	PR19728		00/01/2004	2007027	- 00 107 10 007
		APPROVED	09/01/2004	20070227	02/27/2009
		TORS STORAGE YARD, VEHIC		2000057	
	PP20699	APPROVED	07/28/2005	20080625	06/25/2012
		PROPOSES TO DEVELOP FIVE			
	PP20699R1	APPROVED	06/16/2011	20110816	08/16/2013
		ROM 5 INDUS BLDG TO 3/N			
	PP21552	APPROVED	03/21/2006	20061218	12/18/2008
		LIGHT INDUS BLDGS; TOTA	L OF 14 PARCELS.		
	PP21714	APPROVED	05/04/2006	20070921	09/21/2009
		WRLSS COMM 65' MONOT	REE BROADLEAF/OUTDOO	OR E	
	PP22532	APPROVED	02/09/2007	20080107	01/07/2010
	OFFICE AN	ID MANUFACTURING FACILI	TY		
	PP23342	APPROVED	03/20/2008	20080820	10/28/2013
	MULTI US	E INDUSTRIAL PARK WAREH	OUSE BUILDINGS		
	PP24608	APPROVED	06/17/2010	20140908	09/08/2016
	FEED & GF	RAIN SALES W/6400 SF HAY	30 SEV.	20270500	05,00,2010
	PR24735	APPROVED	09/30/2010	20120326	03/26/2014
	X	PINE/12 PANNL ANTS/1 MI		20120320	03/20/2014
	PP25067	APPROVED	12/22/2011	20130603	06/03/2015
	×	55 FT MONOEUCALYPTUS W		The state of the s	00/03/2013
-	PP25252	APPROVED		non-traffic	
1			12/20/2012	20130205	NA
1		F WAREHOUSE/OFFICE BLDG			
7	PUP00325	APPROVED	12/26/2000	0	NA
			No. of the control of		
	PUP00693	APPROVED	11/17/1989	19910108	01/08/1993
	BUILD A C				
	PL/P00697	APPROVED	12/22/1989	19940816	08/15/1996
	CHURCH F	ACILITY			
	PUR00726	APPROVED	07/26/1991	19911015	10/15/1993
	OFFICES A	ND DAY CARE CENTER			
	PUP00765	APPROVED	03/31/1995	19950905	09/05/1997
	PUBLIC US	E PERMIT FOR 32-BED RESID	DENTIAL CARE FACI		
	PUP00856	APPROVED	07/19/2002	20030415	NA
+	<ul> <li>DAY CARE</li> </ul>	CENTER			
	PUP00856R1	APPROVED	06/11/2008	20090624	06/24/2011
		ME&EXPANSION OF EXISTING			00/21/2022
	PUP00856R2	APPROVED	01/09/2012	20121219	12/29/2014
		SQ FT CARE TAKERS QUART		20121213	12/25/2014
	PUP0315	APPROVED	08/07/2000	19751031	11/01/1985
		N OF FAMILY CARE HOME	00/07/2000	13/31031	11/01/1902
7	PUP0325	APPROVED	08/07/2000	0	NI A
(	1 010323	ALLINOAED	00/07/2000	0	NA
,	CD00241	ADDDOVED	04/24/2004	20051212	
+	SP00341	APPROVED	04/21/2004	20051012	NΑ
	FUK 6.2 IVI	ILLION SQ FT BUS PARK & LO	טאוו וכ.		

CASE NAME	<u>STATUS</u>	APPLIED DATE	APPROVAL DATE	<b>EXPIRED DATE</b>	
CASE DESC	CRIPTION				
TR23234	APPROVED	12/14/1987	19880607	06/07/2001	
DIVIDE 44.	.55 ACRES INTO 170 SINGLE FAM	ILY RESIDENC			
TR23234M2	APPROVED	08/27/1996	19970429	06/07/2001	
MC TO TR	23234 TO RECONFIGURE STREET	S AND LOTS			
TR30592	APPROVED	01/08/2003	20040225	02/25/2016	
TO SUBDIV	/IDE 34 ACRES INTO 131 SFR LOT	S		3	9
TR30592M1	APPROVED	09/01/2005	20060208	02/25/2016	
REMOVE T	RANS COND. 50.TRANS.22 FOR F	ROW IMPROVEMNT V	ion-traffic	• 1,000,000	
			The second secon		

### **Charlene Hwang So**

From: Tsang, Kevin <KTSANG@rctlma.org>
Sent: Thursday, April 30, 2015 3:06 PM

To: Charlene Hwang So

Cc: CMS Administrator; Isidro Abreo Subject: RE: 09347: Cumulative List

#### Please see below.

#### **Thanks**

From: Charlene Hwang So [mailto:cso@urbanxroads.com]

**Sent:** Thursday, April 23, 2015 1:43 PM

To: Tsang, Kevin

**Cc:** CMS Administrator; Isidro Abreo **Subject:** 09347: Cumulative List

Importance: High

Hi Kevin,

Just trying to sort through the cumulative projects from the County that need to be added to our list. Could you please review and provide us with needed info or if projects should be removed? Thanks in advance!

Below is a list of projects we will be including because there was no expiration date, please let us know if there are projects that should be removed:

- 1. CUP03527 8,000 sf Warehouse: Keep
- 2. CUP03599 52,798 sf hotel: Keep
- 3. PP09997R2 12,800 sf maintenance building: You may remove, existing.
- 4. PP16932 12,000 sf manufacturing building: You may remove, existing.
- 5. PP24608 9,280 sf feed and grain sales: Keep
- 6. PP25252 399,150 sf warehouse: You may remove, existing.

The cumulative projects listed below did not have an expiration date and are missing information or we need to confirm information in order to be added:

- 1. CUP03632 Auction/Sales yard (need sf/acreage): You may remove, existing.
- 2. PM32699 Need land use and quantity: 2 SFDU
- 3. PM23532 Gas Station/Convenience Store (need # of pumps or sf): You may remove, no activity for 5+ years.
- 4. PP24002 Feed Store (need sf): You may remove, no activity for 5+ years.
- 5. PP25001 Feed and Grain Sales (need sf): You may remove, no activity for 3+ years.
- 6. PP25699 2 drive-thru restaurants (need total sf): (2) 2,800 SF fast food w/ DT, 19,000 SF retail
- 7. PUP00892 Adult Residential Care (need # of DUs or Beds and type of adult care facility): You may remove, no activity for 5+ years.
- 8. PP14485R1 Heavy Equipment Auction Yard (need sf or acreage): : You may remove, no activity for 5+ years.
- 9. PP18961 National Archives Warehouse (need sf): You may remove, existing.
- 10. PUP00325 need land use and quantity: You may remove, no activity for 5+ years.
- 11. PUP00856 Day Care Center (need # of students): You may remove, existing.
- 12. TR30592 131 single family DUs: Keep

The following cumulative projects will not be included as they are low traffic generators (less than 50 peak hours trips):

- 1. PM35634 2 single family DUs: OK
- 2. PM36034 16 single family DUs: OK
- 3. PM36078 2 single family DUs: OK
- 4. PP24818 Home conversion to 1,860 sf Church: OK
- 5. PP25019: You may remove, no activity for 4+ years.
- 6. PP25768: Keep, 52,450 SF manufacturing
- 7. TR33869 39 single family DUs: OK
- 8. CUP01634: You may remove, existing.
- 9. CUP03620R1: Keep, 8 VFP gas station w/ Conv. Store
- 10. CUP03642: You may remove, existing.
- 11. PM33357 2 single family DUs: OK
- 12. PM34971 2 single family DUs: OK
- 13. PM35780 2 single family DUs: OK
- 14. PP15189R1: You may remove, cell tower.

On a separate note, I wanted to follow up on your review of the scoping agreement for TTM No. 35570 (near Washington and Benton). Let me know if you have any questions.

Regards,

CHARLENE SO, P.E.

Senior Transportation Engineer



41 Corporate Park, Suite 300 Irvine, CA 92606 (949) 336-5982 Direct (949) 861-0177 Cell (949) 660-1994 Main

urbanxroads.com

# APPENDIX 4.2:

**POST PROCESSING WORKSHEETS** 



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### INPUT DATA

Future Conditions Model Run ID: ==> RivTAM GP <===

LOCATION:					Н	arvill Ave	nue / Harl	ey Knox Boule	evard				
	AM PEA	к но	UR						PM PEA	к нои	R		
EXISTING TURNING MOVE	MENT VO	LUME	S:				EXISTING	TURNING MO	VEMENT VO	LUMES	:		
2015			5	3	9		2015				9 418	5	
		<	٧	;	>					<	V	>	
	5 ^				٨	16			33 ^			^	4
	5 >		Tot	al =	740 <	11			5 >		Total =	824 <	1
	4 v				V	310			<b>8</b> v			V	1
		<	٨	;	>					<	٨	>	
			1	2	369						5 330	5	
EXISTING MODEL YEAR:							EXISTING	MODEL YEAR:					
2008				2	10		2008				12	5	
				V	۸						V	٨	
	38	<	IN	=	538 <	284			72	<	IN =	805 <	515
	66	>	OL	JT =	538 >	235			55	>	OUT =	805 >	264
				V	٨						V	٨	
				255	186						464	223	
FUTURE MODEL YEAR:							FUTURE N	лоdel year:					
2035				50	50		2035				50	50	
				V	٨						V	٨	
	2014	<	IN	=	3674 <	1649			1527	<	IN =	4210 <	1679
	1098	>	OL	JT =	3673 >	1466			2179	>	OUT =	4210 >	1796
				V	٨						V	٨	
				143	877						837	302	
EXISTING (COUNTED) ADT	s BY LEG:						EXISTING	(COUNTED) AI	DTs BY LEG:				
2015			8,	268			2015				8,268		
				N							N		
	300	٧	۷ L	EG	Е	132			300	W	+	Ε	132
				S							S		
			8,	052							8,052		
REFINED FUTURE ADT'S BY	Y LEG:						REFINED I	FUTURE ADT'S	BY LEG:				
2035				0			2035				0		
				N							N		
	34,000	٧	٧ <b>L</b>	EG	E	34,000			34,000	W	+	Ε	34,000
				S							S		
			9,	000							9,000		

 $\label{lem:condition} \begin{tabular}{ll} U:\UcJobs \Delta 09100-09500 \Delta 09347 \Post\ Processing \[08\ Harvill\_Harley\ Knox.xls] \Input\ (1) \Barrier \Delta 09100-09500 \Delta 09300 \Delta 0930$ 

Project: Knox Logistics

Scenario: Horizon Year Without Project

Job #: 09347 Analyst: CHS Date: 04/23/15

LOCATION: Harvill Avenue / Harley Knox Boulevard

EXISTING COUNTED INBOUND A	ND OU	ITBOL	JND VOLUM	ME CALC	ULATION						
				А	М				Р	М	
EXISTING COUNT YEAR:							EXISTING COUNT YEAR:				
2015				17			2015		432		
				V	۸				V	٨	
				IN =	740 <				IN =	824 <	6
			14 >	OUT =	740 >	383		46 >	OUT =	824 >	15
				V	^				V	^	
				317	372				427	340	
GROWTH CALCULATION DECISIO											
MIN = Minimum Count Growth A							MIN = Minimum Count Growth Approach				
ADD = Additive (Growth Increme	, ,	proa	ch	ADD	ADD		ADD = Additive (Growth Increment) Appro	ach	ADD	ADD	
MUL = Multiplicative (Ratio) App	roach			V	^		MUL = Multiplicative (Ratio) Approach		V	^	
			MUL <			ADD		MUL <		<	
			MUL >			ADD		MUL >		>	MUL
				V	۸				V	^	
				MIN	ADD				MUL	ADD	
MINIMUM GROWTH %s	2008	TO	2035	4000/	4000/				4000/	1000/	
					-100% ^					-100% ^	
			0% <	V		00/		00/ 4	V		00/
					<			0% <		< >	0%
			0% >		^	0%		0% >	.,	^	0%
				v 0%					v 0%		
REFINED GROWTH:	2008	TO	2035	0%	076		ADJUSTED GROWTH: 2008 TO	2035	076	0%	
REFINED GROWTH.	2006	10	2033	50	40		ADJUSTED GROWTH. 2008 TO	2055	40	50	
				ν V	40 ^				40 V	۸	
			883 <	V	<	1370		305 <		<	14
			216 >		>	1230		1774 >		>	85
			210 >	v	^	1230		1//4 /	v	^	03
				0					343		
PRORATED GROWTH:	2015	TO	2035		030		PRORATED GROWTH: 2015 TO	2035	3 13		
20 YEARS	2013		2033	40	30		20 YEARS	2033	30	40	
20 12/113				v	۸		25 12/115		v	۸	
			650 <	•	<	1010		230 <		<	10
			160 >		>	910		1310 >		>	60
				V	٨				V	٨	
				0	510				250	60	
NEW PROJECTED VOLUMES:		2035					NEW PROJECTED VOLUMES: 203	5			
				60	53				460	647	
				V	۸				V	۸	
			707 <	IN =	2460 <	1350		394 <	IN =	2240 <	20
			170 >	OUT =	2460 >	1362		1360 >	OUT =	2240 >	126
				V	۸ *				v	۸ *	
				338	880				1073	400	

<sup>\*</sup> NOTE: Outbound future volume may be factored (increased) to match inbound if inbound is greater than outbound.

 $\label{lem:u:luclobs} \begin{tabular}{ll} U:\begin{tabular}{ll} U:\begin{tabular}{ll}$ 

Project: Knox Logistics Job #: 09347
Scenario: Horizon Year Without Project Analyst: CHS
Date: 04/23/15

LOCATION: Harvill Avenue / Harley Knox Boulevard

FORECAST YEAR: 2035

			INDIVIDUAL T	URN VOLUMI	GROWTH F	REVIEW			
			AM PEAK HOL	JR INPUT DAT	4	PN	1 PEAK HOL	JR INPUT DA	ATA
	TURNING	EXISTING	FUTURE	DIFF-	%	EXISTING	FUTURE	DIFF-	%
APPROACH	MOVEMENT	COUNT	VOLUME	ERENCE	CHANGE	COUNT	VOLUME	ERENCE	CHANGE
NORTH	Left	1	1	0	0%	5	248	243	4860%
BOUND	Through	2	0	-2	-100%	330	149	-181	-55%
	Right	369	1,101	732	198%	5	4	-1	-20%
	NB Total	372	1,102	730	196%	340	401	61	18%
SOUTH	Left	9	56	47	522%	5	1	-4	-80%
BOUND	Through	3	0	-3	-100%	418	331	-87	-21%
	Right	5	12	7	140%	9	128	119	1322%
	SB Total	17	68	51	300%	432	460	28	6%
EAST	Left	5	4	-1	-20%	33	497	464	1406%
BOUND	Through	5	205	200	4000%	5	122	117	2340%
	Right	4	1	-3	-75%	8	740	732	9150%
	EB Total	14	210	196	1400%	46	1,359	1,313	2854%
WEST	Left	310	337	27	9%	1	1	0	0%
BOUND	Through	11	694	683	6209%	1	18	17	1700%
	Right	16	49	33	206%	4	1	-3	-75%
	WB Total	337	1,080	743	220%	6	20	14	233%
TOTAL ENTERING		740	2.460	1720	2220/	024	2 240	1/1/	1720/

TOTAL ENTERING VOLUME 740 2,460 1720 232% 824 2,240 1416 172%

		F	ORECAST PE	AK HOUR TO ADT	COMPARISON	
		VOLU	MES	PERCENT	T OF ADT	
		AM	PM	AM	PM	ADT
North Leg	Inbound	68	460			
North Leg	Outbound	53	647			
North Leg	TOTAL	121	1,107	#DIV/0!	#DIV/0!	-
South Leg	Inbound	1,102	401			
South Leg	Outbound	338	1,072			
South Leg	TOTAL	1,440	1,473	16%	16%	9,000
East Leg	Inbound	1,080	20			
East Leg	Outbound	1,362	127			
East Leg	TOTAL	2,442	147	7%	0%	34,000
West Leg	Inbound	210	1,359			
West Leg	Outbound	707	394			
West Leg	TOTAL	917	1,753	3%	5%	34,000
OVERALL TO	OTAL	4,920	4,480	6%	6%	77,000

 $\label{lem:condition} \begin{tabular}{ll} $U:\UcJobs\_09100-09500\D9300\09347\Post\ Processing\\ \end{tabular} \begin{tabular}{ll} $Aarvill\_Harley\ Knox.xls\\ \end{tabular} Output\ (3) \begin{tabular}{ll} $Aarvill\_Harley\ Knox.xls\\ \end{tabular} \begin{tabular}{ll} $Aarvill\ Ha$ 

### INPUT DATA

Future Conditions Model Run ID: ==> RivTAM <===

LOCATION:		•			I-215	Southbou	nd Ramps / H	larley Knox B	oulevard	•				
	AM PEA	к но	JR						PM PEA	к нос	JR			
EXISTING TURNING MOVE	MENT VO	LUME	S:				EXISTING TU	JRNING MOVE	EMENT VOI	UMES	S:			
2015		1	.65	2	466		2015			3	394	2	277	
		<	V		>					<	V	;	>	
	0 ^					^ (	1		0 ^				۸	0
	397 >					< 167	1		418 >				<	144
	<b>10</b> v					v 135			<b>10</b> v				V	136
		<	۸		>					<	٨		>	
			0	0	0						0	0	0	
FUTURE MODEL YEAR:							FUTURE MC	DEL YEAR:						
2035				598	0		2035					717	0	
				V	٨							٧	۸	
	1094	<		1 =	2158				1597	<		1 =	2744 <	
	1064	>	0	UT =	2158	> 878	1		1147	>	0	UT =	2444 >	645
				V	٨							٧	۸	
				186	0							202	0	
EXISTING (COUNTED) ADT	s BY LEG:						1	OUNTED) ADT	rs BY LEG:		_			
2015			6	5,180			2015				6	5,180		
				N	_				0 == 0			N	_	
	8,556	W	/	LEG	E	10,416			8,556	V	/	+	E	10,416
				S							4	S		
			1	,464							1	.,464		
REFINED FUTURE ADT'S B	Y LEG:						REFINED FU	TURE ADT'S B	Y LEG:					
2035			8	3,700			2035				8	3,700		
				N								N		
	24,800	W	/	LEG	Ε	13,900			24,800	V	/	+	Е	13,900
	,			S		,			,			S		•
			2	2,300							2	,300		
				-										

 $\label{localization} \begin{tabular}{ll} U:\UCJobs \Delta 09100-09500 \Delta 09347 \Post\ Processing \[10\ I-215\ SB\_Harley\ Knox.xlsx]Input\ (1) \end{tabular}$ 

Project: Knox Logistics

Scenario: Horizon Year Without Project

Analyst: CHS Date: 4/23/2015

Job #: 09347

LOCATION: I-215 Southbound Ramps / Harley Knox Boulevard

EXISTING COUNTED INBOUND	AND OL	JTBOL	JND VOLUN	ΛΕ CALC	ULATION								
				Α	M						P	М	
EXISTING COUNT YEAR:							EXISTING COUNT YEAR:						
2015				633	0		2015				673	0	
				V	^						V	^	
			332 <	IN =	1342 <	302				538 <	IN =	1381 <	280
			407 >	OUT =	1342 >	863				428 >	OUT =	1381 >	695
				V	^						V	^	
				147	0						148	0	
GROWTH CALCULATION DECISI	ION RUL	.E											
MIN = Minimum Count Growth	n Approa	ach					MIN = Minimum Count Growth	n Approa	ch				
ADD = Additive (Growth Increm	nent) Ap	proad	ch	MIN	MUL		ADD = Additive (Growth Incren	nent) Ap	proac	:h	MUL	MUL	
MUL = Multiplicative (Ratio) Ap	proach			V	^		MUL = Multiplicative (Ratio) Ap	proach			V	^	
			MUL <		<	MUL				MUL <		<	MUL
			MUL >		>	MUL				MUL >		>	MIN
				V	^						V	^	
				MUL	MUL						MUL	MUL	
MINIMUM GROWTH %s	2015	TO	2035										
				0%	0%						0%	0%	
				V	^						V	^	
			0% <		<	0%				0% <		<	0%
			0% >		>	0%				0% >		>	0%
				V	^						V	^	
				0%	0%						0%	0%	
REFINED GROWTH:	2015	TO	2035				ADJUSTED GROWTH:	2015	TO	2035			
				0	0						47	0	
				V	۸						V	۸	
			758 <		<	198				1062 <		<	600
			653 >		>	17				722 >		>	0
				V	^						V	^	
				43	0						52	0	
PRORATED GROWTH:	2015	TO	2035				PRORATED GROWTH:	2015	TO	2035			
20 YEARS				0	0		20 YEARS				50	0	
				V	^						V	^	
			760 <		<					1060 <		<	600
			650 >		>	20				720 >		>	0
				V	^						V	^	
				40	0						50	0	
NEW PROJECTED VOLUMES:		2035					NEW PROJECTED VOLUMES:		2035				
				630							720		
				V	^						V	^	
			1105 <		2190 <					1760 <		2750 <	880
			1060 >	OUT =	2190 >	892				1150 >		2750 >	770
				V	۸ *						V	۸ *	
				193	0						220	0	

<sup>\*</sup> NOTE: Outbound future volume may be factored (increased) to match inbound if inbound is greater than outbound.

 $\label{localization} \begin{tabular}{ll} U:\label{localization} U:$ 

Project: Job #: 09347 **Knox Logistics** Scenario: Horizon Year Without Project Analyst: CHS 4/23/2015 Date:

LOCATION: I-215 Southbound Ramps / Harley Knox Boulevard

FORECAST YEAR: 2035

			INDIVIDUAL T	URN VOLUME	GROWTH F	REVIEW			
			AM PEAK HOL	JR INPUT DATA	4	PN	1 PEAK HOL	JR INPUT DA	ATA
	TURNING	EXISTING	FUTURE	DIFF-	%	EXISTING	FUTURE	DIFF-	%
APPROACH	MOVEMENT	COUNT	VOLUME	ERENCE	CHANGE	COUNT	VOLUME	ERENCE	CHANGE
NORTH	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
BOUND	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	NB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
SOUTH	Left	466	46	-420	-90%	277	6	-271	-98%
BOUND	Through	2	1	-1	-50%	2	0	-2	-100%
	Right	165	630	465	282%	394	828	434	110%
	SB Total	633	677	44	7%	673	834	161	24%
EAST	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
BOUND	Through	397	846	449	113%	418	764	346	83%
	Right	10	130	120	1200%	10	150	140	1400%
	EB Total	407	976	569	140%	428	914	486	114%
WEST	Left	135	61	-74	-55%	136	70	-66	-49%
BOUND	Through	167	476	309	185%	144	932	788	547%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	WB Total	302	537	235	78%	280	1,002	722	258%

TOTAL ENTERING VOLUME 1,342 2,190 848 63% 1,381 2,750 1369 99%

		F	ORECAST PE	AK HOUR TO ADT	COMPARISON	
		VOLU	MES	PERCEN'	T OF ADT	
		AM	PM	AM	PM	ADT
North Leg	Inbound	677	834			
North Leg	Outbound	0	0			
North Leg	TOTAL	677	834	8%	10%	8,700
South Leg	Inbound	0	0			
South Leg	Outbound	192	220			
South Leg	TOTAL	192	220	8%	10%	2,300
East Leg	Inbound	537	1,002			
East Leg	Outbound	892	770			
East Leg	TOTAL	1,429	1,772	10%	13%	13,900
West Leg	Inbound	976	914			
West Leg	Outbound	1,106	1,760			
West Leg	TOTAL	2,082	2,674	8%	11%	24,800
OVERALL TO	OTAL	4,380	5,500	9%	11%	49,700

 $\label{lem:condition} \begin{tabular}{ll} U:\UcJobs\_09100-09500\_09300\09347\Post\ Processing\\[10 I-215\ SB\_Harley\ Knox.xlsx]Output\ (3) \\[10 I-215\ SB\_Ha$ 

### INPUT DATA

Future Conditions Model Run ID: ==> RivTAM <===

LOCATION:					I-215	Northbou	nd Ramps / Harley Knox E	Boulevard					
	AM PEA	K HOUI	R					PM PEA	к нои	R			
EXISTING TURNING MOVE	MENT VO	LUMES:	:				EXISTING TURNING MO\	/EMENT VO	LUMES	:			
2015			0	0	0		2015			0	0	0	
		<	V	>	>				<	٧	>		
	215 ^					^ 381		<b>258</b> ^				٨	459
	647 >					< 302		534 >				<	272
	<b>0</b> v				,	v 0		<b>0</b> v				V	0
		<	٨	>	>				<	۸	>	•	
			4	0	105					9	1	124	
FUTURE MODEL YEAR:							FUTURE MODEL YEAR:						
2035				0	667		2035				0	636	
				V	^						/	^	
	496	<	IN		1822	_		880	<	IN		2233 <	
	878	>	OU		1822	> 659		945	>	OU.		2233 >	717
			,	V	٨					1	/	٨	
				0	323						0	357	
EXISTING (COUNTED) ADTS	BY LEG:						EXISTING (COUNTED) AD	Ts BY LEG:					
2015				996			2015				996		
				N						ľ			
	10,356	W		EG	E	13,380		10,356	W		+	E	13,380
				S							5		
			1,3	380						1,3	880		
REFINED FUTURE ADT'S BY	'LEG:						REFINED FUTURE ADT'S	BY LEG:					
2035			7.4	400			2035			7.4	100		
				N						ĺ			
	13,900	W	LI	EG	Ε	16,200		13,900	W		F	E	16,200
	•			S		•		•		9	5		•
			3,4	400						3,4	100		

 $\label{lem:u:loss_optimize} \begin{tabular}{ll} $U:\UcJobs\_09100-09500\_09300\09347\Post\ Processing\[11\ I-215\ NB\_Harley\ Knox.xlsx]Input\ (1) \\ \end{tabular}$ 

Project: Knox Logistics

Scenario: Horizon Year Without Project

Analyst: CHS Date: 4/23/2015

Job #: 09347

LOCATION: I-215 Northbound Ramps / Harley Knox Boulevard

EXISTING COUNTED INBOUND	AND OU	ТВО	JND VOLUN	ЛЕ CALC	ULATION								
				А	M						P	M	
EXISTING COUNT YEAR:							EXISTING COUNT YEAR:						
2015				0			2015				0		
				V	٨						V	^	
			306 <		1654 <						IN =	1657 <	731
			862 >	OUT =	1654 >	752				792 >	OUT =	1657 >	658
				V	^						V	^	
				0	109						0	134	
GROWTH CALCULATION DECIS	ION RUL	E.											
MIN = Minimum Count Growth							MIN = Minimum Count Growt						
ADD = Additive (Growth Incren		proad	ch	MUL	MUL		ADD = Additive (Growth Incre		•	ch	MUL	MIN	
MUL = Multiplicative (Ratio) Ap	pproach			V	٨		MUL = Multiplicative (Ratio) A	Approach			V	^	
			MUL <			MIN				MUL <		<	
			MUL >			MIN				MUL >		>	MUL
				V	^						V	۸	
				MUL	MUL						MUL	MUL	
MINIMUM GROWTH %s	2015	TO	2035										
				0%							0%		
				V	^						V	^	
			0% <		<		1			0% <		<	0%
			0% >		>	0%				0% >		>	0%
				V	^						V	^	
				0%	0%						0%	0%	
REFINED GROWTH:	2015	TO	2035				ADJUSTED GROWTH:	2015	TO	2035			
				0							0		
				V	٨						V	۸	
			194 <		<					599 <		<	199
			18 >		>	0				158 >		>	62
				V	٨						V	۸	
22224752 2224774	2015	=-	2005	0	211		22224752 2224474	2015		2005	0	226	
PRORATED GROWTH:	2015	10	2035				PRORATED GROWTH:	2015	TO	2035			
20 YEARS				0			20 YEARS				0		
			400	V	^					600	V	۸	200
			190 <		<					600 <		<	
			20 >		^	0				160 >		^	60
				v 0							v 0		
NEW DROIECTER VOLUMES.		2025		0	210		NEW PROJECTER VOLLINGE.		2025		U	230	
NEW PROJECTED VOLUMES:		2035		0	670		NEW PROJECTED VOLUMES:		2035	1	0	720	
				0	670 ^						0 v	720 ^	
			E00 -	V		600				000 -	-		020
			500 <		1880 <						IN =	2240 <	930
			880 >	OUT =	1920 >					950 >		2320 >	720
				٧							٧		
				0	320						0	360	

<sup>\*</sup> NOTE: Outbound future volume may be factored (increased) to match inbound if inbound is greater than outbound.

 $<sup>\</sup>label{localization} \begin{tabular}{ll} U:\label{localization} U:$ 

Project: Job #: 09347 **Knox Logistics** Scenario: Horizon Year Without Project Analyst: CHS

4/23/2015 Date:

LOCATION: I-215 Northbound Ramps / Harley Knox Boulevard

FORECAST YEAR: 2035

			INDIVIDUAL T	URN VOLUME	GROWTH F	REVIEW			
			AM PEAK HOL	JR INPUT DATA	4	PN	1 PEAK HOL	JR INPUT DA	\TA
	TURNING	EXISTING	FUTURE	DIFF-	%	EXISTING	FUTURE	DIFF-	%
APPROACH	MOVEMENT	COUNT	VOLUME	ERENCE	CHANGE	COUNT	VOLUME	ERENCE	CHANGE
NORTH	Left	4	57	53	1325%	9	153	144	1600%
BOUND	Through	0	0	0	#DIV/0!	1	3	2	200%
	Right	105	268	163	155%	124	216	92	74%
	NB Total	109	325	216	198%	134	372	238	178%
SOUTH	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
BOUND	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	SB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
EAST	Left	215	412	197	92%	258	473	215	83%
BOUND	Through	647	482	-165	-26%	534	504	-30	-6%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	EB Total	862	894	32	4%	792	977	185	23%
WEST	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
BOUND	Through	302	443	141	47%	272	727	455	167%
	Right	381	258	-123	-32%	459	244	-215	-47%
	WB Total	683	701	18	3%	731	971	240	33%
TOTAL ENTERING	21/01/11/45	1 654	1 020	266	1.60/	1 657	2 220	662	400/

TOTAL ENTERING VOLUME 40% 1,654 1,920 266 16% 1,657 2,320 663

		F	ORECAST PE	AK HOUR TO ADT	COMPARISON	
		VOLU	MES	PERCEN'	T OF ADT	
		AM	PM	AM	PM	ADT
North Leg	Inbound	0	0			
North Leg	Outbound	670	720			
North Leg	TOTAL	670	720	9%	10%	7,400
South Leg	Inbound	325	372			
South Leg	Outbound	0	0			
South Leg	TOTAL	325	372	10%	11%	3,400
East Leg	Inbound	701	971			
East Leg	Outbound	750	720			
East Leg	TOTAL	1,451	1,691	9%	10%	16,200
West Leg	Inbound	894	977			
West Leg	Outbound	500	880			
West Leg	TOTAL	1,394	1,857	10%	13%	13,900
OVERALL TO	OTAL	3,840	4,640	9%	11%	40,900

 $\label{lem:condition} \begin{tabular}{ll} U:\Cobs\_09100-09500\_09300\09347\Post\ Processing\\ \cite{Initial I-215\ NB\_Harley\ Knox.xlsx]} Output\ (3) \end{tabular}$ 

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## APPENDIX 5.1:

**E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS** 



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Note
Note
Movement
Follow-In the conflicting Peds, #/hr
Follow-In the conflicting Peds, #/hr
Conflicting Peds, #/hr         0         0         0         0         0           cign Control         Free         Free         Free         Free         Stop         Stop           ET Channelized         - None         - None         - None         - None         - None           cloring Length         100         - 0         0         O         2         O           cle in Median Storage, #         0 0         0         2         O         0         - O
Stop   Stop
None   None
Storage Length
Veh in Median Storage, #         0         -         -         0         2         -           Grade, %         0         -         -         0         0         -           Peak Hour Factor         92         92         92         92         92           Beavy Vehicles, %         0         0         0         0         0         0           Mornt Flow         0         0         0         0         0         0         0           Major/Minor         Major1         Major2         Minor1         Minor1         Minor1         Minor1         Minor1         Minor1         Minor1         Minor2         Minor1         Minor1         Minor1         Minor2         Minor1         Minor1         Minor1         Minor2         Minor1         Minor1         Minor1         Minor2         Minor3         Minor3<
Grade, %         0         -         -         0         0         -           Peak Hour Factor         92         92         92         92         92         92           Beavy Vehicles, %         0         0         0         0         0         0         0         0           Major/Minor         Major1         Major2         Minor1         Minor1         Major/Minor         Minor1
Reavy Vehicles, %         0         0         0         0         0           Avmt Flow         0         0         0         0         0           Agjor/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         0         35         0           Stage 1         -         -         -         0         -         -           Stage 2         -         -         -         0         -
Major/Minor Major1 Major2 Minor1  Conflicting Flow All 0 0 0 0 0 35 0 Stage 1 0 0 - Stage 2 35 - Critical Hdwy Stg 1 5.4 - Critical Hdwy Stg 2 Critical Hdwy Stg 2 Critical Hdwy Stg 2
Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         0         35         0           Stage 1         -         -         -         0         -           Stage 2         -         -         -         35         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Follow-up Hdwy         -         -         2.2         -         3.5         3.3           Fol Cap-1 Maneuver         -         -         -         -         983         -           Stage 1         -         -         -         -         993         -           Platoon blocked, %         -         -         -         -         983         -           Mov Cap-1 Maneuver         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -
Conflicting Flow All         0         0         0         35         0           Stage 1         -         -         -         -         0         -           Stage 2         -         -         -         -         35         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         -         -           Critical Hdwy Stg 2         -         -         -         -         -         -           Critical Hd
Conflicting Flow All         0         0         0         35         0           Stage 1         -         -         -         -         0         -           Stage 2         -         -         -         -         35         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         -         -           Critical Hdwy Stg 2         -         -         -         -         -         -           Critical Hd
Conflicting Flow All         0         0         0         35         0           Stage 1         -         -         -         -         0         -           Stage 2         -         -         -         -         35         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         -         -           Critical Hdwy Stg 2         -         -         -         -         -         -           Critical Hd
Stage 1       -       -       -       -       35       -         Stage 2       -       -       -       35       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Collow-up Hdwy       -       -       -       -       983       -         Fot Cap-1 Maneuver       -       -       -       -       993       -         Stage 1       -       -       -       -       993       -         Platoon blocked, %       -       -       -       983       -         Mov Cap-1 Maneuver       -       -       -       983       -         Mov Cap-2 Maneuver       -       -       -       -       -       -         Stage 1       -       -       -       -       -       -       -       -         Stage 1       -       -       -       -       -       -       -       -       -       -       -
Stage 2       -       -       -       35       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Collow-up Hdwy       -       -       -       -       5.4       -         Collow-up Hdwy       -       -       -       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       -       -       -       -         Stage 1       -       -       -       -       -       -       -         Stage 2       - </td
Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Collow-up Hdwy       -       -       -       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       -       -       -       -         Stage 1       -       -       -       -       -       -       -         Stage 2       -       -       -       -       993       -         Platoon blocked, %       -       -       -       983       -         Mov Cap-1 Maneuver       -       -       -       983       -         Mov Cap-2 Maneuver       -       -       -       -       -       -         Stage 1       -       -       -       -       -       -       -       -         Stage 1       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -
Critical Hdwy Stg 2       -
Follow-up Hdwy 2.2 - 3.5 3.3 For Cap-1 Maneuver 983 - 983 983 983 983 983 983 -
Pot Cap-1 Maneuver       -       -       -       -       983       -         Stage 1       - <td< td=""></td<>
Stage 1       - </td
Stage 2       -       -       -       -       993       -         Platoon blocked, %       - <td< td=""></td<>
Platoon blocked, % 983 942
Mov Cap-1 Maneuver       -       -       -       983       -         Mov Cap-2 Maneuver       -       -       -       942       -         Stage 1       -       -       -       -       -       -
Nov Cap-2 Maneuver       -       -       -       -       942       -         Stage 1       -       -       -       -       -       -
Stage 1
Stage 2 993 -
pproach EB WB NB
ICM Control Delay, s 0
ICM LOS -
ninor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT
Capacity (veh/h)
ICM Lane V/C Ratio
ICM Control Delay (s)
ICM Lane LOS

HCM 95th %tile Q(veh)

Intersection								
Int Delay, s/veh	4.8							
in Boldy or von	1.0							
Movement		EBT	EBR		WBL	WBT	NBL	NBR
Vol, veh/h		7	0		28	16	0	12
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control		Free	Free		Free	Free	Stop	Stop
RT Channelized		-	None		-	None	- -	None
Storage Length		_	-		100	-	0	-
Veh in Median Storage, #	‡	0	_		-	0	2	_
Grade, %		0	_		_	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		8	0		30	17	0	13
Major/Minor	N	Najor1		). //	lajor2		Minor1	
Conflicting Flow All	IV	<u>11 0 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 </u>	0	IVI	1 <u>1</u> 1012	0	86	8
Stage 1		-	0		8	-	80	δ
Stage 2		-	-		-	-	78	-
Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1		_	-		4.1	-	5.4	0.2
Critical Hdwy Stg 2		_	_		_	_	5.4	_
Follow-up Hdwy		_	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		_	_		1625	_	920	1080
Stage 1		_	-		-	_	1020	-
Stage 2		_	-		-	-	950	-
Platoon blocked, %		-	-			-	700	
Mov Cap-1 Maneuver		-	-		1625	-	903	1080
Mov Cap-2 Maneuver		-	-		-	-	883	-
Stage 1		-	-		-	-	1020	-
Stage 2		-	-		-	-	932	-
<u> </u>								
Approach		EB			WB		NB	
HCM Control Delay, s		0			4.6		8.4	
HCM LOS		J			7.0		A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT			
Capacity (veh/h)	1080	LDI		1625	-			
HCM Lane V/C Ratio	0.012	-		0.019	-			
HCM Control Delay (s)	8.4	-	-	7.3	-			
HCM Lane LOS	0.4 A	-	-	7.3 A	-			
HCM 95th %tile Q(veh)	0	-	-	0.1	-			
110W 75W 70WE Q(VEII)	U	-	-	U. I	-			

Intersection								
Int Delay, s/veh	2.6							
<b>y</b> .								
Movement		EBT	EBR		WBL	WBT	NBL	NBR
Vol, veh/h		20	0		23	44	0	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		_	-		50	-	0	-
Veh in Median Storage, #	#	0	_		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		22	0		25	48	0	11
Major/Minor	N.	/lajor1		M	ajor2		Minor1	
Conflicting Flow All	10	0	0	101	22	0	120	22
Stage 1		-	-		- 22	-	22	- 22
Stage 2					-	-	98	-
Critical Hdwy		_	_		4.1	_	6.4	6.2
Critical Hdwy Stg 1		_	_		-	_	5.4	-
Critical Hdwy Stg 2		_	_		_	_	5.4	-
Follow-up Hdwy		_	-		2.2	_	3.5	3.3
Pot Cap-1 Maneuver		_	-		1607	-	880	1061
Stage 1		-	-		-	-	1006	-
Stage 2		_	-		-	-	931	-
Platoon blocked, %		-	-			-	,01	
Mov Cap-1 Maneuver		_	-		1607	-	866	1061
Mov Cap-2 Maneuver		-	-		-	-	866	-
Stage 1		-	-		-	-	1006	-
Stage 2		-	-		-	-	917	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			2.5		8.4	
HCM LOS							A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT			
Capacity (veh/h)	1061	-		1607	-			
HCM Lane V/C Ratio	0.01	-		0.016	-			
HCM Control Delay (s)	8.4	_	-	7.3	_			
HCM Lane LOS	A	-	-	A	-			
HCM 95th %tile Q(veh)	0	_	_	0	_			
1.5/11 /5011 /50116 (2(1011)	0			U				

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	30	0	1	67	0	0	0	7	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	<del>!</del> _	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	33	0	1	73	0	0	0	8	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	73	0	0	33	0	0	108	108	33	111	108	73
Stage 1	-	-	-	-	-	-	33	33	-	75	75	-
Stage 2	-	-	-	-	-	-	75	75	-	36	33	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1540	-	-	1592	-	-	876	786	1046	872	786	995
Stage 1	-	-	-	-	-	-	988	872	-	939	836	-
Stage 2	-	-	-	-	-	-	939	836	-	985	872	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1540	-	-	1592	-	-	876	786	1046	865	786	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	881	785	-	877	784	-
Stage 1	-	-	-	-	-	-	988	872	-	939	835	-
Stage 2	-	-	-	-	-	-	938	835	-	978	872	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			8.5			0		
HCM LOS				0.1			A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR WBL	WBT	WBR S	RI n1					
		1540		4=00			DLIII					
Capacity (veh/h) HCM Lane V/C Ratio	1046 0.007		-	- 1592 - 0.001	-	-	-					
		-	-	- 7.3	-	-	0					
HCM Control Delay (s) HCM Lane LOS	8.5 A	0 A	-		-	-	0 A					
HCM 95th %tile Q(veh)			-		-	-	Н					
noivi youi %uile Q(ven)	0	0	-	- 0	-	-	-					

Intersection									
Int Delay, s/veh	1.4								
2014 <sub>31</sub> 51 voil									
Movement	E	ВТ	EBR		WBL	WBT	NE	3L	NBR
Vol, veh/h		34	0		16	68		0	7
Conflicting Peds, #/hr		0	0		0	0		0	0
Sign Control	F	ree	Free		Free	Free	Sto	р	Stop
RT Channelized		-	None		-	None		-	None
Storage Length		-	-		50	-		0	-
Veh in Median Storage, #	ŧ	0	-		-	0		2	-
Grade, %		0	-		-	0		0	-
Peak Hour Factor		92	92		92	92	(	92	92
Heavy Vehicles, %		0	0		0	0		0	0
Mvmt Flow		37	0		17	74		0	8
Major/Minor	Maj	or1		N	1ajor2		Mino	r1	
Conflicting Flow All		0	0		37	0		16	37
Stage 1		-	-		-	-		37	-
Stage 2		-	-		-	-		)9	-
Critical Hdwy		-	-		4.1	-		.4	6.2
Critical Hdwy Stg 1		-	-		-	-		.4	-
Critical Hdwy Stg 2		-	-		-	-		.4	-
Follow-up Hdwy		-	-		2.2	-	3	.5	3.3
Pot Cap-1 Maneuver		-	-		1587	-	85	51	1041
Stage 1		-	-		-	-	99	91	-
Stage 2		-	-		-	-	92	21	-
Platoon blocked, %		-	-			-			
Mov Cap-1 Maneuver		-	-		1587	-	84	12	1041
Mov Cap-2 Maneuver		-	-		-	-	88	56	-
Stage 1		-	-		-	-	99	91	-
Stage 2		-	-		-		91	11	-
Approach		EB			WB		N	ΙB	
HCM Control Delay, s		0			1.4			.5	
HCM LOS								Α	
Minor Lane/Major Mvmt	NBLn1 E	ВТ	EBR	WBL	WBT				
Capacity (veh/h)	1041	-		1587	-				
HCM Lane V/C Ratio	0.007	-		0.011	-				
HCM Control Delay (s)	8.5	-	-	7.3	-				
HCM Lane LOS	0.5 A	-		7.5 A					
HCM 95th %tile Q(veh)	0			0	-				
HOW FOUT TOUTE Q(VEII)	U	-	-	U	-				

Intersection							
Int Delay, s/veh	1.5						
Movement	EB	T EBR		WBL	WBT	NBL	NBR
Vol, veh/h	4	11 (	)	21	84	0	9
Conflicting Peds, #/hr		0 0		0	0	0	0
Sign Control	Fre	ee Free	!	Free	Free	Stop	Stop
RT Channelized		- None	!	-	None	-	None
Storage Length				100	-	0	-
Veh in Median Storage, #		0 -		-	0	2	-
Grade, %		0 -		-	0	0	-
Peak Hour Factor	Ç	92 92		92	92	92	92
Heavy Vehicles, %		0 0		0	0	0	0
Mvmt Flow	4	15 C	1	23	91	0	10
Major/Minor	Majo	1		Major2		Minor1	
Conflicting Flow All		0 0		45	0	182	45
Stage 1				-	-	45	-
Stage 2				-	-	137	-
Critical Hdwy				4.1	-	6.4	6.2
Critical Hdwy Stg 1				-	-	5.4	-
Critical Hdwy Stg 2				-	-	5.4	-
Follow-up Hdwy				2.2	-	3.5	3.3
Pot Cap-1 Maneuver				1576	-	812	1031
Stage 1				-	-	983	-
Stage 2				-	-	895	-
Platoon blocked, %					-		
Mov Cap-1 Maneuver				1576	-	800	1031
Mov Cap-2 Maneuver				-	-	828	-
Stage 1				-	-	983	-
Stage 2				-	-	882	-
Approach	E	В		WB		NB	
HCM Control Delay, s		0		1.5		8.5	
HCM LOS		-		1.0		A	
Minor Lane/Major Mvmt	NBLn1 EE	T EBR	WBL	WBT			
Capacity (veh/h)	1031	- LDIV		-			
HCM Lane V/C Ratio	0.009		0.014	-			
HCM Control Delay (s)	8.5		7.3	-			
HCM Lane LOS	o.5 A			-			
HCM 95th %tile Q(veh)	0			-			
FIGINI 75111 761118 Q(VEH)	U		U	-			

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	51	0	30	105	2	0		13	3	0	0
Conflicting Peds, #/hr	0	0	0	0	0	3	0		0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop		Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None		•	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	92	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	0		0	0	0	0
Mvmt Flow	0	76	0	45	157	3	0	0	19	4	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	160	0	0	76	0	0	324	325	79	334	324	158
Stage 1	-	-	-	-	-	-	76		-	248	248	-
Stage 2	-	-	-	-	-	-	248		-	86	76	_
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1432	-	-	1536	-	-	633	596	987	623	597	893
Stage 1	-	-	-	-	-	-	938	836	-	760	705	-
Stage 2	-	-	-	-	-	-	760	704	-	927	836	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1432	-	-	1532	-	-	619		985	596	579	893
Mov Cap-2 Maneuver	-	-	-	-	-	-	690		-	692	635	-
Stage 1	-	-	-	-	-	-	938		-	760	684	-
Stage 2	-	-	-	-	-	-	738	683	-	906	836	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.6			8.7			10.2		
HCM LOS				1.0			Α			В		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR WBL	WBT	WBR S	SRI n1					
Capacity (veh/h)	985	1432	-	- 1532	-	יוטוי	692					
HCM Lane V/C Ratio	0.02	1432	-	- 0.029	-	-	0.006					
HCM Control Delay (s)	8.7	0	-	- 7.4	-	-	10.2					
HCM Lane LOS	Α	A		- A		_	В					
HCM 95th %tile Q(veh)	0.1	0	-	- A	-	-	0					
115W 75W 76W Q(VCH)	U. I	U	-	- 0,1	-	-	U					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	^↑	7	ሻሻ	^↑	7	7	<b>↑</b>	77	ሻ	<b>∱</b> ∱	
Volume (veh/h)	0	4	3	411	9	16	1	2	431	8	3	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	5	2	489	11	19	1	2	140	10	4	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	304	1092	483	862	1678	742	2	562	956	21	1164	0
Arrive On Green	0.00	0.29	0.29	0.24	0.44	0.44	0.00	0.30	0.30	0.01	0.31	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1680	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	5	2	489	11	19	1	2	140	10	4	0
Grp Sat Flow(s),veh/h/ln	1810	1900	1680	1810	1900	1680	1810	1900	1615	1810	1900	0
Q Serve(g_s), s	0.0	0.1	0.1	14.3	0.2	0.6	0.1	0.1	2.1	0.7	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.1	0.1	14.3	0.2	0.6	0.1	0.1	2.1	0.7	0.1	0.0
Prop In Lane	1.00	0	1.00	1.00	0.2	1.00	1.00	0	1.00	1.00	0	0.00
Lane Grp Cap(c), veh/h	304	1093	483	862	1678	742	2	562	956	21	1164	0
V/C Ratio(X)	0.00	0.00	0.00	0.57	0.01	0.03	0.40	0.00	0.15	0.47	0.00	0.00
Avail Cap(c_a), veh/h	304	1093	483	862	1678	742	98	562	956	98	1164	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	30.5	23.7	40.3	18.8	13.0	59.9	29.8	9.2	58.9	28.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.1	35.1	0.0	0.3	5.8	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	0.0	0.1	0.0	7.2	0.1	0.3	0.1	0.0	1.0	0.4	0.0	0.0
LnGrp Delay(d),s/veh	0.0	30.5	23.7	40.8	18.8	13.1	95.0	29.8	9.5	64.7	28.9	0.0
LnGrp LOS	0.0	C	C	D	В	В	F	C	A	E	C	0.0
Approach Vol, veh/h		7			519		•	143			14	
Approach Delay, s/veh		28.6			39.3			10.4			54.5	
Approach LOS		20.0 C			57.5 D			В			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	33.1	40.0	4.7	42.3	14.6	58.5	5.9	41.0				
Change Period (Y+Rc), s	4.5	5.5	4.7	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	23.5	34.5	6.5	35.5	5.0	53.0	6.5	35.5				
Max Q Clear Time (g_c+l1), s	16.3	2.1	2.1	2.1	0.0	2.6	2.7	4.1				
Green Ext Time (p_c), s	0.6	0.0	0.0	0.3	0.0	0.1	0.0	0.3				
η = /	0.0	0.0	0.0	0.5	0.0	0.1	0.0	0.5				
Intersection Summary			20. =									
HCM 2010 Ctrl Delay			33.5									
HCM 2010 LOS			С									

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	₽			₽		ሻ	<b>ተ</b> ኈ		ሻ	<b>^</b>	7
Volume (veh/h)	79	0	19	0	0	1	20	364	3	2	284	127
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	95	0	22	0	0	1	24	439	4	2	342	153
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	113	0	220	2	0	39	45	2589	24	5	2532	1076
Arrive On Green	0.06	0.00	0.14	0.00	0.00	0.02	0.03	0.69	0.69	0.00	0.67	0.67
Sat Flow, veh/h	1810	0	1615	1810	0	1615	1810	3760	34	1810	3800	1615
Grp Volume(v), veh/h	95	0	22	0	0	1	24	222	221	2	342	153
Grp Sat Flow(s), veh/h/ln	1810	0	1615	1810	0	1615	1810	1900	1894	1810	1900	1615
Q Serve(g_s), s	4.7	0.0	1.1	0.0	0.0	0.1	1.2	3.7	3.7	0.1	3.0	3.1
Cycle Q Clear(g_c), s	4.7	0.0	1.1	0.0	0.0	0.1	1.2	3.7	3.7	0.1	3.0	3.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	113	0	220	2	0	39	45	1308	1304	5	2532	1076
V/C Ratio(X)	0.84	0.00	0.10	0.00	0.00	0.03	0.53	0.17	0.17	0.41	0.14	0.14
Avail Cap(c_a), veh/h	113	0	574	101	0	563	101	1308	1304	101	2532	1076
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	34.0	0.0	0.0	42.9	43.3	4.9	4.9	44.8	5.5	5.5
Incr Delay (d2), s/veh	39.4	0.0	0.1	0.0	0.0	0.1	3.5	0.3	0.3	18.9	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.5	0.0	0.0	0.0	0.6	2.0	2.0	0.1	1.6	1.5
LnGrp Delay(d),s/veh	81.2	0.0	34.1	0.0	0.0	43.0	46.9	5.2	5.2	63.8	5.6	5.8
LnGrp LOS	F		С			D	D	Α	Α	Ε	Α	Α
Approach Vol, veh/h		117			1			467			497	
Approach Delay, s/veh		72.3			43.0			7.4			5.9	
Approach LOS		Е			D			А			А	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.7	67.5	0.0	17.8	6.8	65.5	10.1	7.7				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.6	31.4				
Max Q Clear Time (q_c+I1), s	2.1	5.7	0.0	3.1	3.2	5.1	6.7	2.1				
Green Ext Time (p_c), s	0.0	2.8	0.0	0.0	0.0	2.9	0.0	0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			13.8									
HCM 2010 LOS			В									
Notes												

Existing plus Project Conditions - AM Peak Hour Urban Crossroads, Inc.

User approved pedestrian interval to be less than phase max green.

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	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<b>/</b>	<b>/</b>	<b>†</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		**	7	ሻ	<b>^</b>						4	7
Volume (veh/h)	0	422	21	120	203	0	0	0	0	409	2	233
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	449	17	128	216	0				435	2	184
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	839	357	665	2410	0				494	2	443
Arrive On Green	0.00	0.07	0.07	0.73	1.00	0.00				0.27	0.27	0.27
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1802	8	1615
Grp Volume(v), veh/h	0	449	17	128	216	0				437	0	184
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	13.7	1.2	2.6	0.0	0.0				27.7	0.0	11.2
Cycle Q Clear(g_c), s	0.0	13.7	1.2	2.6	0.0	0.0				27.7	0.0	11.2
Prop In Lane	0.00	000	1.00	1.00	0.410	0.00				1.00	0	1.00
Lane Grp Cap(c), veh/h	0	839	357	665	2410	0				496	0	443
V/C Ratio(X)	0.00	0.54	0.05	0.19	0.09	0.00				0.88	0.00	0.42
Avail Cap(c_a), veh/h	1.00	839	357	665 2.00	2410	0 1.00				822	1.00	733
HCM Platoon Ratio	0.00	0.33 0.97	0.33 0.97	0.99	2.00 0.99	0.00				1.00	1.00	1.00 1.00
Upstream Filter(I)	0.00	49.7	43.9	10.4	0.99	0.00				41.7	0.00	35.7
Uniform Delay (d), s/veh Incr Delay (d2), s/veh	0.0	2.4	0.2	0.1	0.0	0.0				6.4	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.2	0.1	0.0	0.0				0.4	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.5	0.6	1.3	0.0	0.0				14.7	0.0	5.1
LnGrp Delay(d),s/veh	0.0	52.1	44.1	10.5	0.0	0.0				48.0	0.0	36.3
LnGrp LOS	0.0	J2.1	44.1 D	В	Α	0.0				40.0 D	0.0	30.3 D
Approach Vol, veh/h		466	ט	U	344					ט	621	
Approach Delay, s/veh		51.8			3.9						44.5	
Approach LOS		51.6 D			3.9 A						44.5 D	
Approach EO3		U			А						U	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	49.6	32.0		38.4		81.6						
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5						
Max Green Setting (Gmax), s	23.5	* 27		54.5		54.5						
Max Q Clear Time (g_c+I1), s	4.6	15.7		29.7		2.0						
Green Ext Time (p_c), s	0.9	1.3		3.2		0.9						
Intersection Summary												
HCM 2010 Ctrl Delay			37.1									
HCM 2010 LOS			D									
Notes												

\* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

	۶	<b>→</b>	•	•	<b>←</b>	•	•	†	~	<b>\</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b>			<b>^</b>	7		4	7			
Volume (veh/h)	237	593	0	0	293	334	31	0	96	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	258	645	0	0	318	328	34	0	18			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	283	2755	0	0	2050	871	347	0	310			
Arrive On Green	0.31	1.00	0.00	0.00	0.54	0.54	0.19	0.00	0.19			
Sat Flow, veh/h	1810	3800	0	0	3800	1615	1810	0	1615			
Grp Volume(v), veh/h	258	645	0	0	318	328	34	0	18			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	16.5	0.0	0.0	0.0	5.0	14.1	1.9	0.0	1.1			
Cycle Q Clear(g_c), s	16.5	0.0	0.0	0.0	5.0	14.1	1.9	0.0	1.1			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	283	2755	0	0	2050	871	347	0	310			
V/C Ratio(X)	0.91	0.23	0.00	0.00	0.16	0.38	0.10	0.00	0.06			
Avail Cap(c_a), veh/h	550	2755	0	0	2050	871	347	0	310			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.97	0.97	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	40.5	0.0	0.0	0.0	13.9	16.0	40.0	0.0	39.6			
Incr Delay (d2), s/veh	4.6	0.2	0.0	0.0	0.2	1.2	0.6	0.0	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.5	0.1	0.0	0.0	2.7	6.6	1.0	0.0	0.5			
LnGrp Delay(d),s/veh	45.0	0.2	0.0	0.0	14.0	17.2	40.5	0.0	40.0			
LnGrp LOS	D	А			В	В	D		D			
Approach Vol, veh/h		903			646			52				
Approach Delay, s/veh		13.0			15.6			40.3				
Approach LOS		В			В			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		92.0			22.3	69.7		28.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		87.0			36.5	47.0		23.0				
Max Q Clear Time (g_c+I1), s		2.0			18.5	16.1		3.9				
Green Ext Time (p_c), s		4.8			0.3	4.7		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			15.0									
HCM 2010 LOS			В									

Existing plus Project Conditions - AM Peak Hour Urban Crossroads, Inc.

	11	1	In	n.	1 F
:D/	П	4	ız	U	15

Intersection							
Int Delay, s/veh	0						
in boldy, siven	0						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	0	0	10	0	0	22	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	100	-	0	-	
Veh in Median Storage, #	0	-	-	0	2	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	0	0	0	0	0	0	
Mvmt Flow	0	0	11	0	0	24	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	0	0	22	0	
Stage 1	-	-	-	-	0	-	
Stage 2	_	_	-	_	22	_	
Critical Hdwy	_	_	4.1	_	6.4	6.2	
Critical Hdwy Stg 1	_	_	-	_	5.4	-	
Critical Hdwy Stg 2	_	_	_	_	5.4	_	
Follow-up Hdwy	_	_	2.2	-	3.5	3.3	
Pot Cap-1 Maneuver	_	_		_	1000	-	
Stage 1	_	-	-	-	-	-	
Stage 2	-	_	_	_	1006	-	
Platoon blocked, %	_	-		-	.000		
Mov Cap-1 Maneuver	-	_	_	_	1000	-	
Mov Cap-2 Maneuver	-	-	-	-	955	-	
Stage 1	-	_	_	_	-	-	
Stage 2	-	-	-	-	1006	-	
9					. 300		
Annragah	FC		MD		ND		
Approach	EB		WB		NB		
HCM Control Delay, s	0						
HCM LOS					-		
Minor Lane/Major Mvmt	NBLn1 EBT	EBR	WBL WBT				
Capacity (veh/h)		-					
HCM Lane V/C Ratio		-					
HCM Control Delay (s)		-					
HCM Lane LOS		-					
HCM 95th %tile Q(veh)		-					
( . )							

Intersection								
Int Delay, s/veh	4.5							
in Belay, siven	1.0							
Movement	F	ВТ	EBR		WBL	WBT	NBL	NBR
Vol, veh/h		22	0		12	10	0	28
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control	Е	ree	Free		Free	Free	Stop	Stop
RT Channelized	Г	-	None		-		3ιυμ	None
Storage Length		-	None -		100	None -	0	None
Veh in Median Storage, #	#	0	-		100	0	2	-
Grade, %	7	0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mymt Flow		24	0		13	11	0	30
IVIVIIIL FIOW		24	U		13	11	U	30
Major/Minor	Maj	or1		M	lajor2		Minor1	
Conflicting Flow All		0	0		24	0	61	24
Stage 1		-	-		-	-	24	-
Stage 2		-	-		-	-	37	-
Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4	-
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		1604	-	950	1058
Stage 1		-	-		-	-	1004	-
Stage 2		-	-		-	-	991	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-		1604	-	942	1058
Mov Cap-2 Maneuver		-	-		-	-	925	-
Stage 1		-	-		-	-	1004	-
Stage 2		-	-		-	-	983	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			4		8.5	
HCM LOS							A	
HOW EOO							,,	
Minor Lang/Major Mumat	NBLn1 E	рт	EDD	WDI	WBT			
Minor Lane/Major Mvmt		BT	EBR					
Capacity (veh/h)	1058	-	-	1604	-			
HCM Caretral Palar (a)	0.029	-		0.008	-			
HCM Control Delay (s)	8.5	-	-	7.3	-			
HCM Lane LOS	A	-	-	A	-			
HCM 95th %tile Q(veh)	0.1	-	-	0	-			

Intersection									
Int Delay, s/veh	3								
in Delay, 3/Ven	J								
Movement		EBT	EBR		WBL	WBT	NE	21	NBR
Vol, veh/h		50	0		13	22	INE	0	28
Conflicting Peds, #/hr		0	0		0	0		0	0
Sign Control	-	ree	Free		Free	Free	Sto		Stop
RT Channelized		-	None		-	None	Sit	- -	None
Storage Length			None		50	-		0	-
Veh in Median Storage, #		0	_		-	0		2	_
Grade, %		0	-		-	0		0	-
Peak Hour Factor		92	92		92	92	(	92	92
Heavy Vehicles, %		0	0		0	0		0	0
Mvmt Flow		54	0		14	24		0	30
Major/Minor	Ma	ijor1		N.	1ajor2		Mino	r1	
	IVId	0	0	TV	54	0		)6	54
Conflicting Flow All Stage 1		0	-		54	-		54	54
Stage 2		-	-		-	-		52	-
Critical Hdwy		-	-		4.1	-		.4	6.2
Critical Hdwy Stg 1		-	-		4.1	-		.4 .4	0.2
Critical Hdwy Stg 2		_	_		_	_		.4 .4	_
Follow-up Hdwy		-	_		2.2	_		.5	3.3
Pot Cap-1 Maneuver		_	_		1564	-	89		1019
Stage 1		-	-		-	-	97		-
Stage 2		-	-		-	-	97		-
Platoon blocked, %		-	-			-		-	
Mov Cap-1 Maneuver		-	-		1564	-	88	39	1019
Mov Cap-2 Maneuver		-	-		-	-	89		-
Stage 1		-	-		-	-	97		-
Stage 2		-	-		-	-	96		-
Approach		EB			WB		N	ΙB	
HCM Control Delay, s		0			2.7			.6	
HCM LOS		U			۷.۱		0	.0 A	
FIGNI LUS								Α	
Minor Lang/Major Mumit	NDI1	ГПТ	EDD	WDI	WDT				
Minor Lane/Major Mvmt		EBT	EBR	WBL	WBT				
Capacity (veh/h)	1019	-		1564	-				
HCM Cantrol Palace (a)	0.03	-		0.009	-				
HCM Lora LOS	8.6	-	-	7.3	-				
HCM Lane LOS	A	-	-	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	0	-				

Intersection												
Int Delay, s/veh	0.5											
, , , , , , , , , , , , , , , , , , ,												
Movement	EBL	EBT	EBR	WB	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	78	0		5 35	0	0	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0		0 0	0	0		0	0	0	0
Sign Control	Free	Free	Free	Fre	e Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None			None			None .	-	-	None
Storage Length	50	-	-	10	) -	-	-	-	-	-	-	-
Veh in Median Storage, #	<del>!</del> -	0	-		- 0	-	-	2	-	-	2	-
Grade, %	-	0	-		- 0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	9.	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0		0 0	0	0	0	0	0	0	0
Mvmt Flow	0	85	0		38	0	0	0	3	0	0	0
Major/Minor	Major1			Major.	)		Minor1			Minor2		
Conflicting Flow All	38	0	0	8		0	134	134	85	135	134	38
Stage 1	-	-	-			-	85	85	-	49	49	-
Stage 2	-	-	-			-	49		-	86	85	-
Critical Hdwy	4.1	-	-	4.	l -	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-			-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-			-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2	2 -	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1585	-	-	152	1 -	-	842	760	980	841	760	1040
Stage 1	-	-	-			-	928	828	-	969	858	-
Stage 2	-	-	-			-	969	858	-	927	828	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1585	-	-	152	1 -	-	840	758	980	836	758	1040
Mov Cap-2 Maneuver	-	-	-			-	862	770	-	857	768	-
Stage 1	-	-	-			-	928	828	-	969	855	-
Stage 2	-	-	-			-	966	855	-	924	828	-
Approach	EB			WI	3		NB			SB		
HCM Control Delay, s	0			0.			8.7			0		
HCM LOS	U			0.	<b>,</b>		Α			A		
110111 200										Λ.		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR WB	_ WBT	WBR S	SBI n1					
Capacity (veh/h)	980	1585	-	- 152		-	-					
HCM Lane V/C Ratio	0.003	1000	-	- 0.00		-	-					
HCM Control Delay (s)	8.7	0	-	- 7.		-	0					
HCM Lane LOS	Α	A	_	- /.			A					
HCM 95th %tile Q(veh)	0	0	_		) -	_	-					

Intersection								
	1.8							
= 1.12 <b>y</b> , 1.111.								
Movement		EBT	EBR	١	WBL	WBT	NBL	NBR
Vol, veh/h		81	0		10	40	0	22
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control		Free	Free		Free	Free	Stop	Stop
RT Channelized		-	None		-	None		None
Storage Length		_	-		50	-	0	-
Veh in Median Storage, #		0	_		-	0	2	-
Grade, %		0	_		_	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		88	0		11	43	0	24
Major/Minor		laior1		N 4 a	nior?		Minor1	
Major/Minor	IV.	/lajor1	0	IVI	ajor2	0	Minor1	00
Conflicting Flow All		0	0		88	0	153 88	88
Stage 1		-	-		-		65	-
Stage 2		-	-		4.1	-	6.4	6.2
Critical Hdwy Critical Hdwy Stg 1		-	-		4.1	-	5.4	0.2
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		1520	-	843	976
Stage 1		-	-		1320	-	940	970
Stage 2		-	-		-	-	963	-
Platoon blocked, %		-	-		-	-	703	-
Mov Cap-1 Maneuver					1520	-	837	976
Mov Cap-1 Maneuver			_		-	_	864	770
Stage 1		_	_		_	_	940	_
Stage 2		_	_		_	_	956	-
Olayo Z							730	
Annroach		LD.			\\/D		. ND	
Approach		EB			WB		NB	
HCM Control Delay, s HCM LOS		0			1.5		8.8	
HOW LUS							A	
N. C	ND: 4	- C-	EDD	WD!	N/DT			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR		WBT			
Capacity (veh/h)	976	-		1520	-			
HCM Lane V/C Ratio	0.025	-		0.007	-			
HCM Control Delay (s)	8.8	-	-	7.4	-			
HCM Lane LOS	A	-	-	A	-			
HCM 95th %tile Q(veh)	0.1	-	-	0	-			

Intersection								
Int Delay, s/veh	1.4							
= 5.2 j   5. 5.5								
Movement		EBT	EBR	1	WBL	WBT	NBL	NBR
Vol, veh/h		103	0		9	50	0	21
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control		Free	Free		Free	Free	Stop	Stop
RT Channelized		-	None		-	None	-	None
Storage Length		_	-		100	-	0	-
Veh in Median Storage, #		0	-		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		112	0		10	54	0	23
Major/Minor	Λ	/lajor1		M	ajor2		Minor1	
Conflicting Flow All		0	0	IVIO	112	0	186	112
Stage 1		-	-		-	-	112	-
Stage 2		-	-		-	-	74	-
Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4	-
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		1490	-	808	947
Stage 1		-	-		-	-	918	-
Stage 2		-	-		-	-	954	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-		1490	-	803	947
Mov Cap-2 Maneuver		-	-		-	-	843	-
Stage 1		-	-		-	-	918	-
Stage 2		-	-		-	-	948	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			1.1		8.9	
HCM LOS							А	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL \	WBT			
Capacity (veh/h)	947	-		1490	-			
HCM Lane V/C Ratio	0.024	-		0.007	-			
HCM Control Delay (s)	8.9	-	-	7.4	-			
HCM Lane LOS	A	-	-	Α	-			
HCM 95th %tile Q(veh)	0.1	-	-	0	-			
_(	÷			-				

Intersection														
Int Delay, s/veh	2													
<b>,</b>														
Movement	EBL	EBT	EBR		WBL	WBT	WBR		NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	124	0		16	59	0		0	0	36	0		0
Conflicting Peds, #/hr	0	0	0		0	0	0		0	0	0	0		0
Sign Control	Free	Free	Free		Free	Free	Free	Ç	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None		-	-	None		-	-	None	-	-	None
Storage Length	100	-	-		100	-	-		-	-	-	-	-	-
Veh in Median Storage, #	-	0	-		-	0	-		-	2	-	-	2	-
Grade, %	-	0	-		-	0	-		-	0	-	-	0	-
Peak Hour Factor	67	67	92		67	67	67		67	67	67	67	67	67
Heavy Vehicles, %	0	0	0		0	0	0		0	0	0	0	0	0
Mvmt Flow	0	185	0		24	88	0		0	0	54	0	0	0
Major/Minor	Major1			M	ajor2			Min	nor1			Minor2		
Conflicting Flow All	88	0	0		185	0	0		321	321	185	348		88
Stage 1	-	-	-		-	-	-		185	185	-	136		-
Stage 2	_	-	-		-	-	-		136	136	-	212		_
Critical Hdwy	4.1	-	-		4.1	-	-		7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-		-	-	-		6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-		-	-	-		6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-		2.2	-	-		3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1520	-	-		1402	-	-		636	599	862	610	599	976
Stage 1	-	-	-		-	-	-		821	751	-	872	788	-
Stage 2	-	-	-		-	-	-		872	788	-	795	751	-
Platoon blocked, %		-	-			-	-							
Mov Cap-1 Maneuver	1520	-	-		1402	-	-		628	589	862	565	589	976
Mov Cap-2 Maneuver	-	-	-		-	-	-		728	668	-	663	659	-
Stage 1	-	-	-		-	-	-		821	751	-	872	775	-
Stage 2	-	-	-		-	-	-		857	775	-	745	751	-
Approach	EB				WB				NB			SB		
HCM Control Delay, s	0				1.6				9.5			0		
HCM LOS	0				1.0				Α.			A		
110W 200									, ,			,		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR S	RI n1						
Capacity (veh/h)	862	1520	-		1402	-	WDR 3	DEIT1						
HCM Lane V/C Ratio	0.062	1320	-		).017	-	-	-						
HCM Control Delay (s)	9.5	0	-	- (	7.6	-		0						
HCM Lane LOS	7.5 A	A	-		7.0 A	_	-	A						
HCM 95th %tile Q(veh)	0.2	0	-	_	0.1		_	-						
HOW FULL FORME (VCH)	0.2	U	-	-	0.1	-	-	-						

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b>+</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1,4	<b>^</b>	7	44	<b>^</b>	7	7	<b>↑</b>	77	7	<b>ተ</b> ኈ	
Volume (veh/h)	0	6	6	452	14	6	1	4	526	9	7	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	6	3	466	14	6	1	4	257	9	7	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	3	1282	567	685	2176	961	2	546	929	20	1128	0
Arrive On Green	0.00	0.34	0.34	0.19	0.57	0.57	0.00	0.29	0.29	0.01	0.30	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1679	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	6	3	466	14	6	1	4	257	9	7	0
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1679	1810	1900	1615	1810	1900	0
Q Serve(g_s), s	0.0	0.1	0.1	14.4	0.2	0.2	0.1	0.2	4.5	0.6	0.2	0.0
Cycle Q Clear(g_c), s	0.0	0.1	0.1	14.4	0.2	0.2	0.1	0.2	4.5	0.6	0.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	3	1283	567	685	2176	961	2	546	929	20	1128	0
V/C Ratio(X)	0.00	0.00	0.01	0.68	0.01	0.01	0.40	0.01	0.28	0.46	0.01	0.00
Avail Cap(c_a), veh/h	151	1283	567	685	2176	961	83	546	929	83	1128	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	26.4	20.1	45.3	11.0	11.0	59.9	30.5	12.1	59.0	29.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.2	0.0	0.0	35.1	0.0	0.7	6.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.1	7.4	0.1	0.1	0.1	0.1	2.1	0.3	0.1	0.0
LnGrp Delay(d),s/veh	0.0	26.4	20.1	47.4	11.0	11.0	95.0	30.5	12.9	65.2	29.7	0.0
LnGrp LOS		С	С	D	В	В	F	С	В	Е	С	
Approach Vol, veh/h		9			486			262			16	
Approach Delay, s/veh		24.3			45.9			13.5			49.7	
Approach LOS		С			D			В			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.2	46.0	4.7	41.1	0.0	74.2	5.8	40.0				
Change Period (Y+Rc), s	5.5	* 5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	19.5	* 41	5.5	34.5	5.0	55.0	5.5	34.5				
Max Q Clear Time (g_c+l1), s	16.4	2.1	2.1	2.2	0.0	2.2	2.6	6.5				
Green Ext Time (p_c), s	0.3	0.0	0.0	0.5	0.0	0.9	0.0	0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			34.8									
HCM 2010 LOS			С									
Notes												

Existing plus Project Conditions - PM Peak Hour Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	₽		ሻ	₽		ሻ	<b>ተ</b> ኈ		ሻ	<b>^</b>	7
Volume (veh/h)	165	0	24	1	1	4	8	313	5	0	396	69
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	174	0	25	1	1	4	8	329	5	0	417	73
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	210	0	252	2	10	40	18	2503	38	2	2319	985
Arrive On Green	0.12	0.00	0.16	0.00	0.03	0.03	0.01	0.67	0.67	0.00	0.61	0.61
Sat Flow, veh/h	1810	0	1615	1810	333	1332	1810	3733	57	1810	3800	1614
Grp Volume(v), veh/h	174	0	25	1	0	5	8	167	167	0	417	73
Grp Sat Flow(s), veh/h/ln	1810	0	1615	1810	0	1665	1810	1900	1890	1810	1900	1614
Q Serve(g_s), s	8.5	0.0	1.2	0.0	0.0	0.3	0.4	2.9	2.9	0.0	4.3	0.6
Cycle Q Clear(g_c), s	8.5	0.0	1.2	0.0	0.0	0.3	0.4	2.9	2.9	0.0	4.3	0.6
Prop In Lane	1.00	0.0	1.00	1.00	0.0	0.80	1.00	2.7	0.03	1.00	1.0	1.00
Lane Grp Cap(c), veh/h	210	0	252	2	0	50	18	1274	1267	2	2319	985
V/C Ratio(X)	0.83	0.00	0.10	0.40	0.00	0.10	0.44	0.13	0.13	0.00	0.18	0.07
Avail Cap(c_a), veh/h	308	0.00	574	101	0.00	401	101	1274	1267	101	2319	985
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	32.6	44.9	0.0	42.5	44.3	5.4	5.4	0.0	7.7	1.1
Incr Delay (d2), s/veh	7.5	0.0	0.1	34.8	0.0	0.3	6.1	0.2	0.2	0.0	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.5	0.0	0.0	0.1	0.2	1.6	1.6	0.0	2.3	0.3
LnGrp Delay(d),s/veh	46.4	0.0	32.6	79.7	0.0	42.8	50.4	5.6	5.6	0.0	7.8	1.2
LnGrp LOS	D	0.0	32.0 C	F	0.0	72.0 D	D	Α	Α	0.0	Α.	A
Approach Vol, veh/h	D	199	<u> </u>		6	D	<u> </u>	342	Л		490	
Approach Delay, s/veh		44.6			48.9			6.6			6.9	
11												
Approach LOS		D			D			А			А	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	0.0	65.8	4.6	19.5	5.4	60.4	16.0	8.2				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	5.5	* 5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	15.3	* 22				
Max Q Clear Time (g_c+l1), s	0.0	4.9	2.0	3.2	2.4	6.3	10.5	2.3				
Green Ext Time (p_c), s	0.0	2.7	0.0	0.3	0.0	2.6	0.1	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			14.3									
HCM 2010 LOS			В									
Notes												

User approved pedestrian interval to be less than phase max green.

Existing plus Project Conditions - PM Peak Hour Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	ሻ	<b>^</b>						र्स	7
Volume (veh/h)	0	500	40	127	154	0	0	0	0	349	2	319
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	532	43	135	164	0				371	2	262
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	1188	505	564	2545	0				429	2	385
Arrive On Green	0.00	0.63	0.63	0.62	1.00	0.00				0.24	0.24	0.24
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1800	10	1615
Grp Volume(v), veh/h	0	532	43	135	164	0				373	0	262
Grp Sat Flow(s), veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	8.8	1.3	4.0	0.0	0.0				23.7	0.0	17.7
Cycle Q Clear(g_c), s	0.0	8.8	1.3	4.0	0.0	0.0				23.7	0.0	17.7
Prop In Lane	0.00	1100	1.00	1.00	25.45	0.00				0.99	0	1.00
Lane Grp Cap(c), veh/h	0	1188	505	564	2545	0				432	0	385
V/C Ratio(X)	0.00	0.45	0.09	0.24	0.06	0.00				0.86	0.00	0.68
Avail Cap(c_a), veh/h	1.00	1188	505	564	2545	0 1.00				701	1.00	626
HCM Platoon Ratio	1.00	2.00 0.96	2.00 0.96	2.00 0.99	2.00	0.00				1.00 1.00		1.00
Upstream Filter(I)	0.00	17.1	15.7	16.3	0.99	0.00					0.00	41.5
Uniform Delay (d), s/veh Incr Delay (d2), s/veh	0.0	17.1	0.3	0.1	0.0	0.0				43.8 6.4	0.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0				0.4	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.6	0.6	2.0	0.0	0.0				12.6	0.0	8.1
LnGrp Delay(d),s/veh	0.0	18.3	16.0	16.4	0.0	0.0				50.2	0.0	43.6
LnGrp LOS	0.0	10.3 B	В	В	Α	0.0				50.2 D	0.0	43.0 D
Approach Vol, veh/h		575	D	U	299					ט	635	D
Approach Delay, s/veh		18.1			7.4						47.5	
Approach LOS		В			7.4 A						47.5 D	
Approach E03					Α						D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	42.9	43.0		34.1		85.9						
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5						
Max Green Setting (Gmax), s	20.5	* 38		46.5		62.5						
Max Q Clear Time (g_c+l1), s	6.0	10.8		25.7		2.0						
Green Ext Time (p_c), s	0.6	2.2		2.9		0.7						
Intersection Summary												
HCM 2010 Ctrl Delay			28.4									
HCM 2010 LOS			С									
Notes												

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Existing plus Project Conditions - PM Peak Hour Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	<b>^</b>			<b>^</b>	7		र्स	7			
Volume (veh/h)	340	509	0	0	258	422	22	1	115	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	382	572	0	0	290	449	25	1	20			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	417	2882	0	0	1895	805	276	11	256			
Arrive On Green	0.08	0.25	0.00	0.00	0.50	0.50	0.16	0.16	0.16			
Sat Flow, veh/h	1810	3800	0	0	3800	1614	1743	70	1615			
Grp Volume(v), veh/h	382	572	0	0	290	449	26	0	20			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1614	1813	0	1615			
Q Serve(g_s), s	25.2	14.3	0.0	0.0	5.0	23.2	1.5	0.0	1.3			
Cycle Q Clear(g_c), s	25.2	14.3	0.0	0.0	5.0	23.2	1.5	0.0	1.3			
Prop In Lane	1.00		0.00	0.00		1.00	0.96		1.00			
Lane Grp Cap(c), veh/h	417	2882	0	0	1895	805	287	0	256			
V/C Ratio(X)	0.92	0.20	0.00	0.00	0.15	0.56	0.09	0.00	0.08			
Avail Cap(c_a), veh/h	686	2882	0	0	1895	805	287	0	256			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.97	0.97	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	54.3	16.2	0.0	0.0	16.3	20.9	43.1	0.0	43.0			
Incr Delay (d2), s/veh	7.1	0.2	0.0	0.0	0.2	2.8	0.6	0.0	0.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	13.5	7.6	0.0	0.0	2.7	11.0	8.0	0.0	0.6			
LnGrp Delay(d),s/veh	61.4	16.4	0.0	0.0	16.5	23.7	43.7	0.0	43.6			
LnGrp LOS	E	В			В	С	D		D			
Approach Vol, veh/h		954			739			46				
Approach Delay, s/veh		34.4			20.8			43.7				
Approach LOS		С			С			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		96.0			31.1	64.9		24.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		91.0			45.5	42.0		19.0				
Max Q Clear Time (g_c+l1), s		16.3			27.2	25.2		3.5				
Green Ext Time (p_c), s		4.5			0.5	4.0		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			28.9									
HCM 2010 LOS			С									

Existing plus Project Conditions - PM Peak Hour Urban Crossroads, Inc.

### **APPENDIX 5.2:**

**E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS** 



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05/19/15
40 mph
25 mph
lane
<b>251</b> vpd
RURAL (R)
(1)
- -

#### (Based on Estimated Average Daily Traffic - See Note)

LIDDAN	DUDAL	1	Misis of Di			
<u>URBAN</u>	<u>RURAL</u>		Minimum Re			
XX			EA	DT		
CONDITION A -	Minimum Vehicular Volume			Vehicles Per Day		
Satisfied	Not Satisfied	Vehicles	Per Day on	on Higher-Volume		
	XX	Majo	r Street	Minor Stree	et Approach	
Number of lanes for m	noving traffic on each approach	(Total of Bot	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	Rural	<u>Urban</u>	Rural	
1 <b>251</b>	1 <b>251</b>	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 - Inte	erruption of Continuous Traffic		·	Vehicles	Per Day	
Satisfied	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume	
	XX	on Maj	or Street	_	et Approach	
Number of lanes for m	noving traffic on each approach	(Total of Bot	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	Urban	Rural	Ürban	<u>Rural</u>	
1 251	<u> </u>	12,000	8,400	1,200	<u>850</u>	
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	
Combinatio	n of CONDITIONS A + B		·	·		
Satisfied	Not Satisfied					
	XX	2 CON	DITIONS	2 CONI	DITIONS	
No one condition sati	No one condition satisfied, but following conditions			80	)%	
fulfilled 80% of more	_					
	3% 2%					

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



<u> </u>					TRAFFIC COND	ITIONS	E+P	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/	15
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	40	) 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 =		764	_vpd	Minor Street	Future ADT =	262	_vpd
Speed limit c	or critical speed o	on major stre	eet traffic > 64	km/h (40 m	ph);		RURAL	(D)
In built up ar	ea of isolated cor	mmunity of	< 10,000 popu	lation		or	NUKAL	(K)

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	equirements		
XX	KOTAL		EA	-		
7.0.1	imum Vehicular Volume				Per Day	
		\/ahialaa I	Dor Doy on	Vehicles Per Day on Higher-Volume		
<u>Satisfied</u>	Not Satisfied		Per Day on	•		
	XX		Street	Minor Street Approach		
	ng traffic on each approach	`	n Approaches)		ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
1 <b>764</b>	1 <b>262</b>	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 - Interru			Vehicles	s Per Day		
Satisfied	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume	
	on Maj	or Street	Minor Stree	et Approach		
Number of lanes for movi	ng traffic on each approach	(Total of Botl	n Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
1 <b>764</b>	1 <b>262</b>	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 CONI	DITIONS	2 CONI	DITIONS	
No one condition satisfie	d, but following conditions	8	0%	80	0%	
fulfilled 80% of more						
	<u>A</u> <u>B</u> 6%					

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS	E+P	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/	15
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	40	mph
Minor Street:	Driveway 3			<u> </u>	Critical Approach	Speed (Minor)	25	mph
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	1	lane
Major Street	Future ADT =		1,339	vpd	Minor Street	Future ADT =	313	_vpd
Speed limit o	or critical speed o	n major stre	et traffic > 64	km/h (40 m	ph);		DUDAI	(D)
In built up are	ea of isolated cor	mmunity of	< 10,000 popu	lation		or	RURAL	(K)

#### (Based on Estimated Average Daily Traffic - See Note)

LIDDAN	DUDAL	Minimum Requirements						
<u>URBAN</u>	<u>RURAL</u>							
XX			EA					
CONDITION A - Minin	num Vehicular Volume			Vehicles Per Day				
<u>Satisfied</u>	Not Satisfied	Vehicles F	Per Day on	on Higher-Volume				
	XX	Major	· Street	Minor Street Approach				
Number of lanes for moving	traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)			
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>			
<i>1</i> 1,339	<i>1</i> <b>313</b>	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 - Interrupt			Vehicles	s Per Day				
Satisfied	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume			
	on Maj	or Street	Minor Stree	et Approach				
Number of lanes for moving	traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)			
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>			
<i>1</i> 1,339	1 <b>313</b>	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 C	CONDITIONS A + B							
<u>Satisfied</u>	Not Satisfied							
	XX	2 CONI	DITIONS	2 CONI	DITIONS			
No one condition satisfied,	but following conditions	80	0%	80	0%			
fulfilled 80% of more								
	13% 11%							

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS	E+P	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/1	5
Jurisdiction:	<b>County of River</b>	side		CHK		DATE		
Major Street:	Oleander Avenu	ıe		_	Critical Approach	Speed (Major)	40	mph
Minor Street:	Decker Road			_	Critical Approach	Speed (Minor)	25	mpl
Major Street	Approach Lanes	=	1	lane	Minor Street	Approach Lanes	1	lane
Major Street	Future ADT =		1,700	vpd	Minor Street	Future ADT =	49	vpd
Speed limit o	or critical speed on ea of isolated con	·	eet traffic > 64	_ · km/h (40 m	ph);	or	RURAL (	

#### (Based on Estimated Average Daily Traffic - See Note)

LIDDANI	DUBAL		14: : D				
<u>URBAN</u>	<u>RURAL</u>	Minimum Requirements					
XX			EA	DT			
CONDITION A -	Minimum Vehicular Volume			Vehicles	s Per Day		
Satisfied	Not Satisfied	Vehicles I	Per Day on	on Highe	er-Volume		
	XX	Majo	r Street	Minor Stree	et Approach		
Number of lanes for n	noving traffic on each approach	(Total of Bot	h Approaches)	(One Dire	ction Only)		
Major Street	Minor Street	Urban	Rural	Urban	Rural		
1 <b>1,700</b>	1 <b>49</b>	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 - Inte	erruption of Continuous Traffic	·	·	Vehicles	Per Day		
Satisfied	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume		
	XX	on Maj	or Street	_	et Approach		
Number of lanes for n	noving traffic on each approach	(Total of Bot	h Approaches)	(One Dire	(One Direction Only)		
Major Street	Minor Street	Urban	Rural	<u> Urban</u>	<u>Rural</u>		
<i>1</i> <b>1,700</b>	1 <b>49</b>	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		
Combinatio	n of CONDITIONS A + B	·	·	·	·		
Satisfied	Not Satisfied						
	XX	2 CON	DITIONS	2 CONI	DITIONS		
No one condition sat	isfied, but following conditions	8	0%	80	0%		
fulfilled 80% of more	_						
	2% 4%						
<del>-</del>							

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS	E+P	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/ <sup>-</sup>	15
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	40	) mph
Minor Street:	Driveway 4			_	Critical Approach	Speed (Minor)	25	mph
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	1	_lane
Major Street	Future ADT =		2,002	_vpd	Minor Street	Future ADT =	253	_vpd
Speed limit c	or critical speed o	n major stre	eet traffic > 64	km/h (40 m	ph);		RURAL	(D)
In built up ar	ea of isolated cor	mmunity of	< 10,000 popu	lation		or	NUKAL	(K)

#### (Based on Estimated Average Daily Traffic - See Note)

LIDDANI	DLIDAI		Minimum De				
URBAN	RURAL	Minimum Requirements					
XX			EA				
CONDITION A - Minim	um Vehicular Volume			Vehicles	Per Day		
<u>Satisfied</u>	Not Satisfied	Vehicles F	Per Day on	on Highe	r-Volume		
	XX	Major	Street	Minor Stree	et Approach		
Number of lanes for moving	traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)		
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>		
1 <b>2,002</b>	1 <b>253</b>	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 - Interrupti	on of Continuous Traffic			Vehicles	Per Day		
<u>Satisfied</u>	Not Satisfied	Vehicles	s Per Day	on Highe	r-Volume		
	XX	on Maj	or Street	Minor Stree	et Approach		
Number of lanes for moving	traffic on each approach	(Total of Both	n Approaches)	(One Dire	(One Direction Only)		
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>		
1 <b>2,002</b>	1 <b>253</b>	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 Combination of Combination	ONDITIONS A + B						
<u>Satisfied</u>	Not Satisfied						
	XX	2 CONI	DITIONS	2 CONE	DITIONS		
No one condition satisfied,	out following conditions	80	0%	80	)%		
fulfilled 80% of more	_A <u>B</u> _						
	11%						

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS	E+P	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/1	5
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	40	mph
Minor Street:	Driveway 5			_	Critical Approach	Speed (Minor)	25	mpl
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	1	lane
Major Street	Future ADT =		2,453	_vpd	Minor Street	Future ADT =	197	vpd
Speed limit o	or critical speed o	n major stre	et traffic > 64	km/h (40 m	ph);	Or	RURAL (	/P\
In built up are	ea of isolated cor	mmunity of	< 10,000 popu	lation		or	KOKAL	(11)

#### (Based on Estimated Average Daily Traffic - See Note)

<u>URBAN</u>	<u>RURAL</u>	Minimum Requirements				
XX			EA	DT		
CONDITION A -	Minimum Vehicular Volume			Vehicles	s Per Day	
Satisfied	Not Satisfied	Vehicles I	Per Day on	on Highe	er-Volume	
	XX	Majo	r Street	Minor Stree	et Approach	
Number of lanes for m	noving traffic on each approach	(Total of Bot	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	Rural	<u>Urban</u>	Rural	
1 2,453	1 <b>197</b>	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 - Inte	erruption of Continuous Traffic	·	·	Vehicles	Per Day	
Satisfied	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume	
	XX	on Maj	or Street	_	et Approach	
Number of lanes for m	noving traffic on each approach	(Total of Bot	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	Urban	Rural	Ürban	Rural	
1 <b>2,453</b>	1 <b>197</b>	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	
Combinatio	n of CONDITIONS A + B	·	·	·	·	
Satisfied	Not Satisfied					
	XX	2 CON	DITIONS	2 CONI	DITIONS	
No one condition sati	sfied, but following conditions	8	0%	80	0%	
fulfilled 80% of more	_					
	8% 16%					

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



#### Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = Existing Plus Project Conditions - Weekday PM Peak Hour

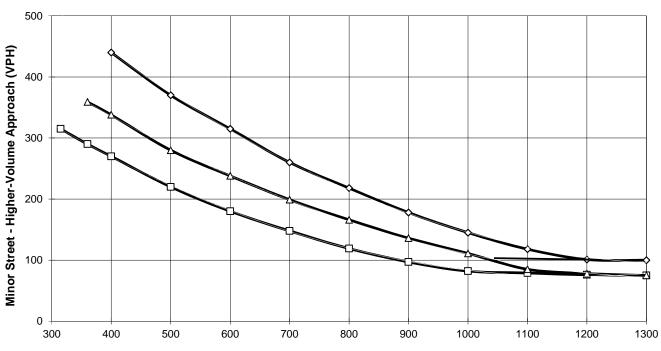
Major Street Name = Oleander Avenue Total of Both Approaches (VPH) = 199

Number of Approach Lanes Major Street = 2

Minor Street Name = Driveway 6 High Volume Approach (VPH) = 18

Number of Approach Lanes Minor Street = 1

#### SIGNAL WARRANT NOT SATISFIED



Major Street - Total of Both Approaches (VPH)

1 Lane (Major) & 1 Lane (Minor)

2+ Lanes (Major) & 1 Lane (Minor) OR 1 Lane (Major) & 2+ Lanes (Minor)

2+ Lanes (Major) & 2+ Lanes (Minor)

→ Major Street Approaches

- - - Minor Street Approaches

\*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane



5.2-7

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### APPENDIX 5.3:

**E+P CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS** 



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6	8	$^{20}$	1	5

	-	•	•	←	<b>↓</b>	1
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	449	22	128	216	437	248
v/c Ratio	0.31	0.03	0.34	0.09	0.79	0.34
Control Delay	25.9	0.0	30.0	9.4	48.7	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	0.0	30.0	9.4	48.7	4.5
Queue Length 50th (ft)	117	0	38	27	311	0
Queue Length 95th (ft)	146	0	61	56	379	52
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	1452	771	372	2339	862	998
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	14	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.03	0.34	0.09	0.51	0.25
Intersection Summary						

### Queues

11: I-215 NB Off Ramp/I-215 NB On Ramp & Harley Knox. Blvd./Harley Knox Blvd. 5/14/2015

	•	<b>→</b>	<b>←</b>	•	<b>†</b>	/
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	258	645	318	363	34	104
v/c Ratio	0.78	0.23	0.16	0.31	0.09	0.23
Control Delay	37.7	6.0	16.1	2.6	40.8	9.1
Queue Delay	0.1	0.6	0.0	0.0	0.0	0.0
Total Delay	37.8	6.5	16.1	2.6	40.8	9.1
Queue Length 50th (ft)	183	73	62	0	22	0
Queue Length 95th (ft)	195	105	98	52	51	47
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	577	2755	1984	1165	364	448
Starvation Cap Reductn	23	1624	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.57	0.16	0.31	0.09	0.23
Intersection Summary						

6	8	$^{20}$	1	5

	-	•	•	•	<b>↓</b>	4
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	532	43	135	164	373	339
v/c Ratio	0.31	0.05	0.42	0.07	0.78	0.46
Control Delay	23.8	2.9	30.7	7.6	52.3	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.8	2.9	30.7	7.6	52.3	5.3
Queue Length 50th (ft)	130	0	34	18	270	0
Queue Length 95th (ft)	218	16	55	41	341	64
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	1697	888	324	2489	736	943
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	130	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.05	0.42	0.07	0.51	0.36
Intersection Summary						

5/14/2015

### Queues

11: I-215 NB Off Ramp/I-215 NB On Ramp & Harley Knox. Blvd./Harley Knox Blvd.

	۶	<b>→</b>	←	4	<b>†</b>	/
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	382	572	290	474	26	129
v/c Ratio	0.83	0.20	0.16	0.41	0.09	0.32
Control Delay	39.7	2.8	18.7	3.1	44.1	9.7
Queue Delay	0.2	0.3	0.0	0.0	0.0	0.0
Total Delay	39.9	3.1	18.7	3.1	44.1	9.7
Queue Length 50th (ft)	254	50	61	0	17	0
Queue Length 95th (ft)	301	10	98	58	44	53
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	720	2881	1847	1154	300	409
Starvation Cap Reductn	43	1639	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.46	0.16	0.41	0.09	0.32
Intersection Summary						

### **APPENDIX 5.4:**

**E+P CONDITIONS BASIC FREEWAY SEGMENT ANALYSIS WORKSHEETS** 

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T		
General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Cross 5/18/2015 AM Peak Ho		Highway/Direction of Travel <i>I-215 Southbound</i> From/To <i>North of Harley Knox B.</i> Jurisdiction <i>Caltrans</i> Analysis Year <i>Existing Plus Project</i>			
	Logistics Ceri		· ,		nning Data	
✓ Oper.(LOS)			Des.(N)	∟Ріа	nning Data	
Flow Inputs Volume, V AADT	2593	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.5 1)] 0.976		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed,	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph	
BFFS LOS and Performanc	e Measures	•	Design (N)			
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF \times V)$ $x f_p)$ $S$ $D = v_p / S$ $LOS$		pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

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BASIC FREEWAY SEGMENTS WORKSHEET					
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour Logistics Center Phase II TIA		Highway/Direction of Trave From/To Jurisdiction Analysis Year	rel I-215 Southbound South of Harley Knox Bl. Caltrans Existing Plus Project	
	Logistics Cert		· ,	□ Die	nning Data
✓ Oper.(LOS)			Des.(N)	⊔Ріа	nning Data
<i>Flow Inputs</i> Volume, V	2195	veh/h	Peak-Hour Factor, PHF	0.92	
AADT		veh/day	%Trucks and Buses, $P_T$	3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	)] <i>0.985</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
$v_p = (V \text{ or DDHV}) / (PHF x)$ $x f_p$		pc/h/ln	Design LOS $v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
S	70.0	mph	S P		mph
$D = v_p / S$	11.5	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		Required Number of Lanes	s, N	·
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow hour volume		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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General Information			Site Information					
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 AM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	North or Caltrans	of Harley Knox Bl.			
	Logistics Cent	ter Phase II TIA	<u>_</u>					
✓ Oper.(LOS)			Pes.(N)	∐ Plar	nning Data			
Flow Inputs								
Volume, V AADT	4114	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5				
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi				
Calculate Flow Adjus	tments							
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.976				
Speed Inputs			Calc Speed Adj and					
Lane Width		ft		<del>-</del>				
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph			
Number of Lanes, N	3		f <sub>LC</sub>		mph			
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph			
FFS (measured)	70.0	mph	FFS	70.0	mph			
Base free-flow Speed, BFFS		mph		70.0	тіріі			
LOS and Performanc	e Measures		Design (N)		_			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1528 68.8 22.2 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln			
Glossary			Factor Location					
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1			

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T					
General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Cross 5/18/2015 AM Peak Ho		Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	I-215 Northbound South of Harley Knox Bl. Caltrans Existing Plus Project				
✓ Oper.(LOS)	Logistics Certi		Des.(N)	□ Dla	nning Data				
Flow Inputs			Jes.(IV)	∟гіа	Illillig Data				
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	3740	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.92 4 0 Level mi					
DDIIV - MADI XIX D		VCIIIII	Up/Down %	,,,,					
Calculate Flow Adjus	tments								
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980					
Speed Inputs			Calc Speed Adj and	FFS					
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph				
LOS and Performanc	e Measures	3	Design (N)						
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1382 69.6 19.9 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1				

General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 PM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	North or Caltrans	of Harley Knox Bl.				
	Logistics Cent	er Phase II TIA							
✓ Oper.(LOS)			Des.(N) Planning Data						
Flow Inputs									
Volume, V AADT	3880	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5					
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi					
Calculate Flow Adjus	tments								
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.976					
Speed Inputs			Calc Speed Adj and						
Lane Width		ft	Care opeca / taj ana						
Rt-Side Lat. Clearance		ft	f		mph				
Number of Lanes, N	3		f <sub>LW</sub>		mph				
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub> TRD Adjustment		mph				
FFS (measured)	70.0	mph	FFS	70.0	mph				
Base free-flow Speed, BFFS		mph	773	70.0	Шрп				
LOS and Performanc	e Measures	}	Design (N)						
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1441 69.3 20.8 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1				

General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 PM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	of Harley Knox Bl.				
	Logistics Cent	ter Phase II TIA	,						
✓ Oper.(LOS)			Des.(N)	∐ Plar	nning Data				
Flow Inputs	0.400	1.0	D 111 E 1 DIE						
Volume, V AADT	3466	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 4					
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi					
Calculate Flow Adjus	tments								
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)1 0.980					
Speed Inputs			Calc Speed Adj and						
Lane Width		ft	Care Opeca Aaj ana	<u> </u>					
Rt-Side Lat. Clearance		ft	f		mnh				
Number of Lanes, N	3		f <sub>LW</sub>		mph				
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub> TRD Adjustment		mph mph				
FFS (measured)	70.0	mph	FFS	70.0	·				
Base free-flow Speed, BFFS		mph	FFS	70.0	mph				
LOS and Performanc	e Measures		Design (N)						
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1281 69.9 18.3 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1				

General Information			Site Information					
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 PM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	North or Caltrans	of Harley Knox Bl.			
	Logistics Cent	ter Phase II TIA	,					
✓ Oper.(LOS)			Des.(N)					
Flow Inputs								
Volume, V AADT	3303	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5				
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi				
Calculate Flow Adjus	tments							
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.976				
Speed Inputs			Calc Speed Adj and					
Lane Width		ft						
Rt-Side Lat. Clearance		ft	f		mph			
Number of Lanes, N	3		f <sub>LW</sub>		mph			
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub> TRD Adjustment		mph			
FFS (measured)	70.0	mph	FFS	70.0	•			
Base free-flow Speed, BFFS		mph	773	70.0	mph			
LOS and Performanc	e Measures	3	Design (N)					
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1227 70.0 17.5 B	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln			
Glossary			Factor Location					
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1			

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T					
General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Cross 5/18/2015 PM Peak Ho		Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	I-215 Northbound South of Harley Knox Bl. Caltrans Existing Plus Project				
	Logistics Cert		· ,	□ Dla	nning Dota				
✓ Oper.(LOS)		L	Des.(N)	⊔Ріа	nning Data				
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K	2788	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 3 0					
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi					
Calculate Flow Adjus	tments								
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = \frac{1}{[1 + P_{T}(E_{T} - 1) + P_{R}(E_{R} - 1)]}$	1.2 )] 0.985					
Speed Inputs			Calc Speed Adj and	FFS					
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph				
LOS and Performanc	e Measures	3	Design (N)						
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1025 70.0 14.6 B	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1				

## **APPENDIX 5.5:**

E+P CONDITIONS FREEWAY MERGE/DIVERGE ANALYSIS WORKSHEETS



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$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Ramp  Ves  No $L_{down} = V_D = V/P$ $V = V/P$ $V = V/P$	tream Adj O O 1420 107 v HF x f <sub>HV</sub>					
Agency or Company Date Performed         Urban Crossroads, Inc. Junction         Junction Caltrans         Harley Knox Off-Ramp Caltrans           Analysis Time Period         AM Peak Hour         Analysis Year         Existing Plus Project           Imputs         Freeway Number of Lanes, N         3           Who Great of Project Description of Manager of Lanes, N         1           Acceleration Lane Length, Lane L	Ramp  Ves  No $L_{down} = V_D = V/P$ $V = V/P$ $V = V/P$	1420 107 v HF x f <sub>HV</sub>					
Analysis Time Period	Ramp  Ves  No $L_{down} = V_D = V/P$ $V = V/P$ $V = V/P$	1420 107 v HF x f <sub>HV</sub>					
Project Description   Knox Logistics Center Phase     TIA (JN 09347)	Ramp  Ves  No $L_{down} = V_D = V/P$ $V = V/P$ $V = V/P$	1420 107 v HF x f <sub>HV</sub>					
Inputs	Ramp  Ves  No $L_{down} = V_D = V/P$ $V = V/P$ $V = V/P$	1420 107 v HF x f <sub>HV</sub>					
	Ramp  Ves  No $L_{down} = V_D = V/P$ $V = V/P$ $V = V/P$	1420 107 v HF x f <sub>HV</sub>					
	$V$ Yes  No $V_{down} = V_{D} = V$ $V = V/P$ $V = V/P$ $V = V/P$ $V = V/P$	1420 107 v HF x f <sub>HV</sub>					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$L_{down} = V_{D} = V_{D}$ $f_{p} \qquad V = V/P$ $00$ $00$ $00$	1420 107 v HF x f <sub>HV</sub> 2889					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$V_{D} = $ $f_{p} \qquad V = V/P$ $00$ $00$ $00$	107 v HF x f <sub>HV</sub>					
Vu = ven/n       Ramp Free-Flow Speed, S <sub>FR</sub> 45.0         Conversion to pc/h Under Base Conditions         (pc/h)       V (Veh/hr)       PHF       Terrain       %Truck       %Rv       f <sub>HV</sub> Freeway       2593       0.92       Level       5       0       0.976       1.0         Ramp       505       0.92       Level       19       0       0.913       1.0         UpStream       DownStream       107       0.92       Level       27       0       0.881       1.0         Merge Areas       Diverge         Estimation of v <sub>12</sub> Estimation of v <sub>12</sub> L <sub>EQ</sub> = (Equation of v <sub>12</sub> )         L <sub>EQ</sub> = (Equation of v <sub>12</sub> )         V <sub>12</sub> = V <sub>F</sub> + V <sub>12</sub> = 0.660 us         V <sub>12</sub> = v <sub>11</sub> pc         V <sub>12</sub> = v <sub>11</sub> pc         V <sub>12</sub> = 2111 pc         V <sub>3</sub> or V <sub>av34</sub> > 2,700 pc/h?  yes       No	f <sub>p</sub> v = V/P	HF x f <sub>HV</sub>					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	000	2889					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	000	2889					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	00						
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	00	601					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$							
		132					
	Diverge Areas						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$							
$\begin{array}{llllllllllllllllllllllllllllllllllll$	(\/ \/ \D						
$\begin{array}{llllllllllllllllllllllllllllllllllll$		12)					
$V_{12} = pc/h$ $V_{12} = 2111 pc$ $V_{3} \text{ or } V_{av34} $ pc/h (Equation 13-14 or 13-17) $V_{3} \text{ or } V_{av34} > 2,700 pc/h? $ Yes $\square$ No							
$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17) $V_3$ or $V_{av34}$ 778 pc/l Is $V_3$ or $V_{av34}$ > 2,700 pc/h? $\square$ Yes $\square$ No Is $V_3$ or $V_{av34}$ > 2,700 pc/h? $\square$ Yes	sing Equation (	=XNIDIT 13-7					
Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes		44 40					
	h (Equation 13-	-14 or 13-					
U-VV A F * V /0 V A F * V /0 V							
If Yes V <sub>v.</sub> = pc/h (Equation 13-16, 13-18, or If Yes V <sub>v.</sub> = pc/h (E	Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes No pc/h (Equation 13-16, 13-18, or 13 19)						
Capacity Checks Capacity Checks							
Actual Capacity LOS F? Actual	Capacity	LC					
V <sub>F</sub> 2889 Ex	hibit 13-8 720	N 00					
$V_{FO}$ Exhibit 13-8 $V_{FO} = V_F - V_R$ 2288 Ex	chibit 13-8 720	00 0					
	hibit 13-10 210	00 0					
Flow Entering Merge Influence Area Flow Entering Diverge In		<u></u>					
	x Desirable	Viola					
	oit 13-8 4400:A						
Level of Service Determination (if not F)  Level of Service Determination	ination (if n	ot F)					
$D_R = 5.475 + 0.00734 \text{ v}_R + 0.0078 \text{ V}_{12} - 0.00627 \text{ L}_A$ $D_R = 4.252 + 0.0086$							
$D_R = (pc/mi/ln)$ $D_R = 20.7 (pc/mi/ln)$	12 5						
LOS = (Exhibit 13-2) LOS = C (Exhibit 13-2)							
Speed Determination Speed Determination							
$M_S$ = (Exibit 13-11) $D_S$ = 0.352 (Exhibit 13-12)							
$S_R$ = mph (Exhibit 13-11) $S_R$ = 60.1 mph (Exhibit 13-12)							
	)						
$S_0$ = mph (Exhibit 13-11) $S_0$ = 76.8 mph (Exhibit 13-12) $S$ = mph (Exhibit 13-13) $S$ = 63.9 mph (Exhibit 13-13)							
pyright © 2014 University of Florida, All Rights Reserved  HCS2010 <sup>TM</sup> Version 6.65	)						

General Infor			RAMP JUNG	Site Infor							
Analyst	CHS	<u> </u>		eeway/Dir of Tr		215 Southboun	d				
Agency or Company		an Crossroads,		nction							
Date Performed		/2015				Harley Knox On-Ramp Caltrans					
Analysis Time Period		Peak Hour				Caltrans Existing Plus Project					
Project Description				iaiysis i cai		Kisilily Flus Flu	увсі				
Inputs	KIIOX LOGISTICS	S Center Friase	TITIA (JIN 09347)								
		Freeway Nun	nber of Lanes, N	3				1			
Jpstream Adj Ramp		1						Downstre	am Adj		
	_	Ramp Number		1				Ramp			
✓ Yes ☐ Or	1	Acceleration	Lane Length, L <sub>A</sub>	260				☐Yes	On		
□ No ☑ Of	f	Deceleration	Lane Length L <sub>n</sub>								
□ NO ▼OI	I	Freeway Volume, V <sub>F</sub> 2088						✓ No	Off		
- <sub>up</sub> = 1420	ft							L <sub>down</sub> =	ft		
-up 1420	11	Ramp Volum	11	107				down			
/, = 505 v	ah/h	Freeway Free	e-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h		
u 303 V	511/11	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0				"			
Conversion t	o pc/h Un	der Base	Conditions								
(pc/h)	V	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f, x f		
. ,	(Veh/hr)						<u> </u>				
Freeway	2088	0.92	Level	1	0	0.995	1.00		2281		
Ramp	107	0.92	Level	27	0	0.881	1.00	ļ	132		
UpStream	505	0.92	Level	19	0	0.913	1.00		601		
DownStream											
		Merge Areas					Diverge Areas				
Estimation of	f v <sub>12</sub>				Estimatio	n of v <sub>12</sub>					
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>ru</sub> )						\_			
=			12 6 or 12 7\			V <sub>12</sub> =	$V_R + (V_F - V_R)$				
-EQ =			13-6 or 13-7)		L <sub>EQ</sub> =		(Equation 13-	·12 or 13-1	3)		
P <sub>FM</sub> =	0.585	using Equa	tion (Exhibit 13-6)		P <sub>FD</sub> =		using Equation	n (Exhibit 1	3-7)		
/ <sub>12</sub> =	1334	pc/h			V <sub>12</sub> =		pc/h				
$V_3$ or $V_{av34}$	947 p	oc/h (Equatio	n 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation 1	12 11 or 12 1	7)		
	17)					> 2 700 na/b2		10-14-01-10-1	')		
Is $V_3$ or $V_{av34} > 2,70$							Yes No				
Is $V_3$ or $V_{av34} > 1.5$	* V <sub>12</sub> /2	es 🗌 No			Is V <sub>3</sub> or V <sub>av34</sub>		☐ Yes ☐ No				
f Yes,V <sub>12a</sub> =	1334	pc/h (Equati	on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or		
	18, or	13-19)					13-19)				
Capacity Che	cks	-			Capacity	Checks					
	Actual	(	Capacity	LOS F?		Actual		pacity	LOS F		
					$V_{F}$		Exhibit 13-	8			
V	2413	Exhibit 13-8		No	$V_{FO} = V_{F} - V_{F}$	V <sub>R</sub>	Exhibit 13-	8			
$V_{FO}$	2413	LYLLINIC 19-0		INU		-1\	Exhibit 13		+		
	<u> </u>				$V_R$		10				
Flow Entering	g Merge lı	nfluence A	\rea		Flow Ente	ering Dive	erge Influen	ce Area	·		
<b>,</b>	Actual	_	Desirable	Violation?		Actual	Max Des		Violation		
V <sub>R12</sub>	1466	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8				
Level of Serv				· · · · · · · · · · · · · · · · · · ·		Service D	eterminatio	n (if not	<i>F</i> )		
		0.0078 V <sub>12</sub> - 0.			<del>1</del>				• /		
• • •	• • • • • • • • • • • • • • • • • • • •	0.0010 V <sub>12</sub> - 0.	UUUZI LA		1	-	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>			
$O_{R} = 15.2  (pc/m)$	ni/ln)				$D_R = (pc)$	/mi/ln)					
K (F	13-2)				LOS = (Ex	hibit 13-2)					
**					<u> </u>	terminati	on				
.OS = B (Exhibit					<del>  '</del>	nibit 13-12)					
OS = B (Exhibit	L:140 44\				rs (⊏XII	**					
OS = B (Exhibit Speed Determine) (Exhibit M <sub>S</sub> = 0.314 (Exhibit	· ·				lc _ ·						
OS = B (Exhibit Speed Determine) (Exhibit M <sub>S</sub> = 0.314 (Exhibit	bit 13-11) (Exhibit 13-11)					(Exhibit 13-12					
LOS = B (Exhibit <b>Speed Determ</b> $M_S = 0.314$ (Exi $M_S = 61.2$ mph	· ·					(Exhibit 13-12 (Exhibit 13-12					
LOS = B (Exhibit Speed Determined Ms = 0.314 (Exhibit SR = 61.2 mph SO = 68.4 mph	(Exhibit 13-11)				S <sub>0</sub> = mph	•	)				

General Infori			RAMP JUNG	Site Infor						
Analyst	CHS	<u> </u>		eeway/Dir of Tr		215 Northbound				
Agency or Company		an Crossroads,		nction						
Date Performed		/2015		risdiction		Harley Knox On-Ramp Caltrans				
Analysis Time Period		Peak Hour				Caltrans Existing Plus Project				
Project Description				iaiysis i cai	L/	kisiiliy Flus Flu	ijeci			
Inputs	INIOX LOGISTICS	S Center i nase	11 11A (314 03341)							
		Freeway Num	nber of Lanes, N	3				L .		
Jpstream Adj Ramp		1						Downstre	am Adj	
☑ Yes ☐ On		Ramp Numbe		1				Ramp		
w res □ On		Acceleration I	Lane Length, L <sub>A</sub>	300				☐Yes	On	
☐ No ☑ Off		Deceleration Lane Length L <sub>D</sub>						NI-	□ o#	
		Freeway Volu	ıme, V <sub>r</sub>	3631				✓ No	Off	
- <sub>up</sub> = 1395 f	t	Ramp Volume		483				L <sub>down</sub> =	ft	
ир .000 .	•		11					l down		
/ <sub></sub> = 109 ve	h/h		e-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h	
<u> </u>			low Speed, S <sub>FR</sub>	45.0						
Conversion to		der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	fp	v = V/PHF	x f <sub>HV</sub> x f,	
Freeway	3631	0.92	Level	3	0	0.985	1.00		1006	
		+			<u> </u>		<del>                                     </del>			
Ramp	483	0.92	Level	14	0	0.935	1.00		562	
UpStream	109	0.92	Level	13	0	0.939	1.00		126	
DownStream		Manus A					Discours: A	<u> </u>		
Eatimatic - : f		Merge Areas			Eatim - 4: -		Diverge Areas			
Estimation of					Estimatio	01 OT V <sub>12</sub>				
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )				V =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P		
- <sub>EQ</sub> =	1062.1	5 (Equation	13-6 or 13-7)		_				2)	
_			tion (Exhibit 13-6)		L <sub>EQ</sub> =		(Equation 13-			
2 <sub>FM</sub> =			tion (Exhibit 15-0)		P <sub>FD</sub> =		using Equation	n (Exhibit 1	3-7)	
v <sub>12</sub> –	2347		10.1110		V <sub>12</sub> =		pc/h			
$V_3$ or $V_{av34}$	1659 17)	pc/h (Equati	on 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation 1	3-14 or 13-1	7)	
Is V <sub>3</sub> or V <sub>av34</sub> > 2,700	,	AN-				> 2.700 pc/h?	Yes No		,	
							Yes No			
Is $V_3$ or $V_{av34} > 1.5 *$							pc/h (Equatio	n 13 <sub>-</sub> 16 1	3_18 or	
f Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =		3-19)	11 13-10, 1	J-10, UI	
Capacity Che		13-19)			Capacity	Chocks	•			
Sapacity Cite	Actual		Capacity	LOS F?	Capacity	1	Car	pacity	LOSF	
	Actual		Зарасну	L001:	V	Actual			1001	
					V <sub>F</sub>		Exhibit 13-			
$V_{FO}$	4568	Exhibit 13-8		No	$V_{FO} = V_F - V_F$	V <sub>R</sub>	Exhibit 13-			
. ~					V <sub>R</sub>		Exhibit 13	-		
		-				<u> </u>	10	<u> </u>		
Flow Entering		_		\n · · · ·	Flow Ente		rge Influen			
	Actual	i i	Desirable	Violation?		Actual	Max Desi	ırable	Violation	
V <sub>R12</sub>	2909	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8			
Level of Servi	ce Deteri	mination (	if not F)		Level of S	Service De	eterminatio	n (if not	<i>F</i> )	
D <sub>R</sub> = 5.475 + 0	0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> - 0.	00627 L <sub>A</sub>		D	<sub>R</sub> = 4.252 + (	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>		
O <sub>R</sub> = 26.0 (pc/mi			••		L	· /mi/ln)		-		
OS = C (Exhibit 1	*				1	hibit 13-2)				
					<u> </u>					
Speed Determ	iination				<del>                                     </del>	eterminati	on			
<del></del>	it 13-11)				$D_s = (Exh$	nibit 13-12)				
•					S <sub>R</sub> = mph	(Exhibit 13-12	)			
M <sub>S</sub> = 0.366 (Exib	Exhibit 13-11)				I-Kb					
$M_{\rm S} = 0.366 \text{ (Exibos)}$ $S_{\rm R} = 59.8 \text{ mph (I)}$	Exhibit 13-11)				1	•	-			
$M_{\rm S} = 0.366 \text{ (Exibo}$ $S_{\rm R} = 59.8 \text{ mph (I}$ $S_{\rm O} = 65.8 \text{ mph (I}$	Exhibit 13-11) Exhibit 13-11) Exhibit 13-13)				S <sub>0</sub> = mph	(Exhibit 13-12 (Exhibit 13-13	)			

		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Info	rmation		_	Site Infor						
Analyst	CHS		Fi	reeway/Dir of Tr	avel	I-215 N	lorthbound			
Agency or Company	y Urba	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/		Ju	urisdiction		Caltrar	IS			
Analysis Time Perio		eak Hour		nalysis Year		Existin	g Plus Proj	ect		
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		<u>.</u>								
Upstream Adj F	Ramp	Freeway Num Ramp Numbe	ber of Lanes, N	3					Downstre	eam Adj
☐ Yes [	On	l '	ane Length, L₄	1					Ramp	
	¬0"		Lane Length, L <sub>A</sub>	280					✓ Yes	<b>☑</b> On
☑ No [	Off	Freeway Volu	_	3740					□No	Off
L <sub>up</sub> =	ft	Ramp Volume	•	109					L <sub>down</sub> =	1395 ft
.,		Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	400ah/h
V <sub>u</sub> = ν	/eh/h	Ramp Free-Fl	low Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> -	483 veh/h
Conversion	to pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	3740	0.92	Level	4	0	0.	980	1.00	4	147
Ramp	109	0.92	Level	13	0	0.	939	1.00		126
UpStream										
DownStream	483	0.92	Level	14	0	0.	935	1.00		562
Estimation o	. <b>f</b> , ,	Merge Areas			Fetime	tion o	. <b>f</b>	Diverge Areas	1	
Estimation o					Estimat	iioii c				
	$V_{12} = V_{F}$							· V <sub>R</sub> + (V <sub>F</sub> -		
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13	3-12 or 13-1	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	651 using E	Equation (Ex	hibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		27	742 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		14	105 pc/h (Ed	quation 13-	14 or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7								∃Yes ☑N		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5								Yes ☑ N		
If Yes,V <sub>12a</sub> =	pc/h (	Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub>		_ p	c/h (Equation		3-18, or 13-
Capacity Ch	13-19) e <i>cks</i>	)			Capacit		ecks	9)		
	Actual	T 0	Capacity	LOS F?		.,	Actual		Capacity	LOS F?
			'		V <sub>F</sub>		4147	Exhibit 1	1	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>I</sub>		4021	Exhibit 1	3-8 7200	No
					V <sub>R</sub>		126	Exhibit 13	3-10 2100	No
Flow Enterin	a Merae In	fluence A	rea				a Dive	rge Influe	nce Area	)
	Actual	T	Desirable	Violation?			Actual	Max Desi		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	- 2	2742	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)	•	Level o	f Ser	vice De	terminati	on (if not	: <b>F</b> )
D <sub>R</sub> = 5.475 + 0	0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>			D <sub>R</sub> = 4	1.252 + 0	.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/lı	n)				$D_R = 2$	5.3 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = C	(Exhil	bit 13-2)			
Speed Deter	mination				Speed	Deter	minatio	on		
M <sub>S</sub> = (Exibit 1					<del>                                     </del>		xhibit 13-			
-	hibit 13-11)						(Exhibit			
	hibit 13-11)						(Exhibit			
	hibit 13-13)				1		` (Exhibit			
ppyright © 2014 Unive		Rights Reserve	ed		HCS2010 <sup>TM</sup>			•	Generated: 5/	19/2015 10:05
	•						-			

5.5-4

Canal Information	_		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET			
Agenty or Company	General Info	rmation									
Analysis Time Periol	Analyst Agency or Company	CHS Urba	n Crossroads,	Inc. J	reeway/Dir of Ti unction		Harley	Knox Off-F			
Project Description   Knox Logistics Center Phase II TIA (JN 05947)   Inputs									ect		
Upstream Adj Ramp							Latiouni	g 1 100 1 10j	-		
Or   No   Off   Contact	Inputs			·							
Yes	Upstream Adj F	Ramp	· ·		•						am Adj
Treeway Volume, V <sub>F</sub>   3880	□Yes	On	Acceleration L	ane Length, L <sub>A</sub>							<b>☑</b> On
Comparison   Conversion   Co	✓ No	Off	1	5						□No	Off
Conversion to pc/h Under Base Conditions	L <sub>up</sub> =	ft	Ramp Volume	, V <sub>R</sub>	557					L <sub>down</sub> =	1420 ft
(pc/h)	V <sub>u</sub> = v	reh/h	1							V <sub>D</sub> =	143 veh/h
Part   Phf   Terrain   Phf   Terrain   Phf	Conversion t	o pc/h Und		111							
Ramp		V			%Truck	%Rv f <sub>HV</sub> f <sub>p</sub>			v = V/PHF x f <sub>HV</sub> x f <sub>p</sub>		
UpStream   143   0.92   Level   13   0   0.939   1.00   166	Freeway	3880	0.92	Level	5	0	0.	976	1.00	43	23
DownStream	<u> </u>	557	0.92	Level	14	0	0.	935	1.00	64	48
Stimation of v12   Estimation of v12   Estimation of v12   V12 = Vr (Pr (Pr (Pr (Pr (Pr (Pr (Pr (Pr (Pr (P	_		2.00		10				4.00		•
	DownStream	<u>.                                    </u>		Level	13	0	0.			10	66
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Estimation o		werge Areas			Fetimat	tion o	f v	olverge Areas		
Equation   13-6 or 13-7     Equation   13-6 or 13-7     Equation   13-12 or 13-13     Equation   13-14 or 13-15     Equation   13-14 or 13-15     Equation   13-14 or 13-15     Equation   13-14 or 13-15     Equation   13-14 or 13-17     Equation   13-14 or 13-17     Equation   13-14 or 13-17     Equation   13-14 or 13-18   Equation   13-14 or 13-18   Equation   13-15   Equation   13-14 or 13-18   Equation   13-15   Equation   13-16   Equation   Equa	<u> </u>		<u> </u>			Louina			N . O . N	<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	
P <sub>FM</sub> = using Equation (Exhibit 13-6) V <sub>12</sub> = pc/h V <sub>3</sub> or V <sub>av34</sub> pc/h (Equation 13-14 or 13-17) V <sub>12</sub> = ych V <sub>3</sub> or V <sub>av34</sub> pc/h (Equation 13-14 or 13-17) V <sub>3</sub> or V <sub>av34</sub> > 2,700 pc/h?				40.7		1					
V12 = pc/h         pc/h (Equation 13-14 or 13-17)         V12 = 2934 pc/h         2934 pc/h         V3 or Va/34         1389 pc/h (Equation 13-14 or 13-17)         V3 or Va/34 > 2,700 pc/h?									-		
V3 or V <sub>av34</sub> pc/h (Equation 13-14 or 13-17)         V3 or V <sub>av34</sub> > 2,700 pc/h? ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 2,700 pc/h? ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 2,700 pc/h? ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 2,700 pc/h? ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 2,700 pc/h? ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or V <sub>av34</sub> > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or Vav34 > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or Vav34 > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or Vav34 > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or Vav34 > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or Vav34 > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or Vav34 > 1.5 * V12/2 ☐ Yes ☐ No         Is V3 or Va		_	Equation (E	exhibit 13-6)		1				uation (Exhi	bit 13-/)
$   s \ V_3 \ or \ V_{ay34} \ > 2,700 \ pc/h? \   \ Yes \   \ No \   \   \   \   \   \   \   \   \   \ $	· <del>-</del>	•				1 '-			•		
$   s \lor_3 \text{ or V}_{\text{av34}} > 1.5 * \lor_{12}/2    \text{Yes }   \text{No} \\ \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{ff Yes, V}_{128} =   \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{ff Yes, V}_{128} =   \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{ff Yes, V}_{128} =   \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{ff Yes, V}_{128} =   \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{ff Yes, V}_{128} =   \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{ff Yes, V}_{128} =   \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{ff Yes, V}_{128} =   \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{ff Yes, V}_{128} =   \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{ff Yes, V}_{128} =   \text{pc/h } (\text{Equation } 13-16, 13-18, \text{ or }   \text{pc/h }  $			-	-14 or 13-17)						ation 13-14	4 or 13-17)
		pc/h (	Equation 13	-16, 13-18, or		pc/h (Equation 13-16, 13-18, or 13					-18, or 13-
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Capacity Che		<u> </u>			,					
$ V_{FO} = V_F - V_R  3675 \qquad \text{Exhibit } 13-8 \qquad \frac{V_F}{V_{FO}} = V_F - V_R  3675 \qquad \text{Exhibit } 13-8 \qquad 7200 \qquad \text{Note} \\ V_{FO} = V_F - V_R  3675 \qquad \text{Exhibit } 13-8 \qquad 7200 \qquad \text{Note} \\ V_R \qquad 648 \qquad \text{Exhibit } 13-10 \qquad 2100 \qquad \text{Note} \\ V_R \qquad 648 \qquad \text{Exhibit } 13-10 \qquad 2100 \qquad \text{Note} \\ V_R \qquad 648 \qquad \text{Exhibit } 13-10 \qquad 2100 \qquad \text{Note} \\ V_R \qquad & \text{Actual} \qquad \text{Max Desirable} \qquad & \text{Violation?} \qquad & \text{Actual} \qquad \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Actual} \qquad & \text{Max Desirable} \qquad & \text{Violation?} \qquad & \text{Violation?} \\ V_{R12} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & \text{Exhibit } 13-8 \qquad & \text{Violation?} \qquad & Viol$		1	С	apacity	LOS F?	1			Ca	pacity	LOS F?
$ \begin{array}{ c c c c c c } \hline \textbf{Flow Entering Merge Influence Area} & \hline \textbf{Flow Entering Diverge Influence Area} \\ \hline \textbf{Actual} & \hline \textbf{Max Desirable} & \hline \textbf{Violation?} & \hline \textbf{Actual} & \hline \textbf{Max Desirable} & \hline \textbf{Violation?} & \hline \textbf{Actual} & \hline \textbf{Max Desirable} & \hline \textbf{Violation?} & \hline \textbf{Actual} & \hline \textbf{Max Desirable} & \hline \textbf{Violation?} & \hline \textbf{Actual} & \hline \textbf{Max Desirable} & \hline \textbf{Violation?} & \hline \textbf{V}_{12} & \hline \textbf{2934} & \hline \textbf{Exhibit } 13-8 & \hline \textbf{4400:All} & \hline \textbf{No} \\ \hline \textbf{Level of Service Determination (if not F)} & \hline \textbf{Level of Service Determination (if not F)} \\ \hline \textbf{D}_R = 5.475 + 0.00734 \text{ V}_R + 0.0078 \text{ V}_{12} - 0.00627 \text{ L}_A & \hline \textbf{D}_R = 4.252 + 0.0086 \text{ V}_{12} - 0.009 \text{ L}_D \\ \hline \textbf{D}_R = & (\text{pc/mi/ln}) & \hline \textbf{D}_R = 27.7 \text{ (pc/mi/ln}) \\ \hline \textbf{LOS} = & (\text{Exhibit } 13-2) & \hline \textbf{Speed Determination} \\ \hline \textbf{Speed Determination} & \hline \textbf{Speed Determination} \\ \hline \textbf{M}_S = & (\text{Exibit } 13-11) & \hline \textbf{S}_R = & 0.356 \text{ (Exhibit } 13-12) \\ \hline \textbf{S}_R = & \text{mph (Exhibit } 13-11) & \hline \textbf{S}_0 = & 75.3 \text{ mph (Exhibit } 13-12) \\ \hline \textbf{S}_0 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_1 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_1 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_2 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_1 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_1 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_1 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_2 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_2 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_3 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_2 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_3 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_3 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_3 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_3 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_3 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_3 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_3 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_3 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_3 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_3 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_3 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_3 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_3 = 64.2 \text{ mph (Exhibit } 13-13) \\ \hline \textbf{S}_3 = & \text{mph (Exhibit } 13-13) & \hline \textbf{S}_3 = 64.$				-		V <sub>F</sub>		4323	Exhibit 13-8	3 7200	No
V <sub>R</sub>   648   Exhibit 13-10   2100   No	V <sub>EO</sub>		Exhibit 13-8			V <sub>EO</sub> = V <sub>I</sub>	- V <sub>R</sub>	3675	Exhibit 13-8	3 7200	No
Flow Entering Merge Influence Area         Flow Entering Diverge Influence Area $V_{R12}$ Exhibit 13-8         Violation?         Actual         Max Desirable         Violation? $V_{R12}$ Exhibit 13-8 $V_{12}$ 2934         Exhibit 13-8         4400:All         No           Level of Service Determination (if not F)         Level of Service Determination (if not F)         D <sub>R</sub> = 4.252 + 0.0086 V <sub>12</sub> - 0.009 L <sub>D</sub> D <sub>R</sub> = 27.7 (pc/mi/ln)           LOS = (pc/mi/ln)         LOS = C (Exhibit 13-2)         LOS = C (Exhibit 13-2)         Speed Determination           M <sub>S</sub> = (Exibit 13-11)         D <sub>S</sub> = 0.356 (Exhibit 13-12)         S <sub>R</sub> = 60.0 mph (Exhibit 13-12)           S <sub>R</sub> = mph (Exhibit 13-11)         S <sub>R</sub> = 60.0 mph (Exhibit 13-12)         S <sub>O</sub> = 75.3 mph (Exhibit 13-12)           S <sub>O</sub> = mph (Exhibit 13-13)         S = 64.2 mph (Exhibit 13-13)								648	Exhibit 13-1	0 2100	No
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Flow Entering	a Merae In	fluence A	rea							1 117
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	TOW Emering				Violation?	1 1011 21	_				Violation?
	V <sub>R12</sub>		<del>-</del>			V <sub>12</sub>				r	No
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		rice Detern	nination (i	if not F)		+	f Serv	vice De	terminatio	n (if not	<del> </del> F)
$\begin{array}{llllllllllllllllllllllllllllllllllll$			•								
	l '`	• • •	12	,,						5	
		13-2)				1 '''		,			
$\begin{array}{llllllllllllllllllllllllllllllllllll$	,						•		on .		
$S_R^{=}$ mph (Exhibit 13-11) $S_R^{=}$ 60.0 mph (Exhibit 13-12) $S_0^{=}$ mph (Exhibit 13-11) $S_0^{=}$ 75.3 mph (Exhibit 13-12) $S_0^{=}$ 64.2 mph (Exhibit 13-13)	-					+ -					
$S_0 = mph (Exhibit 13-11)$ $S_0 = 75.3 mph (Exhibit 13-12)$ $S = mph (Exhibit 13-13)$ $S = 64.2 mph (Exhibit 13-13)$											
S = mph (Exhibit 13-13) S = 64.2 mph (Exhibit 13-13)						1					
ppyright © 2014 University of Florida, All Rights Reserved HCS2010 <sup>TM</sup> Version 6.65 Generated: 5/19/2015	l		I Righte Decorre	d		1				anerated: E/40	2/2015 10:05

Conoral	formatic	RAMPS AND	RAIVIP JUI			<u>. C I</u>			
General In	tormatioi			Site Infor					
Analyst		CHS		Freeway/Dir of Tr		-215 Southbour			
Agency or Com	-	Urban Crossroads,		Junction		Harley Knox On	-катр		
Date Performed		5/19/2015		Jurisdiction		Caltrans	-:4		
Analysis Time F		PM Peak Hour		Analysis Year		Existing Plus Pro	oject		
Inputs	IOII KIIOX LOÇ	gistics Center Phase	II TIA (JIN 09347	)					
		Francisco Num	har of Lanca N	2					
Jpstream Adj R	amp	•	ber of Lanes, N	3				Downstre	am Adj
	7.0	Ramp Numbe	r of Lanes, N	1				Ramp	
✓ Yes	On	Acceleration L	ane Length, L <sub>A</sub>	260				☐Yes	On
□ No 🔻	Off	Deceleration L	ane Length L <sub>D</sub>					□ NI -	□ o#
	_ 011	Freeway Volu	me, V <sub>E</sub>	3323				✓ No	Off
- <sub>up</sub> = 14	20 ft	Ramp Volume		143				L <sub>down</sub> =	ft
ир			·, · R -Flow Speed, S <sub>F</sub>						
/ <sub>u</sub> = 55	7 veh/h	<b>I</b>						V <sub>D</sub> =	veh/h
			ow Speed, S <sub>FR</sub>	45.0					
Conversio		Under Base	Conditions			-i-			
(pc/h)	V (Veh/	hr) PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	fp	v = V/PHI	F x f <sub>HV</sub> x f <sub>p</sub>
Francisco			Laval	1 2		-	F		F
Freeway	3323	<del></del>	Level	3	0	0.985	1.00		3666
Ramp	143	0.92	Level	13	0	0.939	1.00		166
UpStream	557	0.92	Level	14	0	0.935	1.00		648
DownStream							Discours Assess		
- otimotio	- of	Merge Areas			Fatimati	on of w	Diverge Areas		
Estimation	1 01 V <sub>12</sub>				Esuman	on of v <sub>12</sub>			
	V <sub>12</sub>	$= V_F (P_{FM})$				V., =	= V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P-5	
- <sub>EQ</sub> =	88	6.89 (Equation	13-6 or 13-7)		l -	* 12	(Equation 13-		12\
P <sub>FM</sub> =		585 using Equat		6)	L <sub>EQ</sub> =				,
/ <sub>12</sub> =		44 pc/h	(=:::::::::::::::::::::::::::::::::::::	-,	P <sub>FD</sub> =		using Equatio	n (Exnibit i	3-7)
		522 pc/h (Equation	on 13 <sub>-</sub> 14 or 13	8_	V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$		7)	511 13-14 01 13	<b>)</b> -	$V_3$ or $V_{av34}$		pc/h (Equation 1	3-14 or 13-	17)
Is V <sub>2</sub> or V <sub>24</sub> >	2,700 pc/h? □	☐Yes ☑No			Is V <sub>3</sub> or V <sub>av3</sub>	4 > 2,700 pc/h?	☐ Yes ☐ No		
		✓Yes □No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>4</sub> > 1.5 * V <sub>12</sub> /2	☐ Yes ☐ No		
		44 pc/h (Equatio	on 13-16 13-		If Yes,V <sub>12a</sub> =		pc/h (Equation	n 13-16, 1	3-18, or
f Yes,V <sub>12a</sub> =		8, or 13-19)	511 13-10, 13-		11 163, v <sub>12a</sub> –	•	13-19)		
Capacity (		-,,			Capacity	Checks			
, , , ,	Actu	al C	apacity	LOS F?		Actua	l Car	pacity	LOS F?
					V <sub>F</sub>		Exhibit 13-8		1 200
						1/	_	+	+
$V_{FO}$	383	2 Exhibit 13-8		No	$V_{FO} = V_F$	· v <sub>R</sub>	Exhibit 13-8		
					$V_R$		Exhibit 13- 10	-	
Class Enta	ring Mara	io Influence A	<u> </u>		lelow En	toring Div			
-iow Erite		e Influence A		\/iolotion?	FIOW EIII		erge Influen		
1/	Actu		Desirable 4600:AII	Violation?	\/	Actual	Max Desi	iabie	Violation
V <sub>R12</sub>	2310		4600:All	No	V <sub>12</sub>	<u> </u>	Exhibit 13-8		<u> </u>
		termination (					eterminatio		: F)
$D_{R} = 5.4$	75 + 0.00734	v <sub>R</sub> + 0.0078 V <sub>12</sub> - 0.0	0627 L <sub>A</sub>		[	$O_{R} = 4.252 +$	0.0086 V <sub>12</sub> - 0.	.009 L <sub>D</sub>	
O <sub>R</sub> = 21.8 (	pc/mi/ln)				$D_R = (pc)$	c/mi/ln)			
	hibit 13-2)				1	xhibit 13-2)			
Speed Det		on .			<u> </u>	eterminati	ion		
•		,,,,			<del> </del>		<u> </u>		
· ·	(Exibit 13-11)					khibit 13-12)			
S <sub>R</sub> = 60.6 i	mph (Exhibit 13	3-11)			l ''	h (Exhibit 13-12			
	mph (Exhibit 13	R_11\			$S_0 = mp$	h (Exhibit 13-12	2)		
$S_0 = 66.3 \text{ i}$	uhu (⊏xuinir i	<i>7</i> -11 <i>)</i>			1 '				
$6_0 = 66.3 \text{ m}$ $6 = 62.7 \text{ m}$	nph (Exhibit 13				S = mp	h (Exhibit 13-13	3)		

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General Infor			RAMP JUNG	Site Infor							
Analyst	CHS	`		eeway/Dir of Tr		215 Northbound					
Agency or Company		an Crossroads,		nction		arley Knox On-					
Date Performed		1/2015		risdiction		altrans					
Analysis Time Period		Peak Hour		alysis Year		ailians xisting Plus Pro	iect				
Project Description				laiysis i cai		xisiliy Flus Flu	ijeci				
Inputs	KIIOX LOGISTICS	S Center Friase	: II TIA (JIN 09347)								
		Freeway Nun	nber of Lanes, N	3				1			
Jpstream Adj Ramp		1 '						Downstre	am Adj		
		Ramp Number		1				Ramp			
✓ Yes ☐ Or	1	Acceleration	Lane Length, L <sub>A</sub>	300				☐Yes	On		
□ No ☑ Of	f	Deceleration	Lane Length L <sub>n</sub>								
□ NO ☑ OI	I	Freeway Volu		2664				✓ No	Off		
- <sub>up</sub> = 1395	ft		•					L <sub>down</sub> =	ft		
-ир 1000	11	Ramp Volum	11	639				down			
/, = 124 ve	ah/h	Freeway Free	e-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h		
'u 124 V	J11/11	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0							
Conversion to	o pc/h Un	der Base	Conditions								
(pc/h)	V	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f, x f		
. ,	(Veh/hr)						· ·				
Freeway	2664	0.92	Level	2	0	0.990	1.00		925		
Ramp	639	0.92	Level	14	0	0.935	1.00		743		
UpStream	124	0.92	Level	10	0	0.952	1.00		142		
DownStream											
		Merge Areas					Diverge Areas				
Estimation of	<sup>F</sup> V <sub>12</sub>				Estimatio	n of v <sub>12</sub>					
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>ru</sub> )				.,		\_			
=			12 6 or 12 7\				$V_R + (V_F - V_R)$				
-EQ =			13-6 or 13-7)		L <sub>EQ</sub> =		(Equation 13-	·12 or 13-1	3)		
P <sub>FM</sub> =	0.586	using Equa	tion (Exhibit 13-6)		P <sub>FD</sub> =		using Equation	n (Exhibit 1	3-7)		
/ <sub>12</sub> =	1714	pc/h			V <sub>12</sub> =		pc/h				
/ <sub>3</sub> or V <sub>av34</sub>	1211	pc/h (Equati	ion 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub>		•	12 14 or 12 1	7\		
	17)				$V_3$ or $V_{av34}$ pc/h (Equation 13-14 or 13-17) Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No						
Is $V_3$ or $V_{av34} > 2,70$											
Is $V_3$ or $V_{av34} > 1.5$	'V <sub>12</sub> /2	es 🗌 No			Is V <sub>3</sub> or V <sub>av34</sub>		☐ Yes ☐ No				
f Yes,V <sub>12a</sub> =			ion 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or		
	18, or	·13-19)					3-19)				
Capacity Che	cks				Capacity	Checks					
	Actual	(	Capacity	LOS F?		Actual		pacity	LOS F		
					$V_{F}$		Exhibit 13-	8	$\perp$		
V	3668	Exhibit 13-8		No	$V_{FO} = V_F - \frac{1}{2}$	V <sub>R</sub>	Exhibit 13-	8			
$V_{FO}$	3000	LAHIDIC 13-8		INU		TN .	Exhibit 13		+		
					$V_R$		10				
Flow Entering	g Merge li	nfluence A	Area	<del></del>	Flow Ente	ering Dive	rge Influen	ce Area	<del></del>		
	Actual	ii'	Desirable	Violation?		Actual	Max Des		Violation		
V <sub>R12</sub>	2457	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8				
Level of Serv						Sorvice D	eterminatio	n (if no4	<i>E</i> )		
					<del>1</del>				<u>r)</u>		
**		0.0078 V <sub>12</sub> - 0.	UUUZI LA		1	· -	0.0086 V <sub>12</sub> - 0	.ooa L <sub>D</sub>			
$D_{R} = 22.4 \text{ (pc/m)}$	i/ln)				$D_R = (pc)$	/mi/ln)					
OS = C (Exhibit	13-2)				LOS = (Ex	hibit 13-2)					
					<u> </u>	eterminati	on				
Speed Detern					<del>                                     </del>	nibit 13-12)	<del></del>				
•	DIT 13-11)				1 "	•					
M <sub>S</sub> = 0.340 (Exi	-				IN = mnh	(Exhibit 13-12	)				
M <sub>S</sub> = 0.340 (Exi	(Exhibit 13-11)					•					
$M_{\rm S} = 0.340 \text{ (Exi}$ $S_{\rm R} = 60.5 \text{ mph}$	-					(Exhibit 13-12					
$S_R = 60.5 \text{ mph}$ $S_0 = 67.4 \text{ mph}$	(Exhibit 13-11)				S <sub>0</sub> = mph	•	)				

		RAMP	S AND RAM	IP JUNCTI	ONS WC	RKS	HEET						
General Infor	mation	10 000	<u> </u>	Site Infor									
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urba 5/19/	n Crossroads,	Inc. J	reeway/Dir of Tr unction urisdiction analysis Year		Harley Caltran	lorthbound Knox Off-F s g Plus Proj						
Project Description	Knox Logistics	Center Phase				,							
Inputs													
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes, N	3 1					Downstrea Ramp	am Adj			
□Yes□	On	Acceleration L	ane Length, L <sub>A</sub>						✓ Yes	<b>☑</b> On			
✓ No	Off	Deceleration L Freeway Volu	Lane Length L <sub>D</sub> me, V⊏	280 2788					□No	Off			
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	124					L <sub>down</sub> =	1395 ft			
V <sub>u</sub> = v	eh/h	1	-Flow Speed, $S_{FF}$ ow Speed, $S_{FR}$	70.0 45.0					V <sub>D</sub> =	639 veh/h			
Conversion t	o pc/h Und	der Base (	Conditions										
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>			
Freeway	2788	0.92	Level	3	0	0.	985	1.00		)76			
Ramp	124	0.92	Level	10	0	0.	952	1.00	1.	42			
UpStream	200	0.00		44	0 0.935			4.00	740				
DownStream	639	0.92	Level	14	0 0.935 1.00 Diverge Areas					43			
Estimation of		Merge Areas			Estimat	ion o	fv.	nverge Areas					
		/ D \						· \/ ± (\/ \/	\D				
	V <sub>12</sub> = V <sub>F</sub>		40.7)		_			V <sub>R</sub> + (V <sub>F</sub> - V <sub>I</sub>					
L <sub>EQ</sub> =		ation 13-6 or			L <sub>EQ</sub> =			Equation 13-1					
P <sub>FM</sub> =	_	Equation (E	=xhibit 13-6)		P <sub>FD</sub> =			677 using Eq	uation (Exhi	ibit 13-7)			
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			27 pc/h					
V <sub>3</sub> or V <sub>av34</sub>		-	-14 or 13-17)		$V_3$ or $V_{av34}$			l9 pc/h (Equa	ition 13-14	or 13-17)			
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70					Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No								
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 <sup>s</sup> If Yes,V <sub>12a</sub> =	pc/h (	Equation 13	-16, 13-18, or		Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes No pc/h (Equation 13-16, 13-18, or 13-19)								
Capacity Che	13-19)				.=.		19	9)					
Capacity Cite	Actual	1 ^	apacity	LOS F?	Capacity Checks  Actual Capacity LOS I								
	Actual	<del>l ĭ</del>	арасну	LOGTE	V <sub>F</sub>		3076	Exhibit 13-8	<del>' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' </del>	LOS F?			
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$		2934	Exhibit 13-8	+	No			
* FO		Exhibit 10 0			V <sub>R</sub>		142	Exhibit 13-1		No			
Flow Entering	g Merge In	fluence A	rea		Flow Er	nterin	g Dive	rge Influen	ce Area				
	Actual	<del>-</del>	Desirable	Violation?		/	Actual	Max Desiral	ole	Violation?			
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	2	2127	Exhibit 13-8	4400:All	No			
Level of Serv	ice Detern	nination (i	if not F)		Level o	f Serv	vice De	terminatio	n (if not	F)			
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			$D_R = 4$	1.252 + 0	.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>				
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 2$	0.0 (pc	/mi/ln)						
LOS = (Exhibit	13-2)				LOS = C	(Exhil	oit 13-2)						
Speed Deterr	nination				Speed Determination								
M <sub>S</sub> = (Exibit 1							xhibit 13-						
''	nibit 13-11)						(Exhibit						
	nibit 13-11)				1 '		(Exhibit						
	nibit 13-13)				S = 65.4 mph (Exhibit 13-13)								
pyright © 2014 Univer	sity of Florida, All	Rights Reserve	ed .		HCS2010 <sup>™</sup>	Version	n 6.65	G	enerated: 5/1	9/2015 10:06			

## **APPENDIX 6.1:**

**EAP (2017) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS** 



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Int Delay, s/veh         0           Movement         EBT EBR         WBL WBT         NBL NBR           Vol, veh/h         0 0 16 0 0 0 7           Conflicting Peds, #/hr         0 0 0 0 0 0 0 0 0 0           Sign Control         Free Free Free Free Free Free Stop Stop RT Channelized - None - None - None - None Storage Length 100 - 0 0 - 0 0 0 0 0 0 0 0 0 0 0
Movement         EBT         EBR         WBL         WBT         NBL         NBR           Vol, veh/h         0         0         16         0         0         7           Conflicting Peds, #/hr         0         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         -         None         -         None         -         None           Storage Length         -         -         100         -         0         -           Veh in Median Storage, #         0         -         -         0         2         -           Grade, %         0         -         -         0         0         -         -           Peak Hour Factor         92         92         92         92         92         92
Vol, veh/h         0         0         16         0         0         7           Conflicting Peds, #/hr         0         -         0         0         -         0         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         <
Vol, veh/h         0         0         16         0         0         7           Conflicting Peds, #/hr         0         -         0         0         -         0         0         -         0         0         -         0         0         -         -         0         0         -         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         <
Conflicting Peds, #/hr         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         -         None         -         None         -         None           Storage Length         -         -         100         -         0         -           Veh in Median Storage, #         0         -         -         0         2         -           Grade, %         0         -         -         0         0         -           Peak Hour Factor         92         92         92         92         92         92
Sign Control         Free         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         -         None         -         None         -         None           Storage Length         -         -         100         -         0         -           Veh in Median Storage, #         0         -         -         0         2         -           Grade, %         0         -         -         0         0         -           Peak Hour Factor         92         92         92         92         92         92
RT Channelized         - None         - None         - None           Storage Length         - 100         - 0         - 0           Veh in Median Storage, #         0 0         - 0         2 - 0           Grade, %         0 - 0         - 0         0 - 0           Peak Hour Factor         92         92         92         92         92         92
Storage Length     -     -     100     -     0     -       Veh in Median Storage, #     0     -     -     0     2     -       Grade, %     0     -     -     0     0     -       Peak Hour Factor     92     92     92     92     92     92
Veh in Median Storage, #       0       -       -       0       2       -         Grade, %       0       -       -       0       0       -         Peak Hour Factor       92       92       92       92       92       92
Grade, %       0       -       -       0       0       -         Peak Hour Factor       92       92       92       92       92       92
Peak Hour Factor         92         92         92         92         92         92         92         92
Heavy Vehicles, % 0 0 0 0 0
Mvmt Flow 0 0 17 0 0 8
Major/Minor Major1 Major2 Minor1
$oldsymbol{J}$
Stage 1       -       -       -       -       0       -         Stage 2       -       -       -       -       35       -
3
0.00 100 100 100 100 100 100 100 100 100
Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3
Pot Cap-1 Maneuver 983 -
Stage 1
Stage 2 993 -
Platoon blocked, %
Mov Cap-1 Maneuver 983 -
Mov Cap-1 Maneuver 942 -
Stage 1
Stage 2 993 -
Stuge 2 - 773 -
Assessed ED M/D
Approach EB WB NB
HCM Control Delay, s 0
HCM LOS -
Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT
Capacity (veh/h)
HCM Lane V/C Ratio
HCM Control Delay (s)
HCM Lane LOS HCM 95th %tile Q(veh)

Intersection								
Int Delay, s/veh	4.8							
in Bolay, or von	1.0							
Movement		EBT	EBR		WBL	WBT	NBL	NBR
Vol, veh/h		7	0		28	16	0	12
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control		Free	Free		Free	Free	Stop	Stop
RT Channelized		-	None		-	None	- Stop	None
Storage Length		_	-		100	-	0	-
Veh in Median Storage, #	‡	0	_		-	0	2	_
Grade, %		0	_		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		8	0		30	17	0	13
Major/Minor	N.	/lajor1		NA	ajor2		Minor1	
Conflicting Flow All	IV	<u>11 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 </u>	0	IVI	<u>ajui 2</u> 8	0	86	8
Stage 1		-	-		8 -	-	80	ď
Stage 2		-	-		-	-	78	-
Critical Hdwy		_	_		4.1	_	6.4	6.2
Critical Hdwy Stg 1		-	-		4.1	-	5.4	0.2
Critical Hdwy Stg 2					_	_	5.4	_
Follow-up Hdwy		_	_		2.2	_	3.5	3.3
Pot Cap-1 Maneuver		_	_		1625	_	920	1080
Stage 1		_	_		-		1020	-
Stage 2		_	_		_	_	950	_
Platoon blocked, %		-	-			-	700	
Mov Cap-1 Maneuver		-	-		1625	-	903	1080
Mov Cap-2 Maneuver		-	-		-	-	883	-
Stage 1		-	-		-	-	1020	-
Stage 2		-	-		-	-	932	-
<u> </u>								
Approach		EB			WB		NB	
HCM Control Delay, s		0			4.6		8.4	
HCM LOS		J			7.0		Α.4	
TOW EOO							A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL '	WBT			
	1080			1625				
Capacity (veh/h) HCM Lane V/C Ratio	0.012	-			-			
HCM Control Delay (s)	8.4	-		0.019 7.3	-			
HCM Lane LOS	8.4 A	-	-	7.3 A	-			
HCM 95th %tile Q(veh)	0	-	-	0.1	-			
HOW YOU WILL (VEII)	U	-	-	U. I	-			

Intersection							
Int Delay, s/veh	2.6						
Movement	EB	EBR	1	WBL	WBT	NBL	NBR
Vol, veh/h	20	0		23	44	0	10
Conflicting Peds, #/hr	(	0		0	0	0	0
Sign Control	Free	e Free		Free	Free	Stop	Stop
RT Channelized		- None		-	None	-	None
Storage Length				50	-	0	-
Veh in Median Storage, #	(			-	0	2	-
Grade, %	(			-	0	0	-
Peak Hour Factor	92			92	92	92	92
Heavy Vehicles, %	(			0	0	0	0
Mvmt Flow	22	2 0		25	48	0	11
Major/Minor	Major <sup>2</sup>	1	Ma	ajor2		Minor1	
Conflicting Flow All	(			22	0	120	22
Stage 1				-	-	22	-
Stage 2				-	-	98	-
Critical Hdwy				4.1	-	6.4	6.2
Critical Hdwy Stg 1				-	-	5.4	-
Critical Hdwy Stg 2				-	-	5.4	-
Follow-up Hdwy				2.2	-	3.5	3.3
Pot Cap-1 Maneuver			•	1607	-	880	1061
Stage 1				-	-	1006	-
Stage 2				-	-	931	-
Platoon blocked, %					-		
Mov Cap-1 Maneuver			•	1607	-	866	1061
Mov Cap-2 Maneuver				-	-	866	-
Stage 1				-	-	1006	-
Stage 2				-	-	917	-
Approach	EF	}		WB		NB	
HCM Control Delay, s	(			2.5		8.4	
HCM LOS						A	
Minor Lane/Major Mvmt	NBLn1 EB	T EBR	WBL \	WBT			
Capacity (veh/h)			1607	-			
HCM Lane V/C Ratio	0.01		0.016	-			
HCM Control Delay (s)	8.4	- -	7.3	-			
HCM Lane LOS	0.4 A	 	7.5 A	-			
HCM 95th %tile Q(veh)	•		0	-			
FIGIVI 75111 /61118 Q(VEII)	U		U	-			

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	30	0	1	67	0	0	0	4	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	33	0	1	73	0	0	0	4	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	73	0	0	33	0	0	108	108	33	110	108	73
Stage 1	-	-	-	-	-	-	33	33	-	75	75	-
Stage 2		_	_	-	_	_	75	75	_	35	33	_
Critical Hdwy	4.1	_	_	4.1	_	_	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1		-	_	-	_	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	_	-	-	_	-	6.1	5.5	-	6.1	5.5	_
Follow-up Hdwy	2.2	_	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1540	-	_	1592	-	-	876	786	1046	873	786	995
Stage 1	-	-	-	-	-	-	988	872	-	939	836	_
Stage 2	-	-	-	-	-	-	939	836	-	986	872	
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1540	-	-	1592	-	-	876	786	1046	869	786	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	881	785	-	878	784	-
Stage 1	-	-	-	-	-	-	988	872	-	939	835	-
Stage 2	-	-	-	-	-	-	938	835	-	982	872	-
<u> </u>												
Approach	EB			WB			NB			SB		
				0.1			8.5			<u> </u>		
HCM LOS	0			0.1								
HCM LOS							А			А		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR WBL	WBT	WBR S	BLn1					
Capacity (veh/h)	1046	1540	-	- 1592	-	-	-					
HCM Lane V/C Ratio	0.004	-	-	- 0.001	-	-	-					
HCM Control Delay (s)	8.5	0	-	- 7.3	-	-	0					
HCM Lane LOS	А	Α	-	- A	-	-	А					
HCM 95th %tile Q(veh)	0	0	-	- 0	-	-	-					

Intersection							
	1.4						
in Delay, 3/Ven	1.4						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	34	0	16	68	0	7	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	50	-	0	-	
Veh in Median Storage, #	0	-	-	0	2	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	0	0	0	0	0	0	
Mvmt Flow	37	0	17	74	0	8	
Major/Minor	Maisia		Majora		Mino-1		
Major/Minor	Major1	0	Major2	0	Minor1	0.7	
Conflicting Flow All	0	0	37	0	146	37	
Stage 1	-	-	-	-	37	-	
Stage 2	-	-	-	-	109	-	
Critical Hdwy	-	-	4.1	-	6.4	6.2	
Critical Hdwy Stg 1	-	-	-	-	5.4	-	
Critical Hdwy Stg 2	-	-	-	-	5.4	-	
Follow-up Hdwy	-	-	2.2	-	3.5	3.3	
Pot Cap-1 Maneuver	-	-	1587	-	851	1041	
Stage 1	-	-	-	-	991	-	
Stage 2	-	-	-	-	921	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	1587	-	842	1041	
Mov Cap-2 Maneuver	-	-	-	-	856	-	
Stage 1	-	-	-	-	991	-	
Stage 2	-	-	-	-	911	-	
Approach	EB		WB		NB		
HCM Control Delay, s	0		1.4		8.5		
HCM LOS	- O		1.7		Α		
HOW LOS					Α		
Minor Lane/Major Mvmt	NBLn1 EBT		WBL WBT				
Capacity (veh/h)	1041 -		1587 -				
HCM Lane V/C Ratio	0.007 -	- (	0.011 -				
HCM Control Delay (s)	8.5 -	-	7.3 -				
HCM Lane LOS	Α -	-	Α -				
HCM 95th %tile Q(veh)	0 -	-	0 -				

Intersection							
Int Delay, s/veh	1.5						
Movement	EB	T EBR		WBL	WBT	NBL	NBR
Vol, veh/h	4	11 (	)	21	84	0	9
Conflicting Peds, #/hr		0 0		0	0	0	0
Sign Control	Fre	ee Free	!	Free	Free	Stop	Stop
RT Channelized		- None	!	-	None	-	None
Storage Length				100	-	0	-
Veh in Median Storage, #		0 -		-	0	2	-
Grade, %		0 -		-	0	0	-
Peak Hour Factor	Ç	92 92		92	92	92	92
Heavy Vehicles, %		0 0		0	0	0	0
Mvmt Flow	2	15 C		23	91	0	10
Major/Minor	Majo	1		Major2		Minor1	
Conflicting Flow All		0 0		45	0	182	45
Stage 1				-	-	45	-
Stage 2				-	-	137	-
Critical Hdwy				4.1	-	6.4	6.2
Critical Hdwy Stg 1				-	-	5.4	-
Critical Hdwy Stg 2				-	-	5.4	-
Follow-up Hdwy				2.2	-	3.5	3.3
Pot Cap-1 Maneuver				1576	-	812	1031
Stage 1				-	-	983	-
Stage 2				-	-	895	-
Platoon blocked, %					-		
Mov Cap-1 Maneuver				1576	-	800	1031
Mov Cap-2 Maneuver				-	-	828	-
Stage 1				-	-	983	-
Stage 2				-	-	882	-
Approach	E	В		WB		NB	
HCM Control Delay, s		0		1.5		8.5	
HCM LOS		-		1.0		A	
Minor Lane/Major Mvmt	NBLn1 EE	T EBR	WBL	WBT			
Capacity (veh/h)	1031	- LDIV		-			
HCM Lane V/C Ratio	0.009		0.014	-			
HCM Control Delay (s)	8.5		7.3	-			
HCM Lane LOS	o.5 A			-			
HCM 95th %tile Q(veh)	0			-			
HOW FOUT WITH Q(VEH)	U		U	-			

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBI	. NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	51	0	30	105	2	(		13	3	0	0
Conflicting Peds, #/hr	0	0	0	0	0	3	(	-	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None			None	-	-	None
Storage Length	100	-	-	100	-	-			-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-		- 2	-	-	2	-
Grade, %	-	0	-	-	0	-		- 0	-	-	0	-
Peak Hour Factor	67	67	92	67	67	67	6		67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	(		0	0	0	0
Mvmt Flow	0	76	0	45	157	3	(	) 0	19	4	0	0
Major/Minor	Major1			Major2			Minor <sup>*</sup>			Minor2		
Conflicting Flow All	160	0	0	76	0	0	324		79	334	324	158
Stage 1	-		-	-	-	-	76		-	248	248	-
Stage 2	-	_	-	-	-	-	248		-	86	76	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1		6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1		-	6.1	5.5	_
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1		-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	5 4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1432	-	-	1536	-	-	633	596	987	623	597	893
Stage 1	-	-	-	-	-	-	938	836	-	760	705	-
Stage 2	-	-	-	-	-	-	760	704	-	927	836	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1432	-	-	1532	-	-	619	578	985	596	579	893
Mov Cap-2 Maneuver	-	-	-	-	-	-	690	638	-	692	635	-
Stage 1	-	-	-	-	-	-	938	836	-	760	684	-
Stage 2	-	-	-	-	-	-	738	683	-	906	836	-
-												
Approach	EB			WB			NE	2		SB		
HCM Control Delay, s	0			1.6			8.7			10.2		
HCM LOS	U			1.0			J.			В		
HOW LOS										D.		
Minor Lang/Major Mumat	NDI 51	EBL	EBT	EBR WBL	WBT	WBR S	CDI n1					
Minor Lane/Major Mvmt	NBLn1					WDK						
Capacity (veh/h)	985	1432	-	- 1532	-	-	692					
HCM Control Dolay (s)	0.02	-	-	- 0.029	-	-	0.006					
HCM Long LOS	8.7	0	-	- 7.4	-	-	10.2					
HCM OF the Post in Columbia	A	A	-	- A	-	-	В					
HCM 95th %tile Q(veh)	0.1	0	-	- 0.1	-	-	0					

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<b>/</b>	<b>/</b>	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14.54	<b>^</b>	7	ሻሻ	<b>^</b>	7	Ţ	<b>†</b>	77	ň	<b>∱</b> ∱	
Volume (veh/h)	0	4	3	423	9	17	1	2	446	8	3	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	5	2	504	11	20	1	2	158	10	4	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	304	1092	483	862	1678	742	2	562	956	21	1164	0
Arrive On Green	0.00	0.29	0.29	0.24	0.44	0.44	0.00	0.30	0.30	0.01	0.31	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1680	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	5	2	504	11	20	1	2	158	10	4	0
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1680	1810	1900	1615	1810	1900	0
Q Serve(g_s), s	0.0	0.1	0.1	14.8	0.2	0.7	0.1	0.1	2.4	0.7	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.1	0.1	14.8	0.2	0.7	0.1	0.1	2.4	0.7	0.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	304	1093	483	862	1678	742	2	562	956	21	1164	0
V/C Ratio(X)	0.00	0.00	0.00	0.58	0.01	0.03	0.40	0.00	0.17	0.47	0.00	0.00
Avail Cap(c_a), veh/h	304	1093	483	862	1678	742	98	562	956	98	1164	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	30.5	23.7	40.5	18.8	13.0	59.9	29.8	9.2	58.9	28.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.7	0.0	0.1	35.1	0.0	0.4	5.8	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	0.0	0.1	0.0	7.5	0.1	0.3	0.1	0.0	1.1	0.4	0.0	0.0
LnGrp Delay(d),s/veh	0.0	30.5	23.7	41.1	18.8	13.1	95.0	29.8	9.6	64.7	28.9	0.0
LnGrp LOS		С	С	D	В	В	F	С	Α	Е	С	
Approach Vol, veh/h		7			535			161			14	
Approach Delay, s/veh		28.6			39.6			10.4			54.5	
Approach LOS		С			D			В			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	33.1	40.0	4.7	42.3	14.6	58.5	5.9	41.0				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	23.5	34.5	6.5	35.5	5.0	53.0	6.5	35.5				
Max Q Clear Time (g_c+I1), s	16.8	2.1	2.1	2.1	0.0	2.7	2.7	4.4				
Green Ext Time (p_c), s	0.6	0.0	0.0	0.3	0.0	0.1	0.0	0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			33.2									
HCM 2010 LOS			С									

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	₽		ሻ	₽		7	<b>ተ</b> ኈ		ሻ	<b>^</b>	7
Volume (veh/h)	80	0	19	0	0	1	20	378	3	2	295	127
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	96	0	22	0	0	1	24	455	4	2	355	153
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	113	0	220	2	0	39	45	2590	23	5	2532	1076
Arrive On Green	0.06	0.00	0.14	0.00	0.00	0.02	0.03	0.69	0.69	0.00	0.67	0.67
Sat Flow, veh/h	1810	0	1615	1810	0	1615	1810	3761	33	1810	3800	1615
Grp Volume(v), veh/h	96	0	22	0	0	1	24	230	229	2	355	153
Grp Sat Flow(s), veh/h/ln	1810	0	1615	1810	0	1615	1810	1900	1894	1810	1900	1615
Q Serve(g_s), s	4.7	0.0	1.1	0.0	0.0	0.1	1.2	3.9	3.9	0.1	3.1	3.1
Cycle Q Clear(g_c), s	4.7	0.0	1.1	0.0	0.0	0.1	1.2	3.9	3.9	0.1	3.1	3.1
Prop In Lane	1.00	0.0	1.00	1.00	0.0	1.00	1.00	0.7	0.02	1.00	0.1	1.00
Lane Grp Cap(c), veh/h	113	0	220	2	0	39	45	1308	1304	5	2532	1076
V/C Ratio(X)	0.85	0.00	0.10	0.00	0.00	0.03	0.53	0.18	0.18	0.41	0.14	0.14
Avail Cap(c_a), veh/h	113	0	574	101	0	563	101	1308	1304	101	2532	1076
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	34.0	0.0	0.0	42.9	43.3	5.0	5.0	44.8	5.5	5.5
Incr Delay (d2), s/veh	41.5	0.0	0.1	0.0	0.0	0.1	3.5	0.3	0.3	18.9	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.5	0.0	0.0	0.0	0.6	2.1	2.1	0.1	1.7	1.5
LnGrp Delay(d),s/veh	83.3	0.0	34.1	0.0	0.0	43.0	46.9	5.3	5.3	63.8	5.6	5.8
LnGrp LOS	65.5 F	0.0	C	0.0	0.0	D	D	Α	Α	E	Α.	Α.
Approach Vol, veh/h	•	118	0		1		<u> </u>	483	/\		510	
Approach Delay, s/veh		74.1			43.0			7.3			5.9	
Approach LOS		74.1 E			43.0 D			7.3 A			J. 7	
Approach EO3		L			D			A			А	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.7	67.5	0.0	17.8	6.8	65.5	10.1	7.7				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.6	31.4				
Max Q Clear Time (g_c+I1), s	2.1	5.9	0.0	3.1	3.2	5.1	6.7	2.1				
Green Ext Time (p_c), s	0.0	3.0	0.0	0.0	0.0	3.0	0.0	0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			13.8									
HCM 2010 LOS			В									
Notes												

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User approved pedestrian interval to be less than phase max green.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	7	<b>^</b>						4	7
Volume (veh/h)	0	437	21	124	210	0	0	0	0	425	2	239
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	465	17	132	223	0				452	2	190
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	808	343	662	2373	0				512	2	459
Arrive On Green	0.00	0.07	0.07	0.73	1.00	0.00				0.28	0.28	0.28
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1802	8	1615
Grp Volume(v), veh/h	0	465	17	132	223	0				454	0	190
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	14.2	1.2	2.7	0.0	0.0				28.8	0.0	11.5
Cycle Q Clear(g_c), s	0.0	14.2	1.2	2.7	0.0	0.0				28.8	0.0	11.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	808	343	662	2373	0				514	0	459
V/C Ratio(X)	0.00	0.58	0.05	0.20	0.09	0.00				0.88	0.00	0.41
Avail Cap(c_a), veh/h	0	808	343	662	2373	0				822	0	733
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.97	0.97	0.99	0.99	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	50.6	44.5	10.6	0.0	0.0				41.1	0.0	34.9
Incr Delay (d2), s/veh	0.0	2.9	0.3	0.1	0.1	0.0				7.0	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.8	0.6	1.3	0.0	0.0				15.4	0.0	5.2
LnGrp Delay(d),s/veh	0.0	53.4	44.7	10.6	0.1	0.0				48.0	0.0	35.5
LnGrp LOS		D	D	В	A					D		D
Approach Vol, veh/h		482			355						644	
Approach Delay, s/veh		53.1			4.0						44.3	
Approach LOS		D			Α						D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	49.4	31.0		39.6		80.4						
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5						
Max Green Setting (Gmax), s	24.5	* 26		54.5		54.5						
Max Q Clear Time (g_c+l1), s	4.7	16.2		30.8		2.0						
Green Ext Time (p_c), s	0.9	1.3		3.3		1.0						
Intersection Summary												
HCM 2010 Ctrl Delay			37.5									
HCM 2010 LOS			D									
Notes												

Notes

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<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ř	<b>^</b>			<b>^</b>	7		ર્ન	7			
Volume (veh/h)	245	617	0	0	304	347	31	0	100	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	266	671	0	0	330	342	34	0	23			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	291	2755	0	0	2034	864	347	0	310			
Arrive On Green	0.32	1.00	0.00	0.00	0.54	0.54	0.19	0.00	0.19			
Sat Flow, veh/h	1810	3800	0	0	3800	1615	1810	0	1615			
Grp Volume(v), veh/h	266	671	0	0	330	342	34	0	23			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	17.0	0.0	0.0	0.0	5.3	15.0	1.9	0.0	1.4			
Cycle Q Clear(g_c), s	17.0	0.0	0.0	0.0	5.3	15.0	1.9	0.0	1.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	291	2755	0	0	2034	864	347	0	310			
V/C Ratio(X)	0.92	0.24	0.00	0.00	0.16	0.40	0.10	0.00	0.07			
Avail Cap(c_a), veh/h	550	2755	0	0	2034	864	347	0	310			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.96	0.96	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.9	0.0	0.0	0.0	14.2	16.4	40.0	0.0	39.8			
Incr Delay (d2), s/veh	4.6	0.2	0.0	0.0	0.2	1.4	0.6	0.0	0.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.8	0.1	0.0	0.0	2.8	7.0	1.0	0.0	0.7			
LnGrp Delay(d),s/veh	44.5	0.2	0.0	0.0	14.4	17.8	40.5	0.0	40.2			
LnGrp LOS	D	А			В	В	D		D			
Approach Vol, veh/h		937			672			57				
Approach Delay, s/veh		12.8			16.1			40.4				
Approach LOS		В			В			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		92.0			22.8	69.2		28.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		87.0			36.5	47.0		23.0				
Max Q Clear Time (g_c+I1), s		2.0			19.0	17.0		3.9				
Green Ext Time (p_c), s		5.1			0.3	4.9		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			15.1									
HCM 2010 LOS			В									

EAP (2017) Conditions - AM Peak Hour Urban Crossroads, Inc.

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Int Delay, s/veh
Movement         EBT         EBR         WBL         WBT         NBL         NBR           Vol, veh/h         0         0         10         0         0         22           Conflicting Peds, #/hr         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - Oo
Vol, veh/h         0         0         10         0         22           Conflicting Peds, #/hr         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - None<
Vol, veh/h         0         0         10         0         22           Conflicting Peds, #/hr         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - None<
Conflicting Peds, #/hr         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - None         - None         - None         - None           Storage Length         - 100         - 0         0         - 2         0         0         2         0         0         2         0         0         2         0         0         2         0         0         2         2         92
Sign Control         Free Free Free Free Free Free Free Free
RT Channelized         - None         - None         - None           Storage Length         100 - 00 - 00 - 00 - 00 - 00 - 00
Storage Length         -         -         100         -         0         -           Veh in Median Storage, #         0         -         -         0         2         -           Grade, %         0         -         -         0         0         -         -           Peak Hour Factor         92         92         92         92         92         92         92           Heavy Vehicles, %         0         24         0         0         0         0         0         24         0         0         0         0         0         0         24         0         0         0         0         0         24         0         0         0         0         0         24         0         0         0         2         0         0         0         2         0         0         0         0         0         0         0         0         0         0         0         <
Veh in Median Storage, #         0         -         -         0         2         -           Grade, %         0         -         -         0         0         -           Peak Hour Factor         92         92         92         92         92         92           Heavy Vehicles, %         0         0         0         0         0         0         0           Mvmt Flow         0         0         0         0         0         0         24           Major/Minor         Major1         Major2         Minor1         Minor1         Minor1         Minor1         Minor1         Minor1         Minor1         Minor1         Minor2         0         24         0         24         0         24         0         24         0         0         0         0         0         0         0         0         24         0
Grade, %         0         -         -         0         0         -           Peak Hour Factor         92         92         92         92         92         92           Heavy Vehicles, %         0         0         0         0         0         0         0           Mvmt Flow         0         0         0         0         0         0         24           Major/Minor         Major1         Major2         Minor1         Minor1         Minor1         Minor1           Conflicting Flow All         0         0         0         0         22         0           Stage 1         -         -         -         -         0         -           Stage 2         -         -         -         -         0         -           Critical Hdwy         Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Follow-up Hdwy         -         -         -         -         -         -           Stage 1         -         -         -         -         - <t< td=""></t<>
Peak Hour Factor         92
Heavy Vehicles, %         0         0         0         0         0           Mvmt Flow         0         0         11         0         0         24           Major/Minor         Major1         Major2         Minor1         Minor1
Mvmt Flow         0         0         11         0         0         24           Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         0         22         0           Stage 1         -         -         -         0         -           Stage 2         -         -         -         0         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Follow-up Hdwy         -         -         2.2         3.5         3.3           Pot Cap-1 Maneuver         -         -         -         -         -           Stage 1         -         -         -         -         -         -           Stage 2         -         -         -         -         -         -           Mov Cap-1 Maneuver         -         -         -         -         -         -         -         -
Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         0         22         0           Stage 1         -         -         -         0         -           Stage 2         -         -         -         22         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Follow-up Hdwy         -         -         2.2         -         3.5         3.3           Pot Cap-1 Maneuver         -         -         -         -         -         -         -           Stage 1         -         -         -         -         -         -         -         -         -           Platoon blocked, %         -
Conflicting Flow All         0         0         0         0         22         0           Stage 1         -         -         -         -         0         -           Stage 2         -         -         -         -         22         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Follow-up Hdwy         -         -         -         -         5.4         -           Follow-up Hdwy         -         -         -         -         1000         -           Stage 1         -         -         -         -         -         -         -           Stage 2         -         -         -         -         -         -         -           Platoon blocked, %         -         -         -         -         -         -         -           Mov Cap-1 Maneuver         -         -         -         -         -         -
Conflicting Flow All         0         0         0         0         22         0           Stage 1         -         -         -         -         0         -           Stage 2         -         -         -         -         22         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Follow-up Hdwy         -         -         -         -         5.4         -           Follow-up Hdwy         -         -         -         -         1000         -           Stage 1         -         -         -         -         -         -         -           Stage 2         -         -         -         -         -         -         -           Platoon blocked, %         -         -         -         -         -         -         -           Mov Cap-1 Maneuver         -         -         -         -         -         -
Conflicting Flow All         0         0         0         0         22         0           Stage 1         -         -         -         -         0         -           Stage 2         -         -         -         -         22         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Follow-up Hdwy         -         -         -         -         5.4         -           Follow-up Hdwy         -         -         -         -         1000         -           Stage 1         -         -         -         -         -         -         -           Stage 2         -         -         -         -         -         -         -           Platoon blocked, %         -         -         -         -         -         -         -           Mov Cap-1 Maneuver         -         -         -         -         -         -
Stage 1       -       -       -       -       0       -         Stage 2       -       -       -       -       22       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       -       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       -       -       1000       -         Stage 1       -       -       -       -       -       -       -         Stage 2       -       -       -       -       -       -       -       -       -         Mov Cap-1 Maneuver       -
Stage 2       -       -       -       -       -       22       -         Critical Hdwy       -
Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       -       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       -       -       1000       -         Stage 1       -       -       -       -       -       -       -         Stage 2       -       -       -       -       1006       -         Platoon blocked, %       -       -       -       -       1000       -         Mov Cap-1 Maneuver       -       -       -       -       -       1000       -
Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       -       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       -       -       1000       -         Stage 1       -       -       -       -       -       -       -         Stage 2       -       -       -       -       1006       -         Platoon blocked, %       -       -       -       -       1000       -         Mov Cap-1 Maneuver       -       -       -       -       1000       -
Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       -       -       1000       -         Stage 1       -       -       -       -       -       -       -       -         Stage 2       -       -       -       -       1006       -       -         Platoon blocked, %       -       -       -       -       1000       -         Mov Cap-1 Maneuver       -       -       -       -       1000       -
Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       -       -       1000       -         Stage 1       -       -       -       -       -       -       -         Stage 2       -       -       -       -       1006       -         Platoon blocked, %       -       -       -       -       -       1000       -         Mov Cap-1 Maneuver       -       -       -       -       1000       -
Pot Cap-1 Maneuver       -       -       -       -       1000       -         Stage 1       - <t< td=""></t<>
Stage 1       - </td
Stage 2       -       -       -       -       1006       -         Platoon blocked, %       - <t< td=""></t<>
Platoon blocked, % 1000 -
Mov Cap-1 Maneuver 1000 -
Mov Cap-2 Maneuver 955 -
Stage 1
Stage 2 1006 -
Approach EB WB NB
HCM Control Delay, s 0
HCM LOS -
Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT
Capacity (veh/h)
HCM Lane V/C Ratio
HCM Control Delay (s)
HCM Lane LOS
HCM 95th %tile Q(veh)

Intersection								
Int Delay, s/veh	4.5							
in Boldy, Siveri	1.0							
Movement	El	2T	EBR	WE	RI V	VBT	NBL	NBR
Vol, veh/h		22	0		12	10	0	28
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control	Fr		Free	Fre	-	-ree	Stop	Stop
RT Channelized	П		None	FIG		lone	Slup	None
Storage Length		_	-	1(		-	0	None
Veh in Median Storage, #	<i>μ</i>	0	-	10	JU -	0	2	-
Grade, %	<del>†</del>	0	-		-	0	0	-
Peak Hour Factor		92	92	(	92	92	92	92
		92	0	`	0	92	0	92
Heavy Vehicles, % Mvmt Flow		0 24	0		13	11	0	30
IVIVITIL FIOW		<b>24</b>	U		J	11	U	30
Major/Minor	Majo	r1		Majo	r2		Minor1	
Conflicting Flow All		0	0		24	0	61	24
Stage 1		-	-		-	-	24	-
Stage 2		-	-		-	-	37	-
Critical Hdwy		-	-	4	.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4	-
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-	2	.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-	160	)4	-	950	1058
Stage 1		-	-		-	-	1004	-
Stage 2		-	-		-	-	991	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-	160	)4	-	942	1058
Mov Cap-2 Maneuver		-	-		-	-	925	-
Stage 1		-	-		-	-	1004	-
Stage 2		-	-		-	-	983	-
•								
Approach		ЕΒ		W	B		NB	
HCM Control Delay, s		0		•	4		8.5	
HCM LOS					•		A	
110.111 200							, , , , , , , , , , , , , , , , , , ,	
Minor Lang/Major Mumat	NDI 51 FI	ЭΤ	EDD	MDI MI	т			
Minor Lane/Major Mvmt	NBLn1 El			WBL WE				
Capacity (veh/h)	1058	-		1604	-			
HCM Caretral Palar (a)	0.029	-		0.008	-			
HCM Control Delay (s)	8.5	-	-	7.3	-			
HCM Lane LOS	A	-	-	A	-			
HCM 95th %tile Q(veh)	0.1	-	-	0	-			

Init Delay, Siveh   3	Intersection								
Movement		3							
Vol. veh/h         50         0         13         22         0         28           Conflicting Peds, #/hr         0         -         None         None </td <td>in Boildy of Volt</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	in Boildy of Volt								
Vol. veh/h         50         0         13         22         0         28           Conflicting Peds, #/hr         0         -         None         None </td <td>Movement</td> <td></td> <td>FRT</td> <td>FRD</td> <td></td> <td>\MRI</td> <td>\M/RT</td> <td>NRI</td> <td>MRD</td>	Movement		FRT	FRD		\MRI	\M/RT	NRI	MRD
Conflicting Peds, #/hr									
Sign Control         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - None         - None         - None         - None         None         None         None         None         None         - None         - None         None         None         - None         None         None         - None         None         - None									
RT Channelized         None         None         None         None         None         None         None         Storage Length         -         50         -         0         -         O         -         O         -         O         0         -         Common Storage         **         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
Storage Length									•
Veh in Median Storage, #         0         -         -         0         2         -         Grade, %         0         -         -         0         0         -         -         0         0         -         -         0         0         0         -         -         0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>									
Grade, %         0         -         -         0         0         -         Peak Hour Factor         92         93         0			0	_			0		-
Peak Hour Factor				-		-			-
Mymit Flow         54         0         14         24         0         30           Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         54         0         106         54           Stage 1         -         -         -         -         54         -           Stage 2         -         -         -         -         54         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         2.2         -         3.5         3.3           Plance Manal Mage Manal				92		92			92
Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         54         0         106         54           Stage 1         -         -         -         -         54         -           Stage 2         -         -         -         -         54         -           Critical Hdwy         -         -         -         -         5.4         -           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         - <td>Heavy Vehicles, %</td> <td></td> <td>0</td> <td>0</td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>	Heavy Vehicles, %		0	0		0	0	0	0
Conflicting Flow All			54	0		14	24	0	30
Conflicting Flow All									
Conflicting Flow All         0         0         54         0         106         54           Stage 1         -         -         -         -         54         -           Stage 2         -         -         -         -         52         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         -         897         1019           Stage 1         -         -         -         -         -         974         -     <	Maior/Minor	_ M	laior1		M	aior2		Minor1	
Stage 1       -       -       -       54       -         Stage 2       -       -       -       52       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       1564       -       897       1019         Stage 1       -       -       -       -       974       -         Stage 2       -       -       -       976       -         Platoon blocked, %       -       -       -       -         Mov Cap-1 Maneuver       -       -       1564       -       889       1019         Mov Cap-2 Maneuver       -       -       -       -       974       -         Stage 1       -       -       -       -       974       -         Stage 2       -       -       -       -       976       -		IVI		0	IVI		0		54
Stage 2       -       -       -       -       52       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       1564       -       897       1019         Stage 1       -       -       -       -       974       -         Stage 2       -       -       -       -       -         Platoon blocked, %       -       -       -       -         Mov Cap-1 Maneuver       -       -       -       -       889       1019         Mov Cap-2 Maneuver       -       -       -       -       974       -         Stage 1       -       -       -       -       974       -         Stage 2       -       -       -       -       974       -         Stage 1       -       -       -       -									- 34
Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       1564       -       897       1019         Stage 1       -       -       -       -       974       -         Stage 2       -       -       -       -       976       -         Platoon blocked, %       -       -       -       -       -       -         Mov Cap-1 Maneuver       -       -       -       -       889       1019       -       1019       -       889       1019       -       -       895       -       -       -       895       -       -       -       974       -       -       -       974       -       -       -       -       974       -       -       -       -       -       -       -       -       -       -       -       -       -       - <td></td> <td></td> <td>-</td> <td></td> <td></td> <td>-</td> <td>-</td> <td></td> <td>-</td>			-			-	-		-
Critical Hdwy Stg 1       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       1564       -       897       1019         Stage 1       -       -       -       -       974       -         Stage 2       -       -       -       -       976       -         Platoon blocked, %       - <td< td=""><td></td><td></td><td>-</td><td>-</td><td></td><td>4.1</td><td>-</td><td></td><td>6.2</td></td<>			-	-		4.1	-		6.2
Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       -       974       -         Stage 1       -       -       -       974       -         Stage 2       -       -       -       976       -         Plation blocked, %       -       -       -       -       -         Mov Cap-1 Maneuver       -       -       -       -       889       1019         Mov Cap-2 Maneuver       -       -       -       -       895       -         Stage 1       -       -       -       -       974       -         Stage 2       -       -       -       -       974       -         Stage 2       -       -       -       -       967       -         A       -       -       -       -       974       -         Stage 2       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -			-	-			-		-
Follow-up Hdwy 2.2 - 3.5 3.3  Pot Cap-1 Maneuver 1564 - 897 1019  Stage 1 974 - 974 - 5tage 2 976 976 - 976  Mov Cap-1 Maneuver 1564 - 889 1019  Mov Cap-1 Maneuver 1564 - 889 1019  Mov Cap-2 Maneuver 895 - 5tage 1 974 - 974 - 974 - 974 - 974 - 974 - 974 - 974 - 975 -			-	-		-	-		-
Stage 1       -       -       -       974       -         Stage 2       -       -       -       976       -         Platoon blocked, %       -       -       -       -         Mov Cap-1 Maneuver       -       -       1564       -       889       1019         Mov Cap-2 Maneuver       -       -       -       -       974       -       -       -       974       -       -       -       974       -       -       -       967       -       -       -       967       -       -       -       -       967       - <td< td=""><td></td><td></td><td>-</td><td>-</td><td></td><td>2.2</td><td>-</td><td>3.5</td><td>3.3</td></td<>			-	-		2.2	-	3.5	3.3
Stage 2       -			-	-		1564	-	897	1019
Platoon blocked, %			-			-			-
Mov Cap-1 Maneuver         -         -         1564         -         889         1019           Mov Cap-2 Maneuver         -         -         -         -         895         -           Stage 1         -         -         -         -         974         -           Stage 2         -         -         -         -         967         -           Approach         EB         WB         NB           HCM Control Delay, s         0         2.7         8.6           HCM LOS         A         A    Minor Lane/Major Mvmt  NBLn1  EBT  EBR  WBL  WBT  Capacity (veh/h)  1019  - 1564  - 1564  - HCM Lane V/C Ratio  0.03  - 0.009  - HCM Control Delay (s)  8.6  - 7.3  - 7.3  - HCM Lane LOS  A  - A  - A  - A  - A  - A  - A  - A			-	-		-	-	976	-
Mov Cap-2 Maneuver         -         -         -         895         -           Stage 1         -         -         -         -         974         -           Stage 2         -         -         -         -         967         -           Approach         EB         WB         NB           HCM Control Delay, s         0         2.7         8.6           HCM LOS         A         A    Minor Lane/Major Mvmt  NBLn1  EBT  EBR  WBL  WBT  Capacity (veh/h)  1019  - 1564  - 1564  - HCM Lane V/C Ratio  0.03  - 0.009  - HCM Control Delay (s)  8.6  - 7.3  - HCM Lane LOS  A  - A  - A  - A  - A  - B	•		-	-			-		
Stage 1         -         -         -         974         -           Stage 2         -         -         -         967         -           Approach         EB         WB         NB           HCM Control Delay, s         0         2.7         8.6           HCM LOS         A         A    Minor Lane/Major Mvmt  NBLn1  EBT  EBR  WBL  WBT  Capacity (veh/h)  1019  - 1564  - 1564  - HCM Lane V/C Ratio  0.03  - 0.009  - HCM Control Delay (s)  8.6  - 7.3  - A  - A  - A  - A  - A  - A  - A  -			-	-		1564	-		1019
Stage 2         -         -         -         967         -           Approach         EB         WB         NB           HCM Control Delay, s         0         2.7         8.6           HCM LOS         A         A             Minor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           Capacity (veh/h)         1019         -         -         1564         -           HCM Lane V/C Ratio         0.03         -         -         0.009         -           HCM Control Delay (s)         8.6         -         -         7.3         -           HCM Lane LOS         A         -         -         A         -			-				-		-
Approach         EB         WB         NB           HCM Control Delay, s         0         2.7         8.6           HCM LOS         A         A             Minor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           Capacity (veh/h)         1019         -         -         1564         -           HCM Lane V/C Ratio         0.03         -         -         0.009         -           HCM Control Delay (s)         8.6         -         -         7.3         -           HCM Lane LOS         A         -         -         A         -			-	-		-	-		-
HCM Control Delay, s	Stage 2		-	-		-	-	967	-
HCM Control Delay, s									
HCM Control Delay, s       0       2.7       8.6         HCM LOS       A             Minor Lane/Major Mvmt       NBLn1       EBT       EBR       WBL       WBT         Capacity (veh/h)       1019       -       -       1564       -         HCM Lane V/C Ratio       0.03       -       -       0.009       -         HCM Control Delay (s)       8.6       -       -       7.3       -         HCM Lane LOS       A       -       -       A       -	Approach		EB			WB		NB	
Minor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           Capacity (veh/h)         1019         -         -         1564         -           HCM Lane V/C Ratio         0.03         -         -         0.009         -           HCM Control Delay (s)         8.6         -         -         7.3         -           HCM Lane LOS         A         -         -         A         -			0			2.7		8.6	
Capacity (veh/h) 1019 1564 -  HCM Lane V/C Ratio 0.03 0.009 -  HCM Control Delay (s) 8.6 7.3 -  HCM Lane LOS A A -								А	
Capacity (veh/h)       1019       -       -       1564       -         HCM Lane V/C Ratio       0.03       -       -       0.009       -         HCM Control Delay (s)       8.6       -       -       7.3       -         HCM Lane LOS       A       -       -       A       -									
Capacity (veh/h) 1019 1564 -  HCM Lane V/C Ratio 0.03 0.009 -  HCM Control Delay (s) 8.6 7.3 -  HCM Lane LOS A A -	Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT			
HCM Lane V/C Ratio       0.03       -       -       0.009       -         HCM Control Delay (s)       8.6       -       -       7.3       -         HCM Lane LOS       A       -       -       A       -									
HCM Control Delay (s) 8.6 7.3 - HCM Lane LOS A A -									
HCM Lane LOS A A -			-			-			
			-	-		-			
			-	-		-			

Intersection												
Int Delay, s/veh	0.5											
<b>J</b> .												
Movement	EBL	EBT	EBR	WB	_ WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	78	0		5 35	0	0	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0		0 0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Fre	e Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None			None	-	-	None	-	-	None
Storage Length	50	-	-	10	) -	-	-	-	-	-	-	-
Veh in Median Storage, #	<del>!</del> _	0	-		- 0	-	-	2	-	-	2	-
Grade, %	-	0	-		- 0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	9	2 92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0		0 0	0	0	0	0	0	0	0
Mvmt Flow	0	85	0		5 38	0	0	0	3	0	0	0
Major/Minor	Major1			Major.	2		Minor1			Minor2		
Conflicting Flow All	38	0	0	8	5 0	0	134	134	85	135	134	38
Stage 1	-	-	-			-	85	85	-	49	49	-
Stage 2	-	-	-			-	49	49	-	86	85	-
Critical Hdwy	4.1	-	-	4.	1 -	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-			-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-			-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2	2 -	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1585	-	-	152	4 -	-	842	760	980	841	760	1040
Stage 1	-	-	-			-	928	828	-	969	858	-
Stage 2	-	-	-			-	969	858	-	927	828	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1585	-	-	152	1 -	-	840	758	980	836	758	1040
Mov Cap-2 Maneuver	-	-	-			-	862	770	-	857	768	-
Stage 1	-	-	-			-	928	828	-	969	855	-
Stage 2	-	-	-			-	966	855	-	924	828	-
Approach	EB			WI	3		NB			SB		
HCM Control Delay, s	0			0.			8.7			0		
HCM LOS				<u> </u>			A			A		
							,					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR WB	_ WBT	WBR S	SBLn1					
Capacity (veh/h)	980	1585	-	- 152		-	-					
HCM Lane V/C Ratio	0.003	-	-	- 0.00			_					
HCM Control Delay (s)	8.7	0	_	- 7.			0					
HCM Lane LOS	Α	A	-	- 1		_	A					
HCM 95th %tile Q(veh)	0	0	_		) -	_	-					
/ 541 / 5410 (2(1011)	O	J			-							

Intersection								
Int Delay, s/veh	1.8							
int Dolay, Siven	1.0							
Movement		ТПТ	EDD	,	A/DI	WDT	NBL	NDD
Movement Value and I // I		EBT	EBR	\	NBL 10	WBT		NBR
Vol, veh/h		81	0		10	40	0	22
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control	ŀ	ree	Free	l	Free	Free	Stop	Stop
RT Channelized		-	None		-	None	-	None
Storage Length	ı	-	-		50	-	0	-
Veh in Median Storage, #	<b>F</b>	0	-		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		88	0		11	43	0	24
Major/Minor	Ma	jor1	_	Ma	ajor2	_	Minor1	
Conflicting Flow All		0	0		88	0	153	88
Stage 1		-	-		-	-	88	-
Stage 2		-	-		-	-	65	-
Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4	-
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-	1	1520	-	843	976
Stage 1		-	-		-	-	940	-
Stage 2		-	-		-	-	963	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-	1	1520	-	837	976
Mov Cap-2 Maneuver		-	-		-	-	864	-
Stage 1		-	-		-	-	940	-
Stage 2		-	-		-	-	956	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			1.5		8.8	
HCM LOS		U			1.0		A	
HOW LOO							- A	
Minor Lane/Major Mvmt	NDI n1 I	DT	EDD	WDI -	MDT			
		EBT	EBR		NBT_			
Capacity (veh/h)	976	-		1520	-			
HCM Cantral Palace (a)	0.025	-		0.007	-			
HCM Control Delay (s)	8.8	-	-	7.4	-			
HCM Lane LOS	A	-	-	A	-			
HCM 95th %tile Q(veh)	0.1	-	-	0	-			

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	103	0	9	50	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-		100	-	0	-
Veh in Median Storage, #	0	-	-	0	2	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0		0	0	0	0
Mvmt Flow	112	0	10	54	0	23
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	112	0	186	112
Stage 1	-	-	- 1,2	-	112	- 112
Stage 2	_	-	-	-	74	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1490	-	808	947
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	954	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1490	-	803	947
Mov Cap-2 Maneuver	-	-	-	-	843	-
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	948	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.1		8.9	
HCM LOS	Ü		.,,		A	
					,,	
Minor Lane/Major Mvmt	NBLn1 EBT	EBR	WBL WBT			
Capacity (veh/h)	947 -		1490 -			
HCM Lane V/C Ratio	0.024 -		0.007 -			
HCM Control Delay (s)	8.9 -		7.4 -			
HCM Lane LOS	A -	-	A -			
HCM 95th %tile Q(veh)	0.1 -		0 -			
HOW FOUT FOUND (VEH)	U. I -	-	0 -			

Intersection														
Int Delay, s/veh	2													
Movement	EBL	EBT	EBR	\	WBL	WBT	WBR	N	IBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	124	0		16	59	0		0	0	36	0	0	0
Conflicting Peds, #/hr	0	0	0		0	0	0		0	0	0	0	0	0
Sign Control	Free	Free	Free	I	Free	Free	Free	S	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None		-	-	None		-	-	None	-	-	None
Storage Length	100	-	-		100	-	-		-	-	-	-	-	-
Veh in Median Storage, #	-	0	-		-	0	-		-	2	-	-	2	-
Grade, %	-	0	-		-	0	-		-	0	-	-	0	-
Peak Hour Factor	67	67	92		67	67	67		67	67	67	67	67	67
Heavy Vehicles, %	0	0	0		0	0	0		0	0	0	0	0	0
Mvmt Flow	0	185	0		24	88	0		0	0	54	0	0	0
Major/Minor	Major1			Ma	ajor2			Min	or1			Minor2		
Conflicting Flow All	88	0	0		185	0	0		321	321	185	348	321	88
Stage 1	-	-	-		-	-	-		185	185	-	136	136	-
Stage 2	-	-	-		-	-	-		136	136	-	212	185	-
Critical Hdwy	4.1	-	-		4.1	-	-		7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-		-	-	-		6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-		-	-	-		6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-		2.2	-	-		3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1520	-	-	1	1402	-	-	(	636	599	862	610	599	976
Stage 1	-	-	-		-	-	-	;	821	751	-	872	788	-
Stage 2	-	-	-		-	-	-	;	872	788	-	795	751	-
Platoon blocked, %		-	-			-	-							
Mov Cap-1 Maneuver	1520	-	-	1	1402	-	-		628	589	862	565	589	976
Mov Cap-2 Maneuver	-	-	-		-	-	-	•	728	668	-	663	659	-
Stage 1	-	-	-		-	-	-		821	751	-	872	775	-
Stage 2	-	-	-		-	-	-	:	857	775	-	745	751	-
Approach	EB				WB				NB			SB		
HCM Control Delay, s	0				1.6				9.5			0		
HCM LOS	U				1.0				Α.			A		
HOW LOS									$\Lambda$			Л		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR \	WBL	WBT	WBR SI	RI n1						
Capacity (veh/h)	862	1520	_ LDT		1402	-	WDIC 3L	DEIII						
HCM Lane V/C Ratio	0.062	1320	-		.017	-	-	-						
HCM Control Delay (s)	9.5	0	-	- U -	7.6	-	_	0						
HCM Lane LOS	7.5 A	A	-		Α.		-	A						
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	_	_	-						
HOW 75HI 70HIE Q(VEH)	0.2	U	-	-	0.1	-	-	-						

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1,4	<b>^</b>	7	ሻሻ	<b>^</b>	7	7	<b>↑</b>	77	7	<b>ተ</b> ኈ	
Volume (veh/h)	0	6	6	468	15	6	1	4	541	9	7	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	6	3	482	15	6	1	4	273	9	7	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	3	1282	567	685	2176	961	2	546	929	20	1128	0
Arrive On Green	0.00	0.34	0.34	0.19	0.57	0.57	0.00	0.29	0.29	0.01	0.30	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1679	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	6	3	482	15	6	1	4	273	9	7	0
Grp Sat Flow(s),veh/h/ln	1810	1900	1680	1810	1900	1679	1810	1900	1615	1810	1900	0
Q Serve(g_s), s	0.0	0.1	0.1	14.9	0.2	0.2	0.1	0.2	4.8	0.6	0.2	0.0
Cycle Q Clear(g_c), s	0.0	0.1	0.1	14.9	0.2	0.2	0.1	0.2	4.8	0.6	0.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	3	1283	567	685	2176	961	2	546	929	20	1128	0
V/C Ratio(X)	0.00	0.00	0.01	0.70	0.01	0.01	0.40	0.01	0.29	0.46	0.01	0.00
Avail Cap(c_a), veh/h	151	1283	567	685	2176	961	83	546	929	83	1128	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	26.4	20.1	45.5	11.0	11.0	59.9	30.5	12.2	59.0	29.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.7	0.0	0.0	35.1	0.0	8.0	6.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.1	7.8	0.1	0.1	0.1	0.1	2.2	0.3	0.1	0.0
LnGrp Delay(d),s/veh	0.0	26.4	20.1	48.2	11.0	11.0	95.0	30.5	13.0	65.2	29.7	0.0
LnGrp LOS		С	С	D	В	В	F	С	В	Е	С	
Approach Vol, veh/h		9			503			278			16	
Approach Delay, s/veh		24.3			46.6			13.6			49.7	
Approach LOS		С			D			В			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.2	46.0	4.7	41.1	0.0	74.2	5.8	40.0				
Change Period (Y+Rc), s	5.5	* 5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	19.5	* 41	5.5	34.5	5.0	55.0	5.5	34.5				
Max Q Clear Time (g_c+l1), s	16.9	2.1	2.1	2.2	0.0	2.2	2.6	6.8				
Green Ext Time (p_c), s	0.3	0.0	0.0	0.6	0.0	0.9	0.0	0.6				
Intersection Summary												
HCM 2010 Ctrl Delay			35.0									
HCM 2010 LOS			D									
Notes												

Note:

EAP (2017) Conditions - PM Peak Hour Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	1>		7	1>		7	<b>ተ</b> ኈ		7	<b>^</b>	7
Volume (veh/h)	166	0	24	1	1	4	8	325	5	0	412	69
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	175	0	25	1	1	4	8	342	5	0	434	73
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	211	0	253	2	10	40	18	2502	37	2	2317	984
Arrive On Green	0.12	0.00	0.16	0.00	0.03	0.03	0.01	0.67	0.67	0.00	0.61	0.61
Sat Flow, veh/h	1810	0	1615	1810	333	1332	1810	3736	55	1810	3800	1614
Grp Volume(v), veh/h	175	0	25	1	0	5	8	174	173	0	434	73
Grp Sat Flow(s), veh/h/ln	1810	0	1615	1810	0	1665	1810	1900	1890	1810	1900	1614
Q Serve(g_s), s	8.5	0.0	1.2	0.0	0.0	0.3	0.4	3.0	3.0	0.0	4.5	0.6
Cycle Q Clear(g_c), s	8.5	0.0	1.2	0.0	0.0	0.3	0.4	3.0	3.0	0.0	4.5	0.6
Prop In Lane	1.00	0.0	1.00	1.00	0.0	0.80	1.00	0.0	0.03	1.00	110	1.00
Lane Grp Cap(c), veh/h	211	0	253	2	0	50	18	1273	1266	2	2317	984
V/C Ratio(X)	0.83	0.00	0.10	0.40	0.00	0.10	0.44	0.14	0.14	0.00	0.19	0.07
Avail Cap(c_a), veh/h	308	0.00	574	101	0.00	401	101	1273	1266	101	2317	984
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	32.5	44.9	0.0	42.5	44.3	5.4	5.4	0.0	7.7	1.1
Incr Delay (d2), s/veh	7.7	0.0	0.1	34.8	0.0	0.3	6.1	0.2	0.2	0.0	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.5	0.0	0.0	0.1	0.2	1.6	1.6	0.0	2.4	0.3
LnGrp Delay(d),s/veh	46.5	0.0	32.6	79.7	0.0	42.8	50.4	5.6	5.6	0.0	7.9	1.2
LnGrp LOS	D	0.0	02.0 C	F	0.0	72.0 D	D	Α	Α	0.0	Α	A
Approach Vol, veh/h	D	200	<u> </u>		6	D	<u> </u>	355	А		507	
Approach Delay, s/veh		44.8			48.9			6.6			7.0	
11		44.0 D			40.9 D			Α			7.0 A	
Approach LOS		D			D			А			А	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	0.0	65.8	4.6	19.6	5.4	60.4	16.0	8.2				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	5.5	* 5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	15.3	* 22				
Max Q Clear Time (g_c+l1), s	0.0	5.0	2.0	3.2	2.4	6.5	10.5	2.3				
Green Ext Time (p_c), s	0.0	2.8	0.0	0.3	0.0	2.7	0.1	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			14.2									
HCM 2010 LOS			В									
Notes												

User approved pedestrian interval to be less than phase max green.

EAP (2017) Conditions - PM Peak Hour Urban Crossroads, Inc.

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<del> </del>	-√
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>*</b>	7	7	<b>^</b>						4	7
Volume (veh/h)	0	515	40	132	159	0	0	0	0	363	2	330
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	548	43	140	169	0				386	2	274
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	1124	478	578	2512	0				445	2	399
Arrive On Green	0.00	0.59	0.59	0.32	0.66	0.00				0.25	0.25	0.25
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1801	9	1615
Grp Volume(v), veh/h	0	548	43	140	169	0				388	0	274
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	9.9	1.4	6.8	1.9	0.0				24.6	0.0	18.5
Cycle Q Clear(g_c), s	0.0	9.9	1.4	6.8	1.9	0.0				24.6	0.0	18.5
Prop In Lane	0.00		1.00	1.00		0.00				0.99		1.00
Lane Grp Cap(c), veh/h	0	1124	478	578	2512	0				448	0	399
V/C Ratio(X)	0.00	0.49	0.09	0.24	0.07	0.00				0.87	0.00	0.69
Avail Cap(c_a), veh/h	0	1124	478	578	2512	0				701	0	626
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.96	0.96	0.99	0.99	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.3	17.5	30.1	7.2	0.0				43.3	0.0	40.9
Incr Delay (d2), s/veh	0.0	1.4	0.4	0.1	0.1	0.0				7.0	0.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.4	0.6	3.4	1.0	0.0				13.2	0.0	8.5
LnGrp Delay(d),s/veh	0.0	20.7	17.9	30.2	7.3	0.0				50.3	0.0	43.0
LnGrp LOS		С	В	С	А					D		D
Approach Vol, veh/h		591			309						662	
Approach Delay, s/veh		20.5			17.7						47.3	
Approach LOS		С			В						D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	43.8	41.0		35.2		84.8						
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5						
Max Green Setting (Gmax), s	22.5	* 36		46.5		62.5						
Max Q Clear Time (g_c+l1), s	8.8	11.9		26.6		3.9						
Green Ext Time (p_c), s	0.6	2.2		3.0		8.0						
Intersection Summary												
HCM 2010 Ctrl Delay			31.3									
HCM 2010 LOS			С									
Notes												

Notes

EAP (2017) Conditions - PM Peak Hour Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

	۶	<b>→</b>	•	•	<b>←</b>	•	•	<b>†</b>	<i>&gt;</i>	<b>\</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	, J	<b>^</b>			<b>^</b>	7		ર્ન	7			
Volume (veh/h)	349	529	0	0	268	439	22	1	120	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	392	594	0	0	301	468	25	1	26			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	427	2882	0	0	1874	796	276	11	256			
Arrive On Green	0.08	0.25	0.00	0.00	0.49	0.49	0.16	0.16	0.16			
Sat Flow, veh/h	1810	3800	0	0	3800	1614	1743	70	1615			
Grp Volume(v), veh/h	392	594	0	0	301	468	26	0	26			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1614	1813	0	1615			
Q Serve(g_s), s	25.8	14.8	0.0	0.0	5.2	24.8	1.5	0.0	1.7			
Cycle Q Clear(g_c), s	25.8	14.8	0.0	0.0	5.2	24.8	1.5	0.0	1.7			
Prop In Lane	1.00		0.00	0.00		1.00	0.96		1.00			
Lane Grp Cap(c), veh/h	427	2882	0	0	1874	796	287	0	256			
V/C Ratio(X)	0.92	0.21	0.00	0.00	0.16	0.59	0.09	0.00	0.10			
Avail Cap(c_a), veh/h	686	2882	0	0	1874	796	287	0	256			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.97	0.97	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	54.2	16.4	0.0	0.0	16.7	21.7	43.1	0.0	43.2			
Incr Delay (d2), s/veh	7.9	0.2	0.0	0.0	0.2	3.2	0.6	0.0	0.8			
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	13.9	7.9	0.0	0.0	2.8	11.8	8.0	0.0	0.8			
LnGrp Delay(d),s/veh	62.1	16.6	0.0	0.0	16.9	24.9	43.7	0.0	44.0			
LnGrp LOS	Е	В			В	С	D		D			
Approach Vol, veh/h		986			769			52				
Approach Delay, s/veh		34.7			21.8			43.9				
Approach LOS		С			С			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		96.0			31.8	64.2		24.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		91.0			45.5	42.0		19.0				
Max Q Clear Time (g_c+I1), s		16.8			27.8	26.8		3.7				
Green Ext Time (p_c), s		4.8			0.5	4.1		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			29.5									
HCM 2010 LOS			С									

EAP (2017) Conditions - PM Peak Hour Urban Crossroads, Inc.

### APPENDIX 6.2:

EAP (2017) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS



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					TRAFFIC COND	ITIONS E	EAP (2017)	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15	
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	<b>40</b> m	pł
Minor Street:	Driveway 1			_	Critical Approach	Speed (Minor)	<b>25</b> m	pł
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	la	ne
Major Street	Future ADT =		251	vpd	Minor Street	Future ADT =	<b>251</b> vp	od
Speed limit o	or critical speed o	·		`	• **	or	RURAL (R	)

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	equirements		
XX	KOTAL		EA	•		
	imum Vehicular Volume		EA I		Dor Dov	
		\/ab:alaa [	Day Day an	Vehicles Per Day		
<u>Satisfied</u>	Not Satisfied		Per Day on r Street	on Higher-Volume		
	XX				et Approach	
	ng traffic on each approach	(Total of Botl	n Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
1 <b>251</b>	1 <b>251</b>	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 - Interru			Vehicles	Per Day		
<u>Satisfied</u>	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume	
	XX	on Maj	or Street	_	et Approach	
Number of lanes for movi	ng traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural	
1 <b>251</b>	1 <b>251</b>	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 CONI	DITIONS	2 CONI	DITIONS	
No one condition satisfie		0%		0%		
fulfilled 80% of more	=					
	3% 2%					
	<b>5</b> % <b>2</b> %					

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS E	EAP (2017)	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15	
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	<b>40</b> m	pł
Minor Street:	Driveway 2			_	Critical Approach	Speed (Minor)	<b>25</b> m	pł
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	<b>1</b> la	ne
Major Street	Future ADT =		764	_vpd	Minor Street	Future ADT =	<b>262</b> vp	od
•	or critical speed o	•		`	• **	or	RURAL (R	)

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	aquiramente		
	KOKAL			•		
XX	.,		EA			
	mum Vehicular Volume			Vehicles Per Day		
<u>Satisfied</u>	Not Satisfied		Per Day on	on Higher-Volume		
	XX	Major	Street	Minor Stree	et Approach	
Number of lanes for movin	g traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
1 <b>764</b>	1 <b>262</b>	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 - Interrup			Vehicles	Per Day		
<u>Satisfied</u>	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume	
	XX	on Maj	or Street	Minor Stree	et Approach	
Number of lanes for movin	g traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
1 <b>764</b>	1 <b>262</b>	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					
<u>Satisfied</u>	Not Satisfied					
	XX	2 CONI	DITIONS	2 CONI	DITIONS	
No one condition satisfied	80	0%	80	0%		
fulfilled 80% of more	_AB_					
	10% 6%					

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS I	EAP (201	17)
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19	/15
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		<u></u>	Critical Approach	Speed (Major)	4	0 mpł
Minor Street:	Driveway 3				Critical Approach	Speed (Minor)	2	25 mpł
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	1	lane
Major Street	Future ADT =		1,339	_vpd	Minor Street	Future ADT =	313	vpd
·	or critical speed o	·		`	• *	or	RURAI	_ ·

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	aquiromente		
	NONAL			•		
XX			EA			
CONDITION A - Mir	nimum Vehicular Volume			Vehicles Per Day		
<u>Satisfied</u>	Not Satisfied	Vehicles I	Per Day on	on Higher-Volume		
	XX	Majoı	r Street	Minor Street Approach		
Number of lanes for mov	ing traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
<i>1</i> <b>1,339</b>	<i>1</i> 313	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 - Interru			Vehicles	s Per Day		
<u>Satisfied</u>	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume	
	XX	on Maj	or Street	Minor Stree	et Approach	
Number of lanes for mov	ing traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
1 <b>1,339</b>	<i>1</i> 313	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 o	f CONDITIONS A + B					
<u>Satisfied</u>	Not Satisfied					
	XX	2 CON	DITIONS	2 CONI	DITIONS	
No one condition satisfie	8	0%	80	0%		
fulfilled 80% of more	_					
	13% 11%					

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS E	EAP (2017)	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15	
Jurisdiction:	<b>County of River</b>	side		CHK		DATE		
Major Street:	Oleander Avenu	ıe		<u>-</u> _	Critical Approach	Speed (Major)	<b>40</b> mp	٦ŀ
Minor Street:	Decker Road			<u>-</u>	Critical Approach	Speed (Minor)	<b>25</b> mp	٦ŀ
Major Street	Approach Lanes	=	1	lane	Minor Street	Approach Lanes	<b>1</b> lar	16
Major Street	Future ADT =		1,702	vpd	Minor Street	Future ADT =	<b>51</b> vpc	d
·	or critical speed on ea of isolated con	·		- km/h (40 m		or	RURAL (R)	)

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	aguiromente		
·	NONAL			•		
XX			EA			
	inimum Vehicular Volume			Vehicles Per Day		
<u>Satisfied</u>	Not Satisfied		Per Day on	on Higher-Volume		
	XX	Majoi	r Street	Minor Street Approach		
Number of lanes for mo	ving traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
<i>1</i> 1,702	<i>1</i> <b>51</b>	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 - Inter			Vehicles	s Per Day		
Satisfied	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume	
	XX	on Maj	or Street	Minor Stree	et Approach	
Number of lanes for mo	ving traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
<i>1</i> <b>1,702</b>	<i>1</i> <b>51</b>	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					
	2 CON	DITIONS	2 CONI	DITIONS		
No one condition satisf	8	0%	80	0%		
fulfilled 80% of more	_					
	2% 4%					

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS E	EAP (2017)	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15	
Jurisdiction:	<b>County of River</b>	rside		CHK		DATE		
Major Street:	Oleander Avenu	ıe		_	Critical Approach	Speed (Major)	<b>40</b> m	pł
Minor Street:	Driveway 4			_	Critical Approach	Speed (Minor)	<b>25</b> m	pł
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	<b>1</b> la	ne
Major Street	Future ADT =		2,006	vpd	Minor Street	Future ADT =	<b>253</b> vp	od
Speed limit o	or critical speed on ea of isolated con	·		,	• **	or	RURAL (R	:)

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements					
<u></u>	KUKAL			•			
XX			EA				
CONDITION A - Mir	nimum Vehicular Volume			Vehicles Per Day			
<u>Satisfied</u>	Not Satisfied	Vehicles I	Per Day on	on Highe	er-Volume		
	XX	Majoı	r Street	Minor Stree	et Approach		
Number of lanes for mov	ing traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)		
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>		
1 <b>2,006</b>	1 <b>253</b>	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 - Interru	ption of Continuous Traffic			Vehicles	s Per Day		
<u>Satisfied</u>	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume		
	XX	on Maj	or Street	Minor Stree	et Approach		
Number of lanes for mov	ing traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)		
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>		
1 <b>2,006</b>	1 <b>253</b>	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 o	f CONDITIONS A + B						
<u>Satisfied</u>	Not Satisfied						
	2 CON	DITIONS	2 CONI	DITIONS			
No one condition satisfie	No one condition satisfied, but following conditions			80	0%		
	fulfilled 80% of more A B						
	11% 17%						

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS E	EAP (2017)
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE	
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	40 mpl
Minor Street:	Driveway 5			_	Critical Approach	Speed (Minor)	25 mpl
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	<b>1</b> lane
Major Street	Future ADT =		2,457	_vpd	Minor Street	Future ADT =	<b>197</b> vpd
Speed limit o	or critical speed o	n major stre	et traffic > 64	km/h (40 m	ph);		DUDAL (D)
In built up are	ea of isolated cor	nmunity of	< 10,000 popu	lation		or	RURAL (R)

#### (Based on Estimated Average Daily Traffic - See Note)

		Michael Devices						
<u>URBAN</u>	<u>RURAL</u>	Minimum Requirements						
XX			EA	DT				
CONDITION A -	Minimum Vehicular Volume			Vehicles	Per Day			
Satisfied	Not Satisfied	Vehicles	Per Day on	on Highe	er-Volume			
	XX	Majo	r Street	Minor Stree	et Approach			
Number of lanes for n	noving traffic on each approach	(Total of Bot	h Approaches)	(One Dire	ction Only)			
Major Street	Minor Street	Urban	Rural	<u>Urban</u>	Rural			
1 2,457	1 <b>197</b>	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 - Inte	erruption of Continuous Traffic		·	Vehicles	Per Day			
Satisfied	•			on Highe	er-Volume			
	XX	on Maj	jor Street	_	et Approach			
Number of lanes for n	noving traffic on each approach	(Total of Bot	h Approaches)	(One Direction Only)				
Major Street	Minor Street	Urban	Rural	<u> Urban</u>	Rural			
1 2,457	1 <b>197</b>	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			
Combinatio	n of CONDITIONS A + B		·	·	·			
Satisfied	Not Satisfied							
_	XX	2 CON	DITIONS	2 CONI	DITIONS			
No one condition sat	No one condition satisfied, but following conditions			80%				
	fulfilled 80% of more A B							
	8% 16%							

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



#### Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = EAP (2017) Conditions - Weekday PM Peak Hour

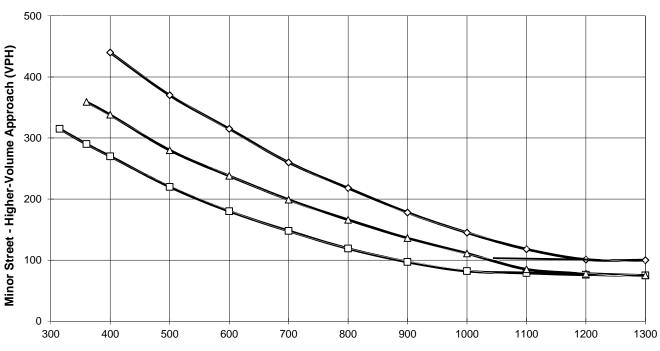
Major Street Name = Oleander Avenue Total of Both Approaches (VPH) = 199

Number of Approach Lanes Major Street = 2

Minor Street Name = Driveway 6 High Volume Approach (VPH) = 18

Number of Approach Lanes Minor Street = 1

### SIGNAL WARRANT NOT SATISFIED



Major Street - Total of Both Approaches (VPH)

1 Lane (Major) & 1 Lane (Minor)

2+ Lanes (Major) & 1 Lane (Minor) OR 1 Lane (Major) & 2+ Lanes (Minor)

2+ Lanes (Major) & 2+ Lanes (Minor)

Major Street Approaches

- - - Minor Street Approaches

\*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane



6.2-7

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## APPENDIX 6.3:

EAP (2017) CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS



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6/8/2015

	<b>→</b>	•	•	<b>←</b>	ļ	4
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	465	22	132	223	454	254
v/c Ratio	0.34	0.03	0.34	0.10	0.79	0.34
Control Delay	27.6	0.1	29.0	9.9	48.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	0.1	29.0	9.9	48.2	4.3
Queue Length 50th (ft)	126	0	38	28	322	0
Queue Length 95th (ft)	155	0	61	57	390	51
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	1385	738	387	2303	862	1001
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	16	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.03	0.34	0.10	0.53	0.25
Intersection Summary						

5/15/2015

### Queues

11: I-215 NB Off Ramp/I-215 NB On Ramp & Harley Knox. Blvd./Harley Knox Blvd.

	•	<b>→</b>	•	•	<b>†</b>	1
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	266	671	330	377	34	109
v/c Ratio	0.79	0.24	0.17	0.32	0.09	0.24
Control Delay	36.7	6.1	16.5	2.6	40.8	8.9
Queue Delay	0.1	0.6	0.0	0.0	0.0	0.0
Total Delay	36.8	6.7	16.5	2.6	40.8	8.9
Queue Length 50th (ft)	188	78	65	0	22	0
Queue Length 95th (ft)	200	115	103	53	51	49
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	577	2755	1967	1165	364	452
Starvation Cap Reductn	26	1618	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.59	0.17	0.32	0.09	0.24
Intersection Summary						

6/8/2015

	-	•	•	←	ļ	1
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	548	43	140	169	388	351
v/c Ratio	0.34	0.05	0.39	0.07	0.78	0.46
Control Delay	26.1	3.1	28.2	8.0	52.0	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	3.1	28.2	8.0	52.0	5.1
Queue Length 50th (ft)	140	0	34	18	280	0
Queue Length 95th (ft)	231	16	53	40	353	63
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	1604	844	356	2459	736	951
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	136	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.05	0.39	0.07	0.53	0.37
Intersection Summary						

5/15/2015

### Queues

11: I-215 NB Off Ramp/I-215 NB On Ramp & Harley Knox. Blvd./Harley Knox Blvd.

	٠	<b>→</b>	<b>←</b>	•	<b>†</b>	/
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	392	594	301	493	26	135
v/c Ratio	0.83	0.21	0.16	0.43	0.09	0.33
Control Delay	38.5	2.6	19.1	3.2	44.1	9.6
Queue Delay	0.2	0.3	0.0	0.0	0.0	0.0
Total Delay	38.6	2.9	19.1	3.2	44.1	9.6
Queue Length 50th (ft)	260	52	64	0	17	0
Queue Length 95th (ft)	307	2	103	60	44	54
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	720	2881	1826	1156	300	414
Starvation Cap Reductn	37	1616	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.47	0.16	0.43	0.09	0.33
Intersection Summary						

### APPENDIX 6.4:

EAP (2017) CONDITIONS BASIC FREEWAY SEGMENT ANALYSIS WORKSHEETS



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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour x Logistics Center Phase II TIA		Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Harley Knox Bl. s
	Logistics Cert		· ,		nning Data
✓ Oper.(LOS)			Des.(N)	∟Ріа	nning Data
<b>Flow Inputs</b> Volume, V AADT	2696	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.5 1)] 0.976	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance		ft ft	f <sub>LW</sub>		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performanc	e Measures	<b>3</b>	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF \times I)$ $x f_p)$ $S$ $D = v_p / S$	N x f <sub>HV</sub> 1001 70.0 14.3	pc/h/ln mph pc/mi/ln	Design (N) Design LOS  v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S	N x f <sub>HV</sub>	pc/h/ln mph
LOS	В		D = v <sub>p</sub> / S Required Number of Lanes	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т		
General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	I I-215 Southbound South of Harley Knox BI. Caltrans EAP (2017)	
Project Description Knox	Logistics Cen		, ,			
✓ Oper.(LOS)		L	Des.(N)	Piai	nning Data	
Flow Inputs Volume, V AADT	2284	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 3		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.985		
Speed Inputs			Calc Speed Adj and			
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed,	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph	
BFFS LOS and Performanc	e Measures	•	Design (N)			
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF \times I)$ $x f_p)$ $S$ $D = v_p / S$ $LOS$		pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Harley Knox Bl. s
	Logistics Cen	ter Phase II TI			. 5.
✓ Oper.(LOS)			Pes.(N)	⊔Pla	nning Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K	4280	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 4 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1582 68.3 23.2 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour x Logistics Center Phase II TIA		Highway/Direction of Trave From/To Jurisdiction Analysis Year		of Harley Knox Bl. s
	Logistics Cert		· ,	□ Die	nning Data
✓ Oper.(LOS)		L	Des.(N)	⊔Ріа	nning Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K	3891	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 4 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1438 69.3 20.7 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	gency or Company <i>Urban Crossroads, Inc.</i> ate Performed <i>5/18/2015</i>					
Project Description Knox	Logistics Cent	er Phase II TIA	A (JN 09347)			
✓ Oper.(LOS)			Des.(N)	Plar	nning Data	
Flow Inputs						
Volume, V AADT Peak-Hr Prop. of AADT, K	4036	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 5 0		
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.976		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width		ft				
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph	
Number of Lanes, N	3		f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	mph	
Base free-flow Speed, BFFS		mph		70.0	тіріі	
LOS and Performanc	e Measures		Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1499 69.0 21.7 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T			
General Information			Site Information				
Analyst CHS Agency or Company Urban Crossroads, Inc. Date Performed 5/18/2015 Analysis Time Period PM Peak Hour Project Description Knox Logistics Center Phase II TIA			Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	-215 Southbound South of Harley Knox Bl. Caltrans EAP (2017)		
	Logistics Cert		· ,	□ Die	nning Data		
✓ Oper.(LOS)		L	Des.(N)	∟Ріа	nning Data		
<i>Flow Inputs</i> Volume, V	3605	veh/h	Peak-Hour Factor, PHF	0.92			
AADT Peak-Hr Prop. of AADT, K		veh/day	%Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	4 0			
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi			
Calculate Flow Adjus	tments		·				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2			
Speed Inputs	1.5		Calc Speed Adj and				
Lane Width		ft	Oaic Opeea Auj and	115			
Rt-Side Lat. Clearance		ft	f		mph		
Number of Lanes, N	3		f <sub>LW</sub>		mph		
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph		
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph		
LOS and Performanc	e Measures	<b>3</b>	Design (N)				
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x location x f <sub>p</sub> ) S	N x f <sub>HV</sub> 1332 69.8	pc/h/ln mph	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$	N x f <sub>HV</sub>	pc/h/ln		
D = v <sub>p</sub> / S LOS	19.1 C	pc/mi/ln	S D = v <sub>p</sub> / S Required Number of Lanes	s, N	mph pc/mi/ln		
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т			
General Information			Site Information				
Analyst CHS Agency or Company Urban Crossroads, Inc. Date Performed 5/18/2015 Analysis Time Period PM Peak Hour Project Description Knox Logistics Center Phase II TIA			Highway/Direction of Trave From/To Jurisdiction Analysis Year	North o	orth of Harley Knox Bl.		
	Logistics Certi		· ,		naina Data		
✓ Oper.(LOS)		L	Des.(N)	Piai	nning Data		
<i>Flow Inputs</i> Volume, V	3434	veh/h	Peak-Hour Factor, PHF	0.92			
AADT		veh/day	%Trucks and Buses, $P_T$	5			
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi			
Calculate Flow Adjus	tments						
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2			
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.976			
Speed Inputs			Calc Speed Adj and	FFS			
Lane Width		ft					
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph		
Number of Lanes, N	3		f <sub>LC</sub>		mph		
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph		
FFS (measured)	70.0	mph	FFS	70.0	mph		
Base free-flow Speed, BFFS		mph					
LOS and Performanc	e Measures	;	Design (N)				
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x I	N x f		Design (N) Design LOS				
x t <sub>p</sub> )		pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln		
S	69.9	mph	S		mph		
$D = v_p / S$	18.2	pc/mi/ln	$D = v_p / S$		pc/mi/ln		
LOS	С		Required Number of Lanes	s, N	·		
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T			
General Information			Site Information				
Analyst CHS Agency or Company Urban Crossroads, Inc. Date Performed 5/18/2015 Analysis Time Period PM Peak Hour Project Description Knox Logistics Center Phase II TIA			Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	outh of Harley Knox Bl.		
	Logistics Cert		·		naina Data		
✓ Oper.(LOS)			Des.(N)	∟Ріа	nning Data		
<b>Flow Inputs</b> Volume, V AADT	2900	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 3			
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi			
Calculate Flow Adjus	tments						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.985			
Speed Inputs			Calc Speed Adj and				
Lane Width Rt-Side Lat. Clearance		ft ft	f <sub>LW</sub>		mph		
Number of Lanes, N	3		f <sub>LC</sub>		mph		
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph		
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph		
LOS and Performanc	e Measures	6	Design (N)				
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1066 70.0 15.2 B	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln		
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

## APPENDIX 6.5:

EAP (2017) CONDITIONS FREEWAY MERGE/DIVERGE ANALYSIS WORKSHEETS



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		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET			
General Infor	mation	TO UM	<u> </u>	Site Infor		,				
Agency or Company Urban Crossroads, Inc. J Date Performed 5/19/2015 J				reeway/Dir of Tounction unction urisdiction nalysis Year						
Project Description				ilaly313 TCal		LAI (Z	011)			
Inputs			(* * * * * * * * * * * * * * * * * * *							
Upstream Adj R	lamp	Freeway Num Ramp Numbe	ber of Lanes, N	3 1					Downstrea Ramp	am Adj
□Yes	On	I '	ane Length, L <sub>A</sub>	'					✓ Yes	<b>☑</b> On
✓ No	Off	Deceleration L Freeway Volu	ane Length L <sub>D</sub>	195 2696					□No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	523					L <sub>down</sub> =	1420 ft
V <sub>u</sub> = v	eh/h	1	-Flow Speed, $S_{FF}$ ow Speed, $S_{FR}$	70.0 45.0					V <sub>D</sub> =	111 veh/h
Conversion t	o pc/h Und	der Base (	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	2696	0.92	Level	5	0	0.	976	1.00	30	004
Ramp	523	0.92	Level	19	0	0.	913	1.00	6	22
UpStream	444	0.00		07		<del>                                     </del>	004	4.00	4	07
DownStream	111	0.92	Level	27	0	0.	881	1.00	1	37
Estimation or		Merge Areas			Estimat	tion o	f V <sub>40</sub>	Diverge Areas		
		/ D \						.\/ + (\/ \/	\D	
	V <sub>12</sub> = V <sub>F</sub>		40.7)		L _			V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>		
L <sub>EQ</sub> =		ation 13-6 or			L <sub>EQ</sub> = (Equation 13-12 or 13-13)					
P <sub>FM</sub> =	_	Equation (E	=xhibit 13-6)		P <sub>FD</sub> = 0.656 using Equation (Exhibit 13-7)					
V <sub>12</sub> =	pc/h				$V_{12} = 2185 \text{ pc/h}$					
V <sub>3</sub> or V <sub>av34</sub>		-	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub> 819 pc/h (Equation 13-14 or 13-17)					
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70					Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\checkmark$ No					
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5			-16, 13-18, or		Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes No pc/h (Equation 13-16, 13-18, or 13-					
If Yes,V <sub>12a</sub> =	13-19)				If Yes,V <sub>12a</sub>		19			,
Capacity Che	ecks				Capacit	ty Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	_	pacity	LOS F?
					V <sub>F</sub>		3004	Exhibit 13-8	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	<sub>F</sub> - V <sub>R</sub>	2382	Exhibit 13-8	7200	No
					$V_R$		622	Exhibit 13-1	0 2100	No
Flow Entering	g Merge In	fluence A	rea		Flow E	nterin	g Dive	rge Influen	ce Area	
	Actual	<del>-</del>	Desirable	Violation?		/	Actual	Max Desirat	ole	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	2	2185	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (i	if not F)		Level o	f Serv	∕ice De	terminatio	n (if not	<b>F</b> )
D <sub>R</sub> = 5.475 + 0.	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			$D_R = 4$	1.252 + 0	.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/In	1)				$D_R = 2$	1.3 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = C	(Exhil	oit 13-2)			
Speed Deterr	nination				Speed I	Deter	minatio	on		
M <sub>S</sub> = (Exibit 1							xhibit 13-			
	nibit 13-11)						(Exhibit			
	nibit 13-11)				1		(Exhibit			
l	nibit 13-13)				1		(Exhibit	13-13)		
pyright © 2014 Univer	sity of Florida, All	Rights Reserve	ed .		HCS2010 <sup>™</sup>	Version	n 6.65	Ge	enerated: 5/1	9/2015 10:07

General Infori		O 7 (11B	IVAIIII OOII	CTIONS W		<u> </u>			
				Site Infor					
Analyst	CHS			reeway/Dir of Tr		-215 Southbou			
Agency or Company		an Crossroads, I		unction		Harley Knox On	і-Катр		
Date Performed		/2015		urisdiction		Caltrans			
Analysis Time Period		Peak Hour		nalysis Year	L	EAP (2017)			
Project Description	Knox Logistics	Center Phase	1 HA (JN 09347)						
Inputs		Transcon Nicoral	an af Lamas N					1	
Jpstream Adj Ramp		Freeway Numb		3				Downstre	am Adj
		Ramp Number	of Lanes, N	1				Ramp	
✓ Yes ☐ On		Acceleration La	ane Length, L <sub>A</sub>	260				□Yes	On
□ No ☑ Off	·	Deceleration L	ane Length L <sub>D</sub>						
		Freeway Volun	ne, V <sub>⊏</sub>	2173				✓ No	Off
- <sub>up</sub> = 1420 1	ft	Ramp Volume,		111				L <sub>down</sub> =	ft
ир			Flow Speed, S <sub>FF</sub>	70.0				1	
$v_{u} = 523 \text{ ve}$	eh/h							V <sub>D</sub> =	veh/h
		Ramp Free-Flo	. 117	45.0					
Conversion to		<u>der Base C</u>	Conditions	•	1	-i-			
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>n</sub>
Freeway	2173	0.92	Level	1	0	0.995	1.00	<b></b>	2374
Ramp	111	0.92	Level	27	0	0.993	1.00		137
Ramp UpStream	523	0.92		19	0		1.00		622
	523	0.92	Level	19	U	0.913	1.00		022
DownStream		Merge Areas					Diverge Areas		
Estimation of		Merge Areas			Fstimati	on of v <sub>12</sub>	Diverge Areas		
-3umation of					LStillati	011 01 112			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> :	= V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	)P <sub>ED</sub>	
- <sub>EQ</sub> =	604.19	(Equation 1	3-6 or 13-7)		L <sub>EQ</sub> =	12	(Equation 13		3)
P <sub>FM</sub> =	0.585	using Equati	on (Exhibit 13-6	)			using Equation		,
/ <sub>12</sub> =	1388	pc/h			P <sub>FD</sub> =			on (Exhibit i	J-1 )
			13-14 or 13-		V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$	17)	(= 4.5.0.0.0			V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation		7)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,700	0 pc/h? 🗌 Ye	es 🗹 No				-	☐ Yes ☐ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2 <b>☑</b> Ye	es 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	$_4 > 1.5 * V_{12}/2$	☐ Yes ☐ No		
		pc/h (Equation	n 13-16. 13-		If Yes,V <sub>12a</sub> =		pc/h (Equation	n 13-16, 1	3-18, or
		13-19)	,		12a		13-19)		
.20		10 10)							
.20		10 10)			Capacity	/ Checks			
.20			apacity	LOS F?	Capacity	/ Checks Actua	al Ca	pacity	LOS F?
.20	cks		apacity	LOS F?		1	al Ca Exhibit 13-		LOS F?
Capacity Che	<b>cks</b> Actual	Ca	apacity		V <sub>F</sub>	Actua	Exhibit 13-	8	LOS F?
120	cks		apacity	LOS F?	V <sub>F</sub> V <sub>FO</sub> = V <sub>F</sub> -	Actua	Exhibit 13- Exhibit 13-	8	LOS F?
Capacity Che	<b>cks</b> Actual	Ca	apacity		V <sub>F</sub>	Actua	Exhibit 13-	8	LOS F?
Capacity Che	Actual 2511	Ci Exhibit 13-8			$V_F$ $V_{FO} = V_F$ $V_R$	- V <sub>R</sub>	Exhibit 13- Exhibit 13- Exhibit 13 10	8	
fYes,V <sub>12a</sub> =  Capacity Che  V <sub>FO</sub>	Actual 2511  2511  2511	Exhibit 13-8	rea	No	$V_F$ $V_{FO} = V_F$ $V_R$	- V <sub>R</sub>	Exhibit 13- Exhibit 13- Exhibit 13- 10  erge Influer	8 8 	
Capacity Che  V <sub>FO</sub> Flow Entering	Actual 2511	Exhibit 13-8  offluence A  Max E	<b>rea</b> Desirable		$V_F$ $V_{FO} = V_F \cdot V_R$	- V <sub>R</sub>	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 10  erge Influer Max Des	8 8 	
V <sub>FO</sub>	Actual  2511  2511  Merge In  Actual  1525	Exhibit 13-8  Diffuence A  Max E  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow End	Actual	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8	8 8 8 8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9	Violation
Capacity Che  V <sub>FO</sub> Flow Entering  V <sub>R12</sub> Level of Servi	Actual 2511  2511  Merge In Actual 1525  ice Detern	Exhibit 13-8  Influence A  Max E  Exhibit 13-8  Exhibit 13-8	rea Desirable 4600:All <b>f not F)</b>	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow End $V_{12}$ Level of	Actual  Actual  Actual  Service D	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 10 Erge Influer Max Des Exhibit 13-8	8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Violation
V <sub>FO</sub> Flow Entering  V <sub>R12</sub> Level of Servi	Actual 2511  2511  7 Merge In Actual 1525  6 Ce Detern 0.00734 v R + +	Exhibit 13-8  Diffuence A  Max E  Exhibit 13-8	rea Desirable 4600:All <b>f not F)</b>	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow Enter $V_{12}$ Level of	Actual  tering Div Actual  Service D  D <sub>R</sub> = 4.252 +	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8	8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $D_R = 15.7 \text{ (pc/mi)}$	Actual 2511  2511  2511  Actual 1525  Ce Deterr  0.00734 v R + 4	Exhibit 13-8  Influence A  Max E  Exhibit 13-8  Influence (i	rea Desirable 4600:All <b>f not F)</b>	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow End $V_{12}$ Level of $D_{R} = (pc)$	Actual  tering Div Actual  Service D OR = 4.252 + c/mi/ln)	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 10 Erge Influer Max Des Exhibit 13-8	8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $O_R = 15.7 \text{ (pc/mi)}$ $O_R = 8 \text{ (Exhibit } 10 \text{ (pc.)}$	Actual  2511	Exhibit 13-8  Influence A  Max E  Exhibit 13-8  Influence (i	rea Desirable 4600:All <b>f not F)</b>	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow End $V_{12}$ Level of $D_{R} = (pc)$	Actual  tering Div Actual  Service D  D <sub>R</sub> = 4.252 +	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- 10 Erge Influer Max Des Exhibit 13-8	8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $D_R = 15.7 \text{ (pc/min)}$	Actual  2511	Exhibit 13-8  Influence A  Max E  Exhibit 13-8  Influence (i	rea Desirable 4600:All <b>f not F)</b>	No Violation?	$V_{FO} = V_{F}$ $V_{RO} = V_{FO}$ $V_{RO} = V_{FO}$ $V_{RO} = V_{RO}$ $V_{RO} = V_$	Actual  tering Div Actual  Service D OR = 4.252 + c/mi/ln)	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8	8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 10.00$ $D_R = 15.7 \text{ (pc/mi)}$	Actual  2511  2511  2511  2 Merge In  Actual  1525  ice Detern  0.00734 v R + 1  i/ln)  13-2)  nination	Exhibit 13-8  Influence A  Max E  Exhibit 13-8  Influence (i	rea Desirable 4600:All <b>f not F)</b>	No Violation?	$V_F$ $V_{FO} = V_F \cdot V_R$ Flow Entrol $V_{12}$ Level of $D_R = (p_0 \cdot p_0 \cdot p_0)$ LOS = (E.	Actual  Actual  Actual  Service D  R = 4.252 + c/mi/ln)  xhibit 13-2)	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8	8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 15.7 \text{ (pc/mi)}$ $OS = B \text{ (Exhibit '}$ Speed Determ $M_S = 0.316 \text{ (Exit)}$	Actual  2511  2511  2511  2511  Actual 1525  ice Deterr  0.00734 v <sub>R</sub> + 1  i/ln)  13-2)  nination  bit 13-11)	Exhibit 13-8  Max E Exhibit 13-8  mination (i 0.0078 V <sub>12</sub> - 0.0	rea Desirable 4600:All <b>f not F)</b>	No Violation?	V <sub>F</sub>   V <sub>FO</sub> = V <sub>F</sub>   V <sub>R</sub>     V <sub>12</sub>     Level of   D <sub>R</sub> = (po LOS = (E. Speed D D <sub>S</sub> = (E. Speed D D D D D D D D D D D D D D D D D D	Actual  tering Div Actual  Service D O <sub>R</sub> = 4.252 + c/mi/ln) xhibit 13-2)  eterminat chibit 13-12)	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8 Exhibit 13- Exhibit 13	8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $OS = B$ (Exhibit 1)  Speed Determ $M_S = 0.316$ (Exit 5) $C_R = 61.2$ mph (	Actual  2511  2511  2511  2511  2511  261  Actual  1525  262  262  273  274  275  275  275  275  275  275  275	Exhibit 13-8  Max E Exhibit 13-8  mination (i 0.0078 V <sub>12</sub> - 0.0	rea Desirable 4600:All <b>f not F)</b>	No Violation?	$\begin{array}{c} V_F \\ V_{FO} = V_F \\ V_R \end{array}$ Flow End $\begin{array}{c} V_{12} \\ Level \ of \\ D_R = (poly \\ LOS = (E \\ Speed \ D \\ S_R = mp \end{array}$	Actual  tering Div. Actual  Service D  R = 4.252 + c/mi/ln)  xhibit 13-2) teterminat  chibit 13-12) ch (Exhibit 13-1:	Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13- Exhibit 13-8 Exhibit 13- Exhibit	8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Violation
Capacity Che $V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $OS = B$ (Exhibit 1)  Speed Determ $M_S = 0.316$ (Exit 5) $C_R = 61.2$ mph (6) $C_R = 68.3$ mph (7)	Actual  2511  2511  2511  2511  Actual 1525  ice Deterr  0.00734 v <sub>R</sub> + 1  i/ln)  13-2)  nination  bit 13-11)	Exhibit 13-8  Max E Exhibit 13-8  Exhibit 13-8  Mination (i 0.0078 V <sub>12</sub> - 0.0	rea Desirable 4600:All <b>f not F)</b>	No Violation?	$\begin{array}{c c} & V_F \\ \hline V_{FO} = V_F - \\ \hline V_R \\ \hline \end{array}$	Actual  tering Div Actual  Service D O <sub>R</sub> = 4.252 + c/mi/ln) xhibit 13-2)  eterminat chibit 13-12)	Exhibit 13- Exhibit 13-8	8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Violation

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Genera	l Info		IVIF 3 AND	RAMP JUN			_ <u>_</u>			
	ii intori				Site Infor					
Analyst	0	CHS			reeway/Dir of Tr		I-215 Northboun			
Agency or (			ın Crossroads, lı		unction		Harley Knox On	-Ramp		
Date Perfoi			/2015		urisdiction		Caltrans			
	me Period		Peak Hour		nalysis Year		EAP (2017)			
	scription	Knox Logistics	S Center Phase I	I TIA (JN 09347)						
nputs			Freeway Numb	or of Lanca N	2				r	
Jpstream A	Adj Ramp		1		3				Downstre	am Adj
4 37			Ramp Number	of Lanes, N	1				Ramp	
✓ Yes	☐ On		Acceleration La	ane Length, L <sub>A</sub>	300				□Yes	On
☐ No	✓ Off		Deceleration La	ane Length L <sub>D</sub>						
	<u> </u>		Freeway Volun	ne, V₌	3778				✓ No	Off
- <sub>up</sub> =	1395 f	t	Ramp Volume,		502				L <sub>down</sub> =	ft
ир				Flow Speed, S <sub>FF</sub>						
/ <sub>u</sub> =	113 ve	h/h							$V_D =$	veh/h
			Ramp Free-Flo	. 117	45.0					
Conver	rsion to		der Base C	Conditions			_			
(pc	/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
reeway		3778	0.92	Level	3	0	0.985	1.00		4168
			+		+	+	<del>-</del>	+	<del>                                     </del>	
Ramp UpStream		502	0.92	Level	14	0	0.935	1.00	<del>                                     </del>	584
<u>'</u>		113	0.92	Level	13	0	0.939	1.00	-	131
DownStrea	am [		Merge Areas		1	<del> </del>		Diverge Areas		
etima	tion of		Weige Aleas			Fetimati	ion of v <sub>12</sub>	Diverge Areas		
-Suma	tion or					LStillati	011 01 V <sub>12</sub>			
		$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	= V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>ED</sub>	
EQ =		1101.5	3 (Equation	13-6 or 13-7)		l =	12	(Equation 13-		13)
P <sub>FM</sub> =		0.586	using Equati	on (Exhibit 13-6	j)	L <sub>EQ</sub> =		using Equation		•
/ <sub>12</sub> =		2442		•	•	P <sub>FD</sub> =			ו ווטונ ו	J-1)
				n 13-14 or 13	_	V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$		17)	po (=quane			$V_3$ or $V_{av34}$		pc/h (Equation 1	13-14 or 13-	17)
Is V <sub>3</sub> or V <sub>a</sub>	<sub>0v34</sub> > 2,700	) pc/h?   Ye	s 🗹 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 2,700 pc/h?	☐ Yes ☐ No		
		V <sub>12</sub> /2				Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5 * V <sub>12</sub> /2	☐ Yes ☐ No		
			pc/h (Equatio	n 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
Yes,V <sub>12a</sub>	=		13-19)			11 100, v 12a		13-19)		
Capaci	ty Che	cks	·			Capacity	y Checks			
_		Actual	Ca	apacity	LOS F?		Actua	l Car	pacity	LOS F?
						V <sub>F</sub>	i i	Exhibit 13-	_	
						$V_{FO} = V_{F}$	- V	Exhibit 13-		
V <sub>F</sub>	•o	4752	Exhibit 13-8		No		- VR	Exhibit 13		
						$V_R$		10	-	
low F	nterino	Morgo Ir	ifluence A	roa		Flow En	tering Div	erge Influen	co Area	)
JOW L	iiig	Actual	1	esirable	Violation?	, IOW LII	Actual	Max Desi		Violation
V <sub>R</sub>		3026	Exhibit 13-8	4600:All	No	V <sub>12</sub>	/ totalai	Exhibit 13-8		FIGIALIOITS
					1 140		Convios D		n (if not	! <b></b>
			nination (i					eterminatio		: <i>)</i>
			0.0078 V <sub>12</sub> - 0.0	0021 L <sub>A</sub>			• •	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
	26.9 (pc/mi	/ln)				$D_R = (p$	c/mi/ln)			
.OS = (	C (Exhibit 1	3-2)				LOS = (E	xhibit 13-2)			
.03 - (	Determ	ination				Speed D	eterminat	ion		
						<del>  '                                   </del>	xhibit 13-12)			
Speed		M <sub>S</sub> = 0.374 (Exibit 13-11)								
<b>Speed</b> M <sub>S</sub> = 0	0.374 (Exib	· ·	~							
Speed A M <sub>S</sub> = 0 S <sub>R</sub> = 5	0.374 (Exib 59.5 mph (I	Exhibit 13-11)				S <sub>R</sub> = m <sub>r</sub>	ph (Exhibit 13-12			
<b>Speed</b> $M_S = 0$ $S_R = 0$ $S_0 = 0$	0.374 (Exib 59.5 mph (I 65.6 mph (I	Exhibit 13-11) Exhibit 13-11)				S <sub>R</sub> = mr	ph (Exhibit 13-12 ph (Exhibit 13-12	2)		
<b>Speed</b> 1 <sub>S</sub> = 0 1 <sub>R</sub> = 5 1 <sub>O</sub> = 6	0.374 (Exib 59.5 mph (I 65.6 mph (I	Exhibit 13-11)				S <sub>R</sub> = mr	ph (Exhibit 13-12	2)		

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		RAMP	S AND RAM	MP JUNCTI	ONS WO	RKS	HEET					
General Infor	mation			Site Infor			· ·					
Analyst CHS Freeway/Dir of T Agency or Company Urban Crossroads, Inc. Junction							orthbound Knox Off-F	lamp				
Date Performed	5/19/	•		urisdiction		Caltran			•			
Analysis Time Period	d AM F	eak Hour	A	nalysis Year		EAP (2	017)					
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)									
Inputs		•							1			
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes. N	3 1					Downstrea Ramp	am Adj		
Yes	On		ane Length, L <sub>A</sub>						✓ Yes	<b>☑</b> On		
✓ No	Off	Deceleration L Freeway Volu	ane Length L <sub>D</sub>	280 3891					□No	Off		
L <sub>up</sub> = f	t	Ramp Volume	, V <sub>R</sub>	113					L <sub>down</sub> =	1395 ft		
V,, = v	eh/h		-Flow Speed, $S_{FF}$	70.0					V <sub>D</sub> =	502 veh/h		
· u	011/11	Ramp Free-Fl	ow Speed, S <sub>FR</sub>	45.0					Б			
Conversion t	o pc/h Und	der Base (	Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_HV$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>		
Freeway	3891	0.92	Level	4	0	0.	980	1.00	43	14		
Ramp	113	0.92	Level	13	0	0.	939	1.00	1;	31		
UpStream									_			
DownStream	502	0.92	Level	14	0	0.	935	1.00	58	34		
Estimation of		Merge Areas			Estimat	tion o	<u> </u>	iverge Areas				
Estillation of					LSuma	1011 0						
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	$V_R + (V_F - V_F)$	<sub>R</sub> )P <sub>FD</sub>			
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> = (Equation 13-12 or 13-13)							
P <sub>FM</sub> =	using	Equation (E	Exhibit 13-6)		P <sub>FD</sub> = 0.646 using Equation (Exhibit 13-7)							
V <sub>12</sub> =	pc/h				V <sub>12</sub> = 2834 pc/h							
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub> 1480 pc/h (Equation 13-14 or 13-17)							
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h?	s 🗌 No			Is V <sub>3</sub> or V <sub>av34</sub> > 2,700 pc/h? ☐ Yes ☑ No							
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5					Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes $\checkmark$ No							
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub>			c/h (Equation	13-16, 13-	-18, or 13-		
Capacity Che	ecks				Capacit	ty Ch	ecks					
	Actual	C	apacity	LOS F?			Actual	Са	pacity	LOS F?		
					$V_{F}$		4314	Exhibit 13-8	7200	No		
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{FO}$	V <sub>R</sub>	4183	Exhibit 13-8	7200	No		
					$V_R$		131	Exhibit 13-1	0 2100	No		
Flow Entering	n Merae In	fluence A	rea				a Dive	rge Influen				
TOW EMENTS	Actual		Desirable	Violation?	1 1011 21	_	Actual	Max Desirab		Violation?		
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		834	Exhibit 13-8	4400:AII	No		
Level of Serv	ice Detern		if not F)		+	f Serv	ice De	terminatio				
$D_R = 5.475 + 0.1$		•						.0086 V <sub>12</sub> - 0.	-			
D <sub>R</sub> = (pc/mi/ln	• • • • • • • • • • • • • • • • • • • •	12	-A			6.1 (pc		12 0	_D			
LOS = (Exhibit	,				I		oit 13-2)					
,						•						
Speed Deterr					Speed I							
$M_S = (Exibit 1)$							xhibit 13-					
S <sub>R</sub> = mph (Exh	nibit 13-11)						(Exhibit					
	nibit 13-11)				$S_0 = 7$	4.9 mph	(Exhibit	13-12)				
S = mph (Exh	nibit 13-13)				S = 6	5.4 mph	(Exhibit	13-13)				
pyright © 2014 Univer	sity of Florida, All	Rights Reserve			HCS2010 <sup>™</sup>	Version	6.65	Ge	enerated: 5/19	9/2015 10:09		

		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET			
General Infor	mation			Site Infor			· · ·			
Analyst Agency or Company	CHS	n Crossroads,		reeway/Dir of Trunction			outhbound Knox Off-F			
Date Performed	5/19/	2015	J	urisdiction		Caltran	S			
Analysis Time Period		Peak Hour		nalysis Year		EAP (2	017)			
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		1							1	
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes, N	3 1					Downstrea Ramp	am Adj
Yes	On		ane Length, L <sub>A</sub>						✓ Yes	<b>☑</b> On
✓ No	Off	Deceleration L Freeway Volu	∟ane Length L <sub>D</sub> me. V₋	195 4036					□No	Off
L <sub>up</sub> = f	t	Ramp Volume	, V <sub>R</sub>	578					L <sub>down</sub> =	1420 ft
V,, = v	eh/h		-Flow Speed, $S_{FF}$	70.0					V <sub>D</sub> =	148 veh/h
<b>.</b>			ow Speed, S <sub>FR</sub>	45.0					5	
Conversion to	o pc/h Und	der Base (	Conditions		-					
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	$x f_{HV} x f_{p}$
Freeway	4036	0.92	Level	5	0	0.	976	1.00	44	.97
Ramp	578	0.92	Level	14	0	0.	935	1.00	6	72
UpStream	440	0.00	<u> </u>	40	<del>                                     </del>		000	4.00	4.	7.4
DownStream	148	0.92	Level	13	0	0.	939	1.00	17	/1
Estimation of		Merge Areas			Estima	tion o		Diverge Areas		
LStillation of					LStilla	1011 0				
	$V_{12} = V_{F}$							$V_R + (V_F - V_F)$		
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-1	2 or 13-13	)
P <sub>FM</sub> =	using	Equation (E	Exhibit 13-6)		P <sub>FD</sub> =		0.	617 using Eq	uation (Exhi	bit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		30	)31 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		$V_3$ or $V_{av34}$		14	l66 pc/h (Equ	ation 13-14	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,70$					Is V <sub>3</sub> or V <sub>a</sub>	<sub>v34</sub> > 2,7	00 pc/h? [	☐Yes ☑No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5	* V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>a</sub>	<sub>v34</sub> > 1.5	* V <sub>12</sub> /2	☐Yes ☑No		
If Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub>	=		c/h (Equation	13-16, 13-	-18, or 13-
Capacity Che	13-19)	)			Capacia		19 ocks	9)		
Capacity Cite	Actual	1 0	apacity	LOS F?	Tapacii	ly CIII	Actual	Ca	pacity	LOS F?
	Actual	<del>† ĭ</del>	apacity	LOGIE	V <sub>F</sub>		4497	Exhibit 13-8		No No
V		Exhibit 13-8			V <sub>FO</sub> = V		3825	Exhibit 13-8	+	No
V <sub>FO</sub>		LAHIDIL 13-0								<del>-  </del>
	<u> </u>	<u> </u>			V <sub>R</sub>		672	Exhibit 13-1		No
Flow Entering				1 15 1 5 0	Flow E	_		rge Influen		1.5.1.5.0
.,,	Actual	1	Desirable	Violation?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	$\overline{}$	Actual	Max Desirat	r	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		3031	Exhibit 13-8	4400:All	No
Level of Serv		•			Level o			terminatio		F)
$D_R = 5.475 + 0.$	• • •	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			$D_R = 4$	.252 + 0	.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 2$	8.6 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = [	(Exhil	oit 13-2)			
Speed Determ	nination				Speed	Deter	minatio	on		
M <sub>S</sub> = (Exibit 1							xhibit 13-			
	nibit 13-11)						(Exhibit			
	nibit 13-11)				1 '		(Exhibit			
S = mph (Exh	nibit 13-13)				S = 6	4.1 mph	(Exhibit	13-13)		
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Ha Ca EA	15 Southbour Inley Knox On Iltrans IP (2017)  f HV  0.985  0.939  0.935  N of V 12  V 12 =		Ramp  Yes  No $L_{down} = V_D = V'PH$ $V = V'PH$ $V = V'PH$ 3-12 or 13	ream Adj  On Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
Ha Ca EA	f <sub>HV</sub> 0.985 0.939 0.935	f <sub>p</sub> 1.00 1.00 1.00  Diverge Areas  V <sub>R</sub> + (V <sub>F</sub> - V (Equation 13)	Ramp  Yes  No $L_{down} = V_D = V'PH$ $V = V'PH$ $V = V'PH$ 3-12 or 13	☐ On ☐ Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
Ca EA	f <sub>HV</sub> 0.985 0.939 0.935	f <sub>p</sub> 1.00 1.00 1.00  Diverge Areas  V <sub>R</sub> + (V <sub>F</sub> - V (Equation 13)	Ramp  Yes  No $L_{down} = V_D = V'PH$ $V = V'PH$ $V = V'PH$ 3-12 or 13	☐ On ☐ Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
oRv )	f <sub>HV</sub> 0.985 0.939 0.935	1.00 1.00 1.00 Diverge Areas	Ramp  Yes  No $L_{down} = V_D = V'PH$ $V = V'PH$ $V = V'PH$ 3-12 or 13	☐ On ☐ Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
nRv ) ) )	f <sub>HV</sub> 0.985 0.939 0.935	1.00 1.00 1.00 Diverge Areas	Ramp  Yes  No $L_{down} = V_D = V'PH$ $V = V'PH$ $V = V'PH$ 3-12 or 13	☐ On ☐ Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	Ramp  Yes  No $L_{down} = V_D = V'PH$ $V = V'PH$ $V = V'PH$ 3-12 or 13	☐ On ☐ Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	Ramp  Yes  No $L_{down} = V_D = V'PH$ $V = V'PH$ $V = V'PH$ 3-12 or 13	☐ On ☐ Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	Ramp  Yes  No $L_{down} = V_D = V'PH$ $V = V'PH$ $V = V'PH$ 3-12 or 13	☐ On ☐ Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	Yes  V No  L <sub>down</sub> =  V = V/Pł  V = V/Pł  A-12 or 13	Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	No $L_{down} = V_D = V = V/PI$ $V_B = V/PI$ $V_B = V = V/PI$ $V_B = V = V/PI$ $V_B = V/PI$ $V_B = V/PI$ $V_$	Off ft veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	$L_{down} = V_{D} = V = V/PH$ $V = V/PH$ $V$	ft veh/h HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	$L_{down} = V_{D} = V = V/PH$ $V = V/PH$ $V$	ft veh/h HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	V <sub>D</sub> = V/PH	veh/h  HF x f <sub>HV</sub> x f <sub>p</sub> 3814  171  672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	V <sub>D</sub> = V/PH	HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	v = V/PH	HF x f <sub>HV</sub> x f <sub>p</sub> 3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	/ <sub>R</sub> )P <sub>FD</sub> 3-12 or 13	3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	/ <sub>R</sub> )P <sub>FD</sub> 3-12 or 13	3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	/ <sub>R</sub> )P <sub>FD</sub> 3-12 or 13	3814 171 672
matio	0.985 0.939 0.935 n of v <sub>12</sub>	1.00 1.00 1.00 Diverge Areas	′ <sub>R</sub> )P <sub>FD</sub> 3-12 or 13	171 672
matio	0.939 0.935 n of v <sub>12</sub>	1.00 1.00 Diverge Areas V <sub>R</sub> + (V <sub>F</sub> - V (Equation 13)	′ <sub>R</sub> )P <sub>FD</sub> 3-12 or 13	171 672
matio	0.935 n of v <sub>12</sub>	1.00  Diverge Areas  V <sub>R</sub> + (V <sub>F</sub> - V (Equation 13)	′ <sub>R</sub> )P <sub>FD</sub> 3-12 or 13	672
matio	n of v <sub>12</sub>	Diverge Areas  V <sub>R</sub> + (V <sub>F</sub> - V (Equation 13)	′ <sub>R</sub> )P <sub>FD</sub> 3-12 or 13	
		· V <sub>R</sub> + (V <sub>F</sub> - V (Equation 13	′ <sub>R</sub> )P <sub>FD</sub> 3-12 or 13	-13)
		· V <sub>R</sub> + (V <sub>F</sub> - V (Equation 13	′ <sub>R</sub> )P <sub>FD</sub> 3-12 or 13	-13)
		(Equation 13	3-12 or 13	-13)
,	V <sub>12</sub> =	(Equation 13	3-12 or 13	-13)
,	12	(Equation 13	3-12 or 13	-13)
,		` .		10)
,		using Equal		13 7)
,		n a /la	IOII (EXIIIDIL	10-1)
		pc/h		
/ <sub>av34</sub>		pc/h (Equation		3-17)
		☐ Yes ☐ No		
or V <sub>av34</sub> >		☐ Yes ☐ No		
V <sub>12a</sub> =		pc/h (Equati	on 13-16,	13-18, or
12a		13-19)		
acity (	Checks			
	Actua	l C	apacity	LOS F?
V <sub>F</sub>		Exhibit 13	3-8	
	/_	Exhibit 13	3-8	
	· K			
$V_R$		10	<sup>3-</sup>	
v Ente	rina Dive	erae Influe	nce Are	 a
<u> </u>	Actual			Violation
/12		1		1
	ervice D			)
				<i>,,,,</i>
	•	u.uuoo v <sub>12</sub> -	0.009 L <sub>D</sub>	
(Exh	nibit 13-2)			
ed De	terminat	ion		
1 L- AIII	•	P)		
•	(Fxhihit 13-1)	-/		
mph	•	)\		
mph mph	•			
	V <sub>R</sub> V Enter  V <sub>12</sub> el of S  (pc/  (pc/  (Exh	$V_F$ $= V_F - V_R$ $V_R$ Actual $V_{12}$ el of Service D $D_R = 4.252 + 4.25$	$V_F$ Exhibit 13 $V_R$ Exhibit 13-8 $V_R$ Exhibit 13-8 $V_R$ Exhibit 13-8 $V_R$ Exhibit 13-8 $V_R$ Exhibit 13-9	$V_F$ Exhibit 13-8 $V_R$ Exhibit 13-8 $V_R$ Exhibit 13-8 $V_R$ Exhibit 13-10 $V_R$ Exhibit 13-10 $V_R$ Exhibit 13-10 $V_R$ Exhibit 13-10 $V_R$ Exhibit 13-8 $V_R$ Exhibit 13-12

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Canarallat		MPS AND	INAMII JUN			<u> </u>			
General Inf				Site Infor					
Analyst	CH			reeway/Dir of Tr		-215 Northboun			
Agency or Compa	-	an Crossroads, I		unction		Harley Knox On-	-Ramp		
Date Performed		9/2015		urisdiction		Caltrans			
Analysis Time Pe		Peak Hour		Analysis Year	ŀ	EAP (2017)			
	on Knox Logistic	cs Center Phase	I HA (JN 09347)						
nputs		Francisco Mumb	per of Lanes, N	2					
Jpstream Adj Ra	mp			3				Downstre	am Adj
	0:-	Ramp Number	of Lanes, N	1				Ramp	
✓ Yes	On	Acceleration La	ane Length, L <sub>A</sub>	300				☐Yes	On
_No ✓	Off	Deceleration L	ane Length L <sub>D</sub>					✓ No	□ <b>0</b> "
	<b></b>	Freeway Volur	ne, V <sub>F</sub>	2772				INO INO	Off
<sub>rup</sub> = 139	5 ft	Ramp Volume		663				L <sub>down</sub> =	ft
<b>-</b>			Flow Speed, S <sub>FF</sub>						
/ <sub>u</sub> = 129	veh/h							V <sub>D</sub> =	veh/h
		Ramp Free-Flo	· 11X	45.0					
Conversion	to pc/h Ui	ider Base (	Conditions	1	1	Ī		1	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHI	x f <sub>HV</sub> x f <sub>p</sub>
reeway	2772	0.92	Level	2	0	0.990	1.00		3043
Ramp	663	0.92	Level	13	0	0.939	1.00		767
UpStream	129	0.92	Level	10	0	0.952	1.00		147
DownStream	129	0.92	Level	10	0	0.932	1.00		147
Downstream		Merge Areas		l			Diverge Areas		
stimation	of v.o	morgo / mode			Estimati	on of v <sub>12</sub>	2110190711000		
		. (D. )							
	v <sub>12</sub> = v	<sub>F</sub> (P <sub>FM</sub> )				V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>FD</sub>	
- <sub>EQ</sub> =	899.9	4 (Equation 1	3-6 or 13-7)		L <sub>EQ</sub> =	· <del>-</del>	(Equation 13-	12 or 13-1	(3)
P <sub>FM</sub> =	0.586	using Equati	on (Exhibit 13-6	6)	P <sub>FD</sub> =		using Equatio		•
′ <sub>12</sub> =	1783	pc/h			V <sub>12</sub> =		pc/h	(=/	• . ,
/ <sub>3</sub> or V <sub>av34</sub>	1260	pc/h (Equation	n 13-14 or 13	i <b>-</b>			•	0.44 40 4	(7)
	17)				V <sub>3</sub> or V <sub>av34</sub>	. 0.700 # 0	pc/h (Equation 1	3-14 OF 13-	17)
Is $V_3$ or $V_{av34} > 2$	2,700 pc/h? 🗌 Y	es 🗹 No				-	Yes No		
Is $V_3$ or $V_{av34} > 1$	1.5 * V <sub>12</sub> /2 📝 Y	es 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>		☐ Yes ☐ No		
Yes,V <sub>12a</sub> =	1783	pc/h (Equation	n 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equation 13-19)	n 13-16, 1	3-18, or
120		r 13-19)					13-19)		
Capacity C	hecks				Capacity	/ Checks			
	Actual	Ci	apacity	LOS F?		Actua		acity	LOS F?
					$V_{F}$		Exhibit 13-8	3	
$V_{FO}$	3810	Exhibit 13-8		No	V <sub>FO</sub> = V <sub>F</sub>	- V <sub>R</sub>	Exhibit 13-8	3	
- FO	00.0	Example 10 0					Exhibit 13-	-	
					V <sub>R</sub>		10		
Flow Enter	ing Merge l	nfluence A	rea		Flow En	tering Dive	erge Influen	ce Area	1
	Actual	Max [	Desirable	Violation?		Actual	Max Desi	rable	Violation
$V_{R12}$	2550	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
	rvice Deter	mination (i	f not F)	_		Service D	eterminatio	n (if not	<i>F</i> )
	'5 + 0.00734 v <sub>R</sub> +						0.0086 V <sub>12</sub> - 0.		•
	oc/mi/ln)	12	А			c/mi/ln)	- 12	U	
	· ·								
•	ibit 13-2)				<u> </u>	xhibit 13-2)			
speed Dete	ermination				<del>  '                                   </del>	eterminati	on		
$M_{\rm S} = 0.344$ (	(Exibit 13-11)				,	khibit 13-12)			
	ph (Exhibit 13-11	)			S <sub>R</sub> = mp	h (Exhibit 13-12	2)		
<sub>R</sub> = 60.4 m	pri (Exilibit 10-11	/							
					S <sub>0</sub> = mp	h (Exhibit 13-12	2)		
<sub>0</sub> = 67.3 m	ph (Exhibit 13-11 ph (Exhibit 13-13 ph (Exhibit 13-13	)			1 '	oh (Exhibit 13-12 oh (Exhibit 13-13			

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		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET			
General Info	rmation			Site Infor						
Analyst Agency or Company Date Performed		n Crossroads,	Inc. J	reeway/Dir of Trunction unction urisdiction	avel	Harley	Northbound Knox Off-F			
Analysis Time Perio	5/19/ d PM F	eak Hour		nalysis Year		Caltrai EAP (2				
Project Description				inaryolo roar		L/11 (2	-017)			
Inputs			( /							
Upstream Adj F	Ramp	Freeway Num Ramp Numbe	nber of Lanes, N	3					Downstre Ramp	eam Adj
□Yes	On	I '	Lane Length, L <sub>A</sub>	ı					✓ Yes	<b>☑</b> On
✓ No	Off		Lane Length L <sub>D</sub>	280					□No	Off
L <sub>up</sub> =	ft	Freeway Volune Ramp Volume	•	2900 129					L <sub>down</sub> =	1395 ft
V <sub>u</sub> = v	reh/h	1	e-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	70.0 45.0					V <sub>D</sub> =	663 veh/h
Conversion t	to no/h l ln		111	45.0						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	fp	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	2900	0.92	Level	3	0	0	.985	1.00	3	199
Ramp	129	0.92	Level	10	0	$\overline{}$	.952	1.00		147
UpStream										
DownStream	663	0.92	Level	13	0	0	.939	1.00		767
Estimation o		Merge Areas			Ectimo	tion (	[	Diverge Areas		
Estimation o					Estima	lion (				
L <sub>EQ</sub> =	V <sub>12</sub> = V <sub>F</sub> (Equa	(P <sub>FM</sub> ) ition 13-6 or	13-7)		L <sub>EQ</sub> =			= V <sub>R</sub> + (V <sub>F</sub> - Equation 13		3)
P <sub>FM</sub> =	-	Equation (			P <sub>FD</sub> =			673 using E		
V <sub>12</sub> =	pc/h	, ,	,		V <sub>12</sub> =			202 pc/h		,
V <sub>3</sub> or V <sub>av34</sub>	•	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			97 pc/h (Eqi	uation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,70$		-	,			> 2.7		☐Yes ☑ N		, , ,
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5								_Yes ☑N		
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub>		ŗ	oc/h (Equation 9)		3-18, or 13-
Capacity Che	ecks				Capaci	ty Ch	ecks	,		
	Actual		Capacity	LOS F?			Actual		Capacity	LOS F3
					V <sub>F</sub>	•	3199	Exhibit 1	3-8 7200	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V	<sub>F</sub> - V <sub>R</sub>	3052	Exhibit 1	3-8 7200	No
					$V_R$	!	147	Exhibit 13	-10 2100	No
Flow Enterin	g Merge In	fluence A	\rea	•	Flow E	nterir	ng Dive	rge Influe	nce Area	1
	Actual		Desirable	Violation?		_	Actual	Max Desi		Violation?
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>		2202	Exhibit 13-8	4400:All	No
Level of Serv	rice Detern	nination (	if not F)		Level o	f Ser	vice De	terminati	on (if not	: <b>F</b> )
$D_R = 5.475 + 0$	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> ·	- 0.00627 L <sub>A</sub>			$D_R = 4$	4.252 + 0	.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/lr	1)				$D_R = 2$	20.7 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = C	C (Exhi	bit 13-2)			
Speed Deteri	mination				Speed	Deter	minatio	on		
M <sub>S</sub> = (Exibit 1					<del> </del>		xhibit 13			
	nibit 13-11)					31.3 mpl	n (Exhibit	13-12)		
	nibit 13-11)						n (Exhibit			
	nibit 13-13)				1		i n (Exhibit			
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### APPENDIX 7.1:

EAPC (2017) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS



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Е	11	Е	n	Λ	1	Е
O.	/	5	ız	U	ч	Э

Intersection							
Int Delay, s/veh	0						
Doing for ton							
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	0	0	16	0	0	7	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-		- -	None	
Storage Length	-	-	100	-	0	-	
Veh in Median Storage, #	0	_	-	0	2	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	0	0	0	0	0	0	
Mvmt Flow	0	0	17	0	0	8	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	0	0	35	0	
Stage 1	-	-	-	-	0	-	
Stage 2	_	_	_	_	35	_	
Critical Hdwy	-	_	4.1	_	6.4	6.2	
Critical Hdwy Stg 1	-	_	-	_	5.4	-	
Critical Hdwy Stg 2	-	_	-	-	5.4	-	
Follow-up Hdwy	-	-	2.2	-	3.5	3.3	
Pot Cap-1 Maneuver	-	-	-	-	983	-	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	993	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	-	-	983	-	
Mov Cap-2 Maneuver	-		-	-	942	-	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	993	-	
Approach	EB		WB		NB		
HCM Control Delay, s	0						
HCM LOS					-		
Minor Lane/Major Mvmt	NBLn1 EBT	EBR	WBL WBT				
Capacity (veh/h)		-					
HCM Lane V/C Ratio		-					
HCM Control Delay (s)		_					
HCM Lane LOS		-					
HCM 95th %tile Q(veh)		-					
/ 5 / 5 6 2 ( 1011)							

Int Delay, S/veh	Intersection								
Movement		4.8							
Vol, veh/h         7         0         28         16         0         12           Conflicting Peds, #/hr         0         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         -         None         -         None         -         None           Storage Length         -         -         100         -         0         -         None           Veh in Median Storage, #         0         -         -         0         2         -         None           Grade, %         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0 <td> 2 0.037 0. 1011</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	2 0.037 0. 1011								
Vol, veh/h         7         0         28         16         0         12           Conflicting Peds, #/hr         0         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         -         None         -         None         -         None           Storage Length         -         -         100         -         0         -         None           Veh in Median Storage, #         0         -         -         0         2         -         None           Grade, %         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0 <td>Movement</td> <td></td> <td>EBT</td> <td>EBR</td> <td></td> <td>WBL</td> <td>WBT</td> <td>NB</td> <td>L NBF</td>	Movement		EBT	EBR		WBL	WBT	NB	L NBF
Sign Control         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - None         - None         - None         None           Storage Length         0         0         0         2         - Grade           Veh In Median Storage, #         0<	Vol, veh/h		7	0		28	16		0 12
Sign Control         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - None         - None         - None           Storage Length         0         0         0           Veh in Median Storage, #         0 0         0         0           Grade, %         0 0         0         0           Peak Hour Factor         92         92         92         92           92         92         92         92         92           92         92         92         92         92           92         92         92         92         92           Major/Minor         Major         Major         Minor         1           Stage 1	Conflicting Peds, #/hr		0	0		0	0		0 (
Storage Length			Free	Free		Free	Free	Sto	p Stop
Veh in Median Storage, #         0         -         -         0         2         -         Grade, %         0         -         -         0         0         -         -         0         0         -         -         0         0         0         0         0         -         -         0         8         8         8         8         8         8         8         8         8         8         8         8         8         9         8         8         9         8         9         2         1         4         1         4         6         2         2         2         1 <t< td=""><td>RT Channelized</td><td></td><td>-</td><td>None</td><td></td><td>-</td><td>None</td><td></td><td>- None</td></t<>	RT Channelized		-	None		-	None		- None
Grade, %         0         -         0         0         -           Peak Hour Factor         92         92         92         92         92         92           Heavy Vehicles, %         0         13         0         13         0	Storage Length		-	-		100	-		0
Peak Hour Factor         92         93         93         93         93         93         93         93         93         93         93         93         93         93         93         94	Veh in Median Storage, #	#	0	-		-	0		2
Heavy Vehicles, %	Grade, %		0	-		-			0
Mymmt Flow         8         0         30         17         0         13           Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         8         0         86         8           Stage 1         -         -         -         -         8         -           Stage 2         -         -         -         -         78         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         2.2         -         3.5         3.3           Plance         Stg 2         -         -         1.2         -			92	92		92			
Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         8         0         86         8           Stage 1         -         -         -         -         8         -           Stage 2         -         -         -         -         78         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Follow-up Hdwy         -         -         2.2         -         3.5         3.3           Pot Cap-1 Maneuver         -         -         1625         920         1080           Stage 1         -         -         -         -         -         -           Platoon blocked, %         -         -         -         -         -         -         -           Mov Cap-1 Maneuver         -         -         1625         903         1080         -         -         -         -         -         -         -									
Conflicting Flow All 0 0 0 8 0 86 8 Stage 1 8 - 8 Stage 2 8	Mvmt Flow		8	0		30	17		0 13
Conflicting Flow All 0 0 0 8 0 86 8 Stage 1 8 - 8 Stage 2 8									
Conflicting Flow All	Major/Minor	M	ajor1		N	lajor2		Minor	1
Stage 1       -       -       -       78       -         Stage 2       -       -       -       78       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       1625       -       920       1080         Stage 1       -       -       -       -       1020       -         Stage 2       -       -       -       -       950       -         Platoon blocked, %       -       -       -       -       -         Mov Cap-1 Maneuver       -       -       1625       -       903       1080         Mov Cap-2 Maneuver       -       -       -       -       883       -         Stage 1       -       -       -       -       932       -         Approach       EB       WB       WB       WB				0			0	8	6 8
Stage 2       -       -       -       -       78       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       1625       -       920       1080         Stage 1       -       -       -       -       -       950       -         Platoon blocked, %       -       -       -       -       -       -       -         Mov Cap-1 Maneuver       -       -       1625       -       903       1080         Mov Cap-2 Maneuver       -       -       -       -       883       -         Stage 1       -       -       -       -       903       1080         Mov Cap-2 Maneuver       -       -       -       -       903       1080         Stage 2       -       -       -       -       -       932       -									
Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       1625       -       920       1080         Stage 1       -       -       -       -       1020       -         Stage 2       - <td< td=""><td></td><td></td><td>-</td><td>-</td><td></td><td>-</td><td>-</td><td></td><td></td></td<>			-	-		-	-		
Critical Hdwy Stg 1       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       1625       -       920       1080         Stage 1       -       -       -       -       1020       -         Stage 2       -       -       -       -       950       -         Platoon blocked, %       - <t< td=""><td></td><td></td><td>-</td><td>-</td><td></td><td>4.1</td><td>-</td><td></td><td></td></t<>			-	-		4.1	-		
Critical Hdwy Stg 2       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       1625       -       920       1080         Stage 1       -       -       -       -       1020       -         Stage 2       -       -       -       -       950       -         Platoon blocked, %       -       -       -       -       -       -         Mov Cap-1 Maneuver       -       -       -       -       883       -       -         Mov Cap-2 Maneuver       -       -       -       -       883       -       -       1020       -       -       Stage 1       -       -       -       1020       -       -       -       932       -       -       -       -       932       -			-	-		-	-	5.	4
Follow-up Hdwy 2.2 - 3.5 3.3  Pot Cap-1 Maneuver 1625 - 920 1080  Stage 1 1625 - 920 1080  Stage 2 1020 - Stage 2 - 950 - Platoon blocked, %  Mov Cap-1 Maneuver 1625 - 903 1080  Mov Cap-2 Maneuver 1625 - 903 1080  Mov Cap-2 Maneuver 1625 - 903 1080  Mov Cap-2 Maneuver 932 - 1020 - Stage 2 - 932 - 1020 - Stage 2 A			-	-		-	-	5.	4
Stage 1       -       -       -       -       950       -         Platoon blocked, %       - <td< td=""><td></td><td></td><td>-</td><td>-</td><td></td><td></td><td>-</td><td></td><td></td></td<>			-	-			-		
Stage 2       -       -       -       950       -         Platoon blocked, %       -       -       -       -       -         Mov Cap-1 Maneuver       -       -       1625       -       903       1080         Mov Cap-2 Maneuver       -       -       -       -       883       -         Stage 1       -       -       -       -       1020       -         Stage 2       -       -       -       -       932       -         Approach       EB       WB       NB         HCM Control Delay, s       0       4.6       8.4         HCM Los       A       -       1625       -         Minor Lane/Major Mvmt       NBLn1       EBT       EBR       WBL       WBT         Capacity (veh/h)       1080       -       -       1625       -         HCM Lane V/C Ratio       0.012       -       0.019       -         HCM Control Delay (s)       8.4       -       -       7.3       -         HCM Lane LOS       A       -       -       A       -	Pot Cap-1 Maneuver		-	-		1625	-	92	0 1080
Platoon blocked, %       -       -       -         Mov Cap-1 Maneuver       -       -       1625       -       903       1080         Mov Cap-2 Maneuver       -       -       -       -       883       -         Stage 1       -       -       -       -       1020       -         Stage 2       -       -       -       -       932       -         Approach       EB       WB       NB         HCM Control Delay, s       0       4.6       8.4         HCM LoS       A       -       1625       -         Minor Lane/Major Mvmt       NBLn1       EBT       EBR       WBL       WBT         Capacity (veh/h)       1080       -       -       1625       -         HCM Lane V/C Ratio       0.012       -       0.019       -         HCM Control Delay (s)       8.4       -       -       7.3       -         HCM Lane LOS       A       -       -       A       -			-	-		-	-		
Mov Cap-1 Maneuver         -         -         1625         -         903         1080           Mov Cap-2 Maneuver         -         -         -         -         883         -           Stage 1         -         -         -         -         1020         -           Stage 2         -         -         -         -         932         -           Approach         EB         WB         NB         NB           HCM Control Delay, s         0         4.6         8.4           HCM LOS         A         -         -         1625         -           Capacity (veh/h)         1080         -         -         1625         -           HCM Lane V/C Ratio         0.012         -         -         0.019         -           HCM Control Delay (s)         8.4         -         -         7.3         -           HCM Lane LOS         A         -         -         A         -			-	-		-	-	95	0
Mov Cap-2 Maneuver         -         -         -         883         -           Stage 1         -         -         -         -         1020         -           Stage 2         -         -         -         -         932         -           Approach         EB         WB         NB           HCM Control Delay, s         0         4.6         8.4           HCM LOS         A         A    Minor Lane/Major Mvmt  NBLn1  EBT  EBR  WBL  WBT  Capacity (veh/h)  1080  - 1625  - HCM Lane V/C Ratio 0.012  - 0.019  - HCM Control Delay (s)  8.4  - 7.3  - HCM Lane LOS  A  - A  - A  - A  - A  - A  - A  - B  NB  NB  NB  NB  NB  NB  NB  NB  NB			-	-			-		
Stage 1         -         -         -         -         932         -           Approach         EB         WB         NB           HCM Control Delay, s         0         4.6         8.4           HCM LOS         A         A    Minor Lane/Major Mvmt  NBLn1  EBT  EBR  WBL  WBT  Capacity (veh/h)  1080  - 1625  - HCM Lane V/C Ratio 0.012  - 0.019  - HCM Control Delay (s)  8.4  - 7.3  - HCM Lane LOS  A  - A  - A  - A  - TA  - TA			-	-		1625	-		
Stage 2         -         -         -         -         932         -           Approach         EB         WB         NB           HCM Control Delay, s         0         4.6         8.4           HCM LOS         A         A             Minor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           Capacity (veh/h)         1080         -         -         1625         -           HCM Lane V/C Ratio         0.012         -         0.019         -           HCM Control Delay (s)         8.4         -         -         7.3         -           HCM Lane LOS         A         -         -         A         -			-	-		-	-		
Approach         EB         WB         NB           HCM Control Delay, s         0         4.6         8.4           HCM LOS         A         A             Minor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           Capacity (veh/h)         1080         -         -         1625         -           HCM Lane V/C Ratio         0.012         -         -         0.019         -           HCM Control Delay (s)         8.4         -         -         7.3         -           HCM Lane LOS         A         -         -         A         -			-	-		-	-		
HCM Control Delay, s	Stage 2		-	-		-	-	93	2
HCM Control Delay, s									
HCM Control Delay, s	Approach		EB			WB		NI	3
Minor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           Capacity (veh/h)         1080         -         -         1625         -           HCM Lane V/C Ratio         0.012         -         -         0.019         -           HCM Control Delay (s)         8.4         -         -         7.3         -           HCM Lane LOS         A         -         -         A         -									
Minor Lane/Major Mvmt         NBLn1         EBT         EBR         WBL         WBT           Capacity (veh/h)         1080         -         -         1625         -           HCM Lane V/C Ratio         0.012         -         -         0.019         -           HCM Control Delay (s)         8.4         -         -         7.3         -           HCM Lane LOS         A         -         -         A         -									
Capacity (veh/h)       1080       -       -       1625       -         HCM Lane V/C Ratio       0.012       -       -       0.019       -         HCM Control Delay (s)       8.4       -       -       7.3       -         HCM Lane LOS       A       -       -       A       -									
Capacity (veh/h) 1080 1625 -  HCM Lane V/C Ratio 0.012 0.019 -  HCM Control Delay (s) 8.4 7.3 -  HCM Lane LOS A A -	Minor Lane/Maior Mymt	NBLn1	EBT	EBR	WBL	WBT			
HCM Lane V/C Ratio       0.012       -       -       0.019       -         HCM Control Delay (s)       8.4       -       -       7.3       -         HCM Lane LOS       A       -       -       A       -									
HCM Control Delay (s) 8.4 7.3 - HCM Lane LOS A A -									
HCM Lane LOS A A -									
110m 70m 70m 2(10m) 0 U.I	HCM 95th %tile Q(veh)	0	_	-	0.1	_			

Intersection							
Int Delay, s/veh	2.6						
Movement	EB	EBR	1	WBL	WBT	NBL	NBR
Vol, veh/h	20	0		23	44	0	10
Conflicting Peds, #/hr	(	0		0	0	0	0
Sign Control	Free	e Free		Free	Free	Stop	Stop
RT Channelized		- None		-	None	-	None
Storage Length				50	-	0	-
Veh in Median Storage, #	(			-	0	2	-
Grade, %	(			-	0	0	-
Peak Hour Factor	92			92	92	92	92
Heavy Vehicles, %	(			0	0	0	0
Mvmt Flow	22	2 0		25	48	0	11
Major/Minor	Major <sup>2</sup>	1	Ma	ajor2		Minor1	
Conflicting Flow All	(			22	0	120	22
Stage 1				-	-	22	-
Stage 2				-	-	98	-
Critical Hdwy				4.1	-	6.4	6.2
Critical Hdwy Stg 1				-	-	5.4	-
Critical Hdwy Stg 2				-	-	5.4	-
Follow-up Hdwy				2.2	-	3.5	3.3
Pot Cap-1 Maneuver			•	1607	-	880	1061
Stage 1				-	-	1006	-
Stage 2				-	-	931	-
Platoon blocked, %					-		
Mov Cap-1 Maneuver			•	1607	-	866	1061
Mov Cap-2 Maneuver				-	-	866	-
Stage 1				-	-	1006	-
Stage 2				-	-	917	-
Approach	EF	}		WB		NB	
HCM Control Delay, s	(			2.5		8.4	
HCM LOS						A	
Minor Lane/Major Mvmt	NBLn1 EB	T EBR	WBL \	WBT			
Capacity (veh/h)			1607	-			
HCM Lane V/C Ratio	0.01		0.016	-			
HCM Control Delay (s)	8.4	- -	7.3	-			
HCM Lane LOS	0.4 A	 	7.5 A	-			
HCM 95th %tile Q(veh)	•		0	-			
FIGIVI 75111 /ottle Q(VeII)	U		U	-			

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Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	30	0	1	67	0	0	0	4	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	<u>.</u>	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	33	0	1	73	0	0	0	4	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	73	0	0	33	0	0	108	108	33	110	108	73
Stage 1	-	_	-	-	_	-	33	33	-	75	75	_
Stage 2	-	-	-	-	-	-	75	75	-	35	33	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1540	-	-	1592	-	-	876	786	1046	873	786	995
Stage 1	-	-	-	-	-	-	988	872	-	939	836	-
Stage 2	-	-	-	-	-	-	939	836	-	986	872	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1540	-	-	1592	-	-	876	786	1046	869	786	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	881	785	-	878	784	-
Stage 1	-	-	-	-	-	-	988	872	-	939	835	-
Stage 2	-	-	-	-	-	-	938	835	-	982	872	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			8.5			0		
HCM LOS							А			А		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR WBL	WBT	WBR S	SBLn1					
Capacity (veh/h)	1046	1540		- 1592	_	-	-					
HCM Lane V/C Ratio	0.004	-	-	- 0.001	-	-	-					
HCM Control Delay (s)	8.5	0	-	- 7.3	-	-	0					
HCM Lane LOS	A	A	-	- A	_	-	A					
HCM 95th %tile Q(veh)	0	0	-	- 0	-	-	-					
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Intersection								
Int Delay, s/veh	1.4							
in Doidy erron								
Movement		EBT	EBR		WBL	WBT	NBL	NBR
Vol, veh/h		34	0		16	68	0	7
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control		Free	Free		Free	Free	Stop	Stop
RT Channelized		-	None		-	None	-	None
Storage Length		-	-		50	-	0	-
Veh in Median Storage, #	!	0	-		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		37	0		17	74	0	8
Major/Minor		/lajor1		. M	1ajor2		Minor1	
Conflicting Flow All		0	0		37	0	146	37
Stage 1		-	-		-	-	37	
Stage 2		-	-		-	-	109	_
Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4	-
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		1587	-	851	1041
Stage 1		-	-		-	-	991	-
Stage 2		-	-		-	-	921	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-		1587	-	842	1041
Mov Cap-2 Maneuver		-	-		-	-	856	-
Stage 1		-	-		-	-	991	-
Stage 2		-	-		-	-	911	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			1.4		8.5	
HCM LOS							A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT			
Capacity (veh/h)	1041	-		1587	-			
HCM Lane V/C Ratio	0.007	_		0.011	-			
HCM Control Delay (s)	8.5	-	-	7.3	-			
HCM Lane LOS	A	-	-	A	-			
HCM 95th %tile Q(veh)	0	-	-	0	-			
` '								

Intersection								
Int Delay, s/veh	1.5							
in Boldy, 5/Von	1.0							
Movement	E	ЕВТ	EBR	V	NBL	WBT	NBL	NBR
Vol, veh/h		41	0		21	84	0	9
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control	F	ree	Free	F	ree	Free	Stop	Stop
RT Channelized		-	None		-	None	-	None
Storage Length		-	-		100	-	0	-
Veh in Median Storage, #	!	0	-		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	
Mvmt Flow		45	0		23	91	0	10
Major/Minor	Maj	jor1		Ma	jor2		Minor1	
Conflicting Flow All		0	0		45	0	182	45
Stage 1		-	-		-	-	45	-
Stage 2		-	-		-	-	137	_
Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4	-
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-	1	576	-	812	1031
Stage 1		-	-		-	-	983	-
Stage 2		-	-		-	-	895	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-	1	576	-	800	1031
Mov Cap-2 Maneuver		-	-		-	-	828	-
Stage 1		-	-		-	-	983	-
Stage 2		-	-		-	-	882	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			1.5		8.5	
HCM LOS							A	
= 2								
Minor Lane/Major Mvmt	NBLn1 E	BT	EBR	WBL V	VBT			
Capacity (veh/h)	1031	-		1576	-			
HCM Lane V/C Ratio	0.009	-		0.014	-			
HCM Control Delay (s)	8.5	_	_	7.3	_			
HCM Lane LOS	A	-	-	Α.	_			
HCM 95th %tile Q(veh)	0	_	_	0	_			
1.5.W 7501 70016 Q(VOII)	U			U				

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBI	. NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	51	0	30	105	2	(		13	3	0	0
Conflicting Peds, #/hr	0	0	0	0	0	3	(	-	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None			None	-	-	None
Storage Length	100	-	-	100	-	-			-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-		- 2	-	-	2	-
Grade, %	-	0	-	-	0	-		- 0	-	-	0	-
Peak Hour Factor	67	67	92	67	67	67	6		67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	(		0	0	0	0
Mvmt Flow	0	76	0	45	157	3	(	) 0	19	4	0	0
Major/Minor	Major1			Major2			Minor <sup>*</sup>			Minor2		
Conflicting Flow All	160	0	0	76	0	0	324		79	334	324	158
Stage 1	-		-	-	-	-	76		-	248	248	-
Stage 2	-	_	-	-	-	-	248		-	86	76	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1		6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1		-	6.1	5.5	_
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1		-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	5 4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1432	-	-	1536	-	-	633	596	987	623	597	893
Stage 1	-	-	-	-	-	-	938	836	-	760	705	-
Stage 2	-	-	-	-	-	-	760	704	-	927	836	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1432	-	-	1532	-	-	619	578	985	596	579	893
Mov Cap-2 Maneuver	-	-	-	-	-	-	690	638	-	692	635	-
Stage 1	-	-	-	-	-	-	938	836	-	760	684	-
Stage 2	-	-	-	-	-	-	738	683	-	906	836	-
-												
Approach	EB			WB			NE	2		SB		
HCM Control Delay, s	0			1.6			8.7			10.2		
HCM LOS	U			1.0			J.			В		
HOW LOS										D.		
Minor Lang/Major Mumat	NDI 51	EBL	EBT	EBR WBL	WBT	WBR S	CDI n1					
Minor Lane/Major Mvmt	NBLn1					WDK						
Capacity (veh/h)	985	1432	-	- 1532	-	-	692					
HCM Control Dolay (s)	0.02	-	-	- 0.029	-	-	0.006					
HCM Long LOS	8.7	0	-	- 7.4	-	-	10.2					
HCM OF the Post in Columbia	A	A	-	- A	-	-	В					
HCM 95th %tile Q(veh)	0.1	0	-	- 0.1	-	-	0					

		<b>→</b>	•	•	<b>←</b>	•	•	<b>†</b>	<i>&gt;</i>	<b>&gt;</b>	ļ	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1,4	<b>^</b>	7	ሻሻ	<b>^</b>	7	7	<b>↑</b>	77	7	<b>∱</b> ∱	
Volume (veh/h)	0	21	8	534	45	17	8	5	487	8	6	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	25	8	636	54	20	10	6	207	10	7	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	3	1311	580	534	2035	900	22	579	984	22	1158	0
Arrive On Green	0.00	0.35	0.35	0.15	0.54	0.54	0.01	0.30	0.30	0.01	0.30	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1680	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	25	8	636	54	20	10	6	207	10	7	0
Grp Sat Flow(s),veh/h/ln	1810	1900	1680	1810	1900	1680	1810	1900	1615	1810	1900	0
Q Serve(g_s), s	0.0	0.5	0.3	15.5	0.7	0.6	0.6	0.2	5.0	0.6	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.5	0.3	15.5	0.7	0.6	0.6	0.2	5.0	0.6	0.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	3	1311	580	534	2035	900	22	579	984	22	1158	0
V/C Ratio(X)	0.00	0.02	0.01	1.19	0.03	0.02	0.46	0.01	0.21	0.46	0.01	0.00
Avail Cap(c_a), veh/h	172	1311	580	534	2035	900	86	579	984	86	1158	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.97	0.97	0.97	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	22.7	22.6	44.7	11.5	11.5	51.5	25.5	27.1	51.5	25.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	102.8	0.0	0.0	5.5	0.0	0.5	5.5	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	0.0	0.2	0.2	15.3	0.4	0.3	0.3	0.1	2.3	0.3	0.1	0.0
LnGrp Delay(d),s/veh	0.0	22.7	22.7	147.6	11.5	11.5	57.0	25.5	27.6	57.0	25.4	0.0
LnGrp LOS		С	С	F	В	В	Е	С	С	Е	С	
Approach Vol, veh/h		33			710			223			17	
Approach Delay, s/veh		22.7			133.4			28.9			44.0	
Approach LOS		С			F			С			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	41.7	5.8	37.5	0.0	61.7	5.8	37.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	15.5	32.5	5.0	32.0	5.0	43.0	5.0	32.0				
Max Q Clear Time (g_c+l1), s	17.5	2.5	2.6	2.1	0.0	2.7	2.6	7.0				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.4	0.0	0.3	0.0	0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			104.4									
HCM 2010 LOS			F									

EAPC (2017) Conditions - AM Peak Hour Urban Crossroads, Inc.

	•	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b>+</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	₽		ሻ	₽		ሻ	<b>∱</b> β		ሻ	<b>^</b>	7
Volume (veh/h)	80	0	19	0	0	1	20	430	3	2	412	127
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	96	0	22	0	0	1	24	518	4	2	496	153
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	123	0	230	2	0	39	45	2571	20	5	2510	1067
Arrive On Green	0.07	0.00	0.14	0.00	0.00	0.02	0.03	0.68	0.68	0.00	0.66	0.66
Sat Flow, veh/h	1810	0	1615	1810	0	1615	1810	3766	29	1810	3800	1615
Grp Volume(v), veh/h	96	0	22	0	0	1	24	261	261	2	496	153
Grp Sat Flow(s), veh/h/ln	1810	0	1615	1810	0	1615	1810	1900	1895	1810	1900	1615
Q Serve(g_s), s	4.7	0.0	1.1	0.0	0.0	0.1	1.2	4.6	4.6	0.1	4.6	3.2
Cycle Q Clear(g_c), s	4.7	0.0	1.1	0.0	0.0	0.1	1.2	4.6	4.6	0.1	4.6	3.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	123	0	230	2	0	39	45	1297	1294	5	2510	1067
V/C Ratio(X)	0.78	0.00	0.10	0.00	0.00	0.03	0.53	0.20	0.20	0.41	0.20	0.14
Avail Cap(c_a), veh/h	197	0	574	101	0	488	105	1297	1294	101	2510	1067
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.3	0.0	33.6	0.0	0.0	42.9	43.3	5.2	5.2	44.8	6.0	5.7
Incr Delay (d2), s/veh	4.0	0.0	0.1	0.0	0.0	0.1	3.5	0.3	0.4	18.9	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	0.5	0.0	0.0	0.0	0.6	2.5	2.5	0.1	2.5	1.5
LnGrp Delay(d),s/veh	45.3	0.0	33.6	0.0	0.0	43.0	46.9	5.6	5.6	63.8	6.1	6.0
LnGrp LOS	D	0.0	C	0.0	0.0	D	D	A	A	E	A	A
Approach Vol, veh/h		118			1	D	<u> </u>	546	71		651	
Approach Delay, s/veh		43.1			43.0			7.4			6.3	
Approach LOS		43.1 D			43.0 D			7.4 A			0.5 A	
Approach EO3		D			D			А			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.7	67.0	0.0	18.3	6.8	64.9	10.6	7.7				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.2	27.8	9.8	27.2				
Max Q Clear Time (g_c+I1), s	2.1	6.6	0.0	3.1	3.2	6.6	6.7	2.1				
Green Ext Time (p_c), s	0.0	3.8	0.0	0.0	0.0	3.8	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			10.1									
HCM 2010 LOS			В									
Notes												

User approved pedestrian interval to be less than phase max green.

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	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	~	<b>\</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	ሻ	<b>^</b>						ર્ન	7
Volume (veh/h)	0	479	37	250	262	0	0	0	0	1482	2	334
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	510	34	266	279	0				1577	2	291
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	681	289	188	1219	0				1062	1	949
Arrive On Green	0.00	0.18	0.18	0.21	0.64	0.00				0.59	0.59	0.59
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1807	2	1615
Grp Volume(v), veh/h	0	510	34	266	279	0				1579	0	291
Grp Sat Flow(s), veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	15.3	2.1	12.5	3.7	0.0				70.5	0.0	10.9
Cycle Q Clear(g_c), s	0.0	15.3	2.1	12.5	3.7	0.0				70.5	0.0	10.9
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	681	289	188	1219	0				1063	0	949
V/C Ratio(X)	0.00	0.75	0.12	1.41	0.23	0.00				1.49	0.00	0.31
Avail Cap(c_a), veh/h	0	681	289	188	1219	0				1063	0	949
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.96	0.96	0.93	0.93	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	46.7	41.3	47.5	15.3	0.0				24.8	0.0	12.5
Incr Delay (d2), s/veh	0.0	7.1	0.8	211.7	0.4	0.0				223.4	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.7	1.0	17.3	2.0	0.0				100.8	0.0	4.9
LnGrp Delay(d),s/veh	0.0	53.8	42.1	259.2	15.7	0.0				248.2	0.0	12.6
LnGrp LOS		D	D	F	В					F		В
Approach Vol, veh/h		544			545						1870	
Approach Delay, s/veh		53.1			134.5						211.5	
Approach LOS		D			F						F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	17.0	27.0		76.0		44.0						
Change Period (Y+Rc), s	4.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	12.5	21.5		70.5		38.5						
Max Q Clear Time (g_c+I1), s	14.5	17.3		72.5		5.7						
Green Ext Time (p_c), s	0.0	1.4		0.0		3.3						
Intersection Summary												
HCM 2010 Ctrl Delay			168.2									
HCM 2010 LOS			F									

EAPC (2017) Conditions - AM Peak Hour Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	, J	<b>^</b>			<b>^</b>	7		ર્ન	7			
Volume (veh/h)	282	1679	0	0	440	632	73	0	398	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	307	1825	0	0	478	652	79	0	347			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	353	2217	0	0	1254	533	452	0	404			
Arrive On Green	0.26	0.78	0.00	0.00	0.33	0.33	0.25	0.00	0.25			
Sat Flow, veh/h	1810	3800	0	0	3800	1615	1810	0	1615			
Grp Volume(v), veh/h	307	1825	0	0	478	652	79	0	347			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	9.7	17.9	0.0	0.0	5.8	19.8	2.1	0.0	12.3			
Cycle Q Clear(g_c), s	9.7	17.9	0.0	0.0	5.8	19.8	2.1	0.0	12.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	353	2217	0	0	1254	533	452	0	404			
V/C Ratio(X)	0.87	0.82	0.00	0.00	0.38	1.22	0.17	0.00	0.86			
Avail Cap(c_a), veh/h	377	2217	0	0	1254	533	452	0	404			
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.58	0.58	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.5	4.8	0.0	0.0	15.4	20.1	17.6	0.0	21.5			
Incr Delay (d2), s/veh	10.9	2.1	0.0	0.0	0.9	116.7	8.0	0.0	20.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.8	9.5	0.0	0.0	3.1	26.0	1.1	0.0	7.8			
LnGrp Delay(d),s/veh	32.4	6.9	0.0	0.0	16.3	136.8	18.5	0.0	42.1			
LnGrp LOS	С	Α			В	F	В		D			
Approach Vol, veh/h		2132			1130			426				
Approach Delay, s/veh		10.6			85.8			37.7				
Approach LOS		В			F			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		40.0			15.2	24.8		20.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		35.0			12.5	19.0		15.0				
Max Q Clear Time (g_c+I1), s		19.9			11.7	21.8		14.3				
Green Ext Time (p_c), s		10.8			0.0	0.0		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			36.8									
HCM 2010 LOS			D									

EAPC (2017) Conditions - AM Peak Hour Urban Crossroads, Inc.

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Intersection							
Int Delay, s/veh	0						
= 0.0 <b>.</b> ]							
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Vol, veh/h	0	0	10	0	0	22	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-		-	None	
Storage Length	-	-	100	-	0	-	
Veh in Median Storage, #	0	-	-	0	2	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	0	0	0	0	0	0	
Mvmt Flow	0	0	11	0	0	24	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	0	0	22	0	
Stage 1	-	-	-	-	0	-	
Stage 2	-	_	-	-	22	-	
Critical Hdwy	-	_	4.1	-	6.4	6.2	
Critical Hdwy Stg 1	-	-	-	-	5.4	-	
Critical Hdwy Stg 2	-	-	-	-	5.4	-	
Follow-up Hdwy	-	-	2.2	-	3.5	3.3	
Pot Cap-1 Maneuver	-	-	-	-	1000	-	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	1006	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	-	-	1000	-	
Mov Cap-2 Maneuver	-	-	-	-	955	-	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	1006	-	
Approach	EB		WB		NB		
HCM Control Delay, s	0						
HCM LOS					-		
Minor Lane/Major Mvmt	NBLn1 EBT	EBR	WBL WBT				
Capacity (veh/h)		-					
HCM Lane V/C Ratio		-					
HCM Control Delay (s)		-					
HCM Lane LOS		-					
HCM 95th %tile Q(veh)		-					

Intersection								
Int Delay, s/veh	4.5							
in Doidy, siveri	1.0							
Movement		EBT	EBR		WBL	WBT	NBL	NBR
		22			12			
Vol, veh/h			0		0	10	0	28
Conflicting Peds, #/hr		0				0	O Cton	O Cton
Sign Control RT Channelized		Free	Free		Free	Free	Stop	Stop
		-	None		100	None	-	None
Storage Length	ı	-	-		100	-	0	-
Veh in Median Storage, #	:	0	-		-	0	2	-
Grade, %		0 92	- 92		92	0 92	0 92	92
Peak Hour Factor								
Heavy Vehicles, %		0	0		12	0	0	0
Mvmt Flow		24	0		13	11	0	30
Major/Minor	N	1ajor1		M	lajor2		Minor1	
Conflicting Flow All		0	0		24	0	61	24
Stage 1		-	-		-	-	24	-
Stage 2		-	-		-	-	37	-
Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1			-		-	-	5.4	-
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy			-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		1604	-	950	1058
Stage 1		-	-		-	-	1004	-
Stage 2		-	-		-	-	991	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-		1604	-	942	1058
Mov Cap-2 Maneuver		-	-		-	-	925	-
Stage 1		-	-		-	-	1004	-
Stage 2		-	-		-	-	983	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			4		8.5	
HCM LOS		J					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT			
Capacity (veh/h)	1058	-		1604	-			
HCM Lane V/C Ratio	0.029	-		0.008	-			
HCM Control Delay (s)	8.5	-	-	7.3	-			
HCM Lane LOS	0.5 A	-	-	7.3 A	-			
HCM 95th %tile Q(veh)	0.1	-	-	0	-			
HOW 9501 7600E Q(VEII)	0.1	-	-	U	-			

Intersection								
Int Delay, s/veh	3							
Movement		EBT	EBR	\	NBL	WBT	NBL	NBR
Vol, veh/h		50	0	•	13	22	0	28
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control		Free	Free	ı	Free	Free	Stop	Stop
RT Channelized		-	None	•	-	None	-	None
Storage Length		-	-		50	-	0	-
Veh in Median Storage, #		0	_		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		54	0		14	24	0	30
_								
Major/Minor	N.A	lajor1		Ma	ajor2		Minor1	
Conflicting Flow All	IVI	0	0	IVIC	54	0	106	54
Stage 1		U	-		J4 -	-	54	04
Stage 2		-	-		-	-	52	-
Critical Hdwy			_		4.1	-	6.4	6.2
Critical Hdwy Stg 1			-		4.1	-	5.4	0.2
Critical Hdwy Stg 2		_	_		_	-	5.4	_
Follow-up Hdwy			_		2.2	_	3.5	3.3
Pot Cap-1 Maneuver		_	_	1	1564	_	897	1019
Stage 1		_	_	'	-	_	974	-
Stage 2		_	_		_	_	976	-
Platoon blocked, %		-	-			-	770	
Mov Cap-1 Maneuver		-	-	1	1564	-	889	1019
Mov Cap-2 Maneuver		-	-		-	-	895	-
Stage 1		-	-		-	-	974	-
Stage 2		-	-		-	-	967	-
<u> </u>								
Approach		EB			WB		NB	
HCM Control Delay, s		0			2.7		8.6	
HCM LOS					,		A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL V	NBT			
Capacity (veh/h)	1019	-		1564	-			
HCM Lane V/C Ratio	0.03	_		0.009	-			
HCM Control Delay (s)	8.6	_	_	7.3	_			
HCM Lane LOS	Α	-	-	Α.	-			
HCM 95th %tile Q(veh)	0.1	_	_	0	_			
110.11 /0111 /01110 (2(1011)	0.1			U				

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	78	0	5	35	0	0	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	85	0	5	38	0	0	0	3	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	38	0	0	85	0	0	134	134	85	135	134	38
Stage 1	-	-	-	-	-	-	85	85	-	49	49	-
Stage 2	-	-	-	-	-	-	49	49	-	86	85	_
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1585	-	-	1524	-	-	842	760	980	841	760	1040
Stage 1	-	-	-	-	-	-	928	828	-	969	858	-
Stage 2	-	-	-	-	-	-	969	858	-	927	828	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1585	-	-	1524	-	-	840	758	980	836	758	1040
Mov Cap-2 Maneuver	-	-	-	-	-	-	862	770	-	857	768	-
Stage 1	-	-	-	-	-	-	928	828	-	969	855	-
Stage 2	-	-	-	-	-	-	966	855	-	924	828	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.9			8.7			0		
HCM LOS	U			0.7			Α			A		
HOW LOO												
Minor Long/Marin Ma	NDI 1	EDI	EDT	EDD ME	MOT	WIDD	DI1					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR WBL	WBT	WBR S	RTUI					
Capacity (veh/h)	980	1585	-	- 1524	-	-	-					
HCM Cantral Palace (a)	0.003	-	-	- 0.004	-	-	-					
HCM Long LOS	8.7	0	-	- 7.4	-	-	0					
HCM CEAL O(4112 O(4212)	A	A	-	- A	-	-	А					
HCM 95th %tile Q(veh)	0	0	-	- 0	-	-	-					

Intersection						
Int Delay, s/veh	1.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	81	0	10	40	0	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	2	-
Grade, %	0		-	0	0	-
Peak Hour Factor	92		92	92	92	92
Heavy Vehicles, %	0		0	0	0	0
Mvmt Flow	88	0	11	43	0	24
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	88	0	153	88
Stage 1	-	-	- 30	-	88	
Stage 2	_	-	-	-	65	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1520	-	843	976
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	963	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1520	-	837	976
Mov Cap-2 Maneuver	-	-	-	-	864	-
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	956	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.5		8.8	
HCM LOS			1.0		A	
Minor Long/Maiar Musel	NDI 51 EDT	EDD.	MDL MDT			
Minor Lane/Major Mvmt	NBLn1 EBT	EBR	WBL WBT			
Capacity (veh/h)	976 -		1520 -			
HCM Cantral Dalay (a)	0.025 -	-	0.007 -			
HCM Long LOS	8.8 -	-	7.4 -			
HCM Lane LOS	A -	-	Α -			
HCM 95th %tile Q(veh)	0.1 -	-	0 -			

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	103	0	9	50	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	2	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0		0	0	0	0
Mvmt Flow	112	0	10	54	0	23
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	112	0	186	112
Stage 1	-	-		-	112	,2
Stage 2	-	-	-	-	74	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1490	-	808	947
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	954	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1490	-	803	947
Mov Cap-2 Maneuver	-	-	-	-	843	-
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	948	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.1		8.9	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1 EBT	EBR	WBL WBT			
Capacity (veh/h)	947 -		1490 -			
HCM Lane V/C Ratio	0.024 -		0.007 -			
HCM Control Delay (s)	8.9 -	- (	7.4 -			
HCM Lane LOS	8.9 - A -	-				
HCM 95th %tile Q(veh)	0.4		A -			
HOW YOUR WINE U(VEII)	0.1 -	-	0 -			

Intersection												
	2											
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	124	0	16	59	0	0	0	36	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	92	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	185	0	24	88	0	0	0	54	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	88	0	0	185	0	0	321	321	185	348	321	88
Stage 1	-	-	-	-	-	-	185	185	-	136	136	-
Stage 2	-	-	-	-	-	-	136	136	-	212	185	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1520	-	-	1402	-	-	636	599	862	610	599	976
Stage 1	-	-	-	-	-	-	821	751	-	872	788	-
Stage 2	-	-	-	-	-	-	872	788	-	795	751	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1520	-	-	1402	-	-	628	589	862	565	589	976
Mov Cap-2 Maneuver	-	-	-	-	-	-	728	668	-	663	659	-
Stage 1	-	-	-	-	-	-	821	751	-	872	775	-
Stage 2	-	-	-	-	-	-	857	775	-	745	751	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.6			9.5			0		
HCM LOS	U			1.0			7.5 A			A		
HOW LOS							Λ.			Λ.		
Minor Long/Major Myrat	NDI "1	EDI.	ГРТ	EDD WDI	MDT	WIDD	'DI n1					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR WBL	WBT	WBR S	DLIII					
Capacity (veh/h)	862	1520	-	- 1402	-	-	-					
HCM Cantral Pales (a)	0.062	-	-	- 0.017	-	-	-					
HCM Control Delay (s)	9.5	0	-	- 7.6	-	-	0					
HCM Lane LOS	A	A	-	- A	-	-	А					
HCM 95th %tile Q(veh)	0.2	0	-	- 0.1	-	-	-					

	•	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	<b>^</b>	7	ሻሻ	<b>^</b>	7	ሻ	<b>↑</b>	77	ሻ	<b>∱</b> ∱	
Volume (veh/h)	0	50	12	518	37	6	5	6	665	9	9	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	52	9	534	38	6	5	6	401	9	9	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	4	1300	575	322	1858	821	12	640	1088	20	1298	0
Arrive On Green	0.00	0.34	0.34	0.09	0.49	0.49	0.01	0.34	0.34	0.01	0.34	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1679	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	52	9	534	38	6	5	6	401	9	9	0
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1679	1810	1900	1615	1810	1900	0
Q Serve(g_s), s	0.0	0.9	0.3	8.4	0.5	0.2	0.3	0.2	6.2	0.5	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.9	0.3	8.4	0.5	0.2	0.3	0.2	6.2	0.5	0.1	0.0
Prop In Lane	1.00	1000	1.00	1.00	1050	1.00	1.00	( 10	1.00	1.00	1000	0.00
Lane Grp Cap(c), veh/h	4	1300	575	322	1858	821	12	640	1088	20	1298	0
V/C Ratio(X)	0.00	0.04	0.02	1.66	0.02	0.01	0.42	0.01	0.37	0.45	0.01	0.00
Avail Cap(c_a), veh/h	190	1300	575	322	1858	821	95	640	1088	95	1298	1.00
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00 14.2	0.95 43.3	0.95 12.5	0.95	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	20.8 0.1	0.0	310.0	0.0	12.5 0.0	47.0 8.8	21.0	11.4 1.0	46.7 5.7	20.6	0.0
Incr Delay (d2), s/veh Initial Q Delay(d3),s/veh	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.0	18.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	20.9	14.3	353.3	12.6	12.5	55.8	21.0	12.4	52.4	20.7	0.0
LnGrp LOS	0.0	20.7 C	14.3 B	555.5 F	12.0 B	12.5 B	55.6 E	21.0 C	12.4 B	52.4 D	20.7 C	0.0
Approach Vol, veh/h		61	U	<u> </u>	578	U	<u> </u>	412	D	D	18	
Approach Delay, s/veh		19.9			327.3			13.0			36.5	
Approach LOS		17.7 B			327.3 F			13.0 B			30.5 D	
• •			•			,	_				D	
Timer Assistant Disc	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.9	38.0	5.1	37.9	0.0	51.9	5.6	37.5				
Change Period (Y+Rc), s	5.5	* 5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	5.5	* 33	5.0	32.0	5.0	33.0	5.0	32.0				
Max Q Clear Time (g_c+l1), s	10.4	2.9	2.3	2.1	0.0	2.5	2.5	8.2				
Green Ext Time (p_c), s	0.0	0.2	0.0	0.9	0.0	1.1	0.0	0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			183.7									
HCM 2010 LOS			F									
Notes												

Notes

EAPC (2017) Conditions - PM Peak Hour Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	₽		ሻ	₽		ሻ	<b>ተ</b> ኈ		ሻ	<b>^</b>	7
Volume (veh/h)	166	0	24	1	1	4	8	464	5	0	474	69
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	175	0	25	1	1	4	8	488	5	0	499	73
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	212	0	253	2	10	40	18	2515	26	2	2317	984
Arrive On Green	0.12	0.00	0.16	0.00	0.03	0.03	0.01	0.67	0.67	0.00	0.61	0.61
Sat Flow, veh/h	1810	0	1615	1810	333	1332	1810	3755	38	1810	3800	1614
Grp Volume(v), veh/h	175	0	25	1	0	5	8	247	246	0	499	73
Grp Sat Flow(s),veh/h/ln	1810	0	1615	1810	0	1665	1810	1900	1893	1810	1900	1614
Q Serve(g_s), s	8.5	0.0	1.2	0.0	0.0	0.3	0.4	4.4	4.4	0.0	5.3	0.6
Cycle Q Clear(g_c), s	8.5	0.0	1.2	0.0	0.0	0.3	0.4	4.4	4.4	0.0	5.3	0.6
Prop In Lane	1.00		1.00	1.00		0.80	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	212	0	253	2	0	50	18	1273	1268	2	2317	984
V/C Ratio(X)	0.83	0.00	0.10	0.40	0.00	0.10	0.44	0.19	0.19	0.00	0.22	0.07
Avail Cap(c_a), veh/h	310	0	574	101	0	400	101	1273	1268	101	2317	984
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	32.5	44.9	0.0	42.5	44.3	5.6	5.6	0.0	7.9	1.1
Incr Delay (d2), s/veh	7.5	0.0	0.1	34.8	0.0	0.3	6.1	0.3	0.3	0.0	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	0.5	0.0	0.0	0.1	0.2	2.5	2.4	0.0	2.8	0.3
LnGrp Delay(d),s/veh	46.3	0.0	32.6	79.7	0.0	42.8	50.4	6.0	6.0	0.0	8.1	1.2
LnGrp LOS	D		С	E		D	D	Α	Α		Α	Α
Approach Vol, veh/h		200			6			501			572	
Approach Delay, s/veh		44.6			48.9			6.7			7.2	
Approach LOS		D			D			Α			Α	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	0.0	65.8	4.6	19.6	5.4	60.4	16.0	8.2				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	5.5	* 5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	15.4	* 22				
Max Q Clear Time (g_c+I1), s	0.0	6.4	2.0	3.2	2.4	7.3	10.5	2.3				
Green Ext Time (p_c), s	0.0	3.6	0.0	0.3	0.0	3.5	0.1	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			13.1									
HCM 2010 LOS			В									
Notes												

EAPC (2017) Conditions - PM Peak Hour Urban Crossroads, Inc.

User approved pedestrian interval to be less than phase max green.

	۶	<b>→</b>	•	•	<b>←</b>	•	1	†	~	<b>\</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	ሻ	<b>^</b>						र्स	7
Volume (veh/h)	0	635	89	621	186	0	0	0	0	793	2	375
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	676	95	661	198	0				844	2	322
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	681	289	550	1979	0				700	2	626
Arrive On Green	0.00	0.18	0.18	0.10	0.17	0.00				0.39	0.39	0.39
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1805	4	1615
Grp Volume(v), veh/h	0	676	95	661	198	0				846	0	322
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	21.3	6.2	36.5	5.3	0.0				46.5	0.0	18.3
Cycle Q Clear(g_c), s	0.0	21.3	6.2	36.5	5.3	0.0				46.5	0.0	18.3
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	681	289	550	1979	0				701	0	626
V/C Ratio(X)	0.00	0.99	0.33	1.20	0.10	0.00				1.21	0.00	0.51
Avail Cap(c_a), veh/h	0	681	289	550	1979	0				701	0	626
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.96	0.96	0.92	0.92	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	49.2	43.0	54.0	26.0	0.0				36.8	0.0	28.1
Incr Delay (d2), s/veh	0.0	32.1	2.9	105.8	0.1	0.0				106.0	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	14.2	3.0	34.5	2.8	0.0				43.8	0.0	8.3
LnGrp Delay(d),s/veh	0.0	81.2	45.8	159.8	26.1	0.0				142.8	0.0	28.8
LnGrp LOS		F	D	F	С					F		С
Approach Vol, veh/h		771			859						1168	
Approach Delay, s/veh		76.9			129.0						111.4	
Approach LOS		E			F						F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	41.0	27.0		52.0		68.0						
Change Period (Y+Rc), s	4.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	36.5	21.5		46.5		62.5						
Max Q Clear Time (g_c+l1), s	38.5	23.3		48.5		7.3						
Green Ext Time (p_c), s	0.0	0.0		0.0		3.9						
Intersection Summary												
HCM 2010 Ctrl Delay			107.3									
HCM 2010 LOS			F									

EAPC (2017) Conditions - PM Peak Hour Urban Crossroads, Inc.

	ၨ	<b>→</b>	•	•	<b>—</b>	•	•	†	<b>/</b>	<b>\</b>	<del> </del>	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	^↑			<b>^</b>	7		सी	7			
Volume (veh/h)	457	970	0	0	763	1471	43	1	215	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	513	1090	0	0	857	1628	48	1	133			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	354	3008	0	0	2153	915	222	5	202			
Arrive On Green	0.39	1.00	0.00	0.00	0.57	0.57	0.13	0.13	0.13			
Sat Flow, veh/h	1810	3800	0	0	3800	1614	1774	37	1615			
Grp Volume(v), veh/h	513	1090	0	0	857	1628	49	0	133			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1614	1811	0	1615			
Q Serve(g_s), s	23.5	0.0	0.0	0.0	15.1	68.0	2.9	0.0	9.4			
Cycle Q Clear(g_c), s	23.5	0.0	0.0	0.0	15.1	68.0	2.9	0.0	9.4			
Prop In Lane	1.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	354	3008	0	0	2153	915	226	0	202			
V/C Ratio(X)	1.45	0.36	0.00	0.00	0.40	1.78	0.22	0.00	0.66			
Avail Cap(c_a), veh/h	354	3008	0	0	2153	915	226	0	202			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.10	0.10	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	36.5	0.0	0.0	0.0	14.5	26.0	47.2	0.0	50.1			
Incr Delay (d2), s/veh	203.1	0.0	0.0	0.0	0.6	355.4	2.2	0.0	15.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	31.6	0.0	0.0	0.0	8.0	120.3	1.6	0.0	5.1			
LnGrp Delay(d),s/veh	239.6	0.0	0.0	0.0	15.1	381.4	49.4	0.0	65.7			
LnGrp LOS	F	А			В	F	D		Е			
Approach Vol, veh/h		1603			2485			182				
Approach Delay, s/veh		76.7			255.1			61.3				
Approach LOS		Е			F			Е				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				· <u>—</u>
Phs Duration (G+Y+Rc), s		100.0			27.0	73.0		20.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		95.0			23.5	68.0		15.0				
Max Q Clear Time (g_c+I1), s		2.0			25.5	70.0		11.4				
Green Ext Time (p_c), s		39.8			0.0	0.0		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			179.8									
HCM 2010 LOS			F									

EAPC (2017) Conditions - PM Peak Hour Urban Crossroads, Inc.

### APPENDIX 7.2:

EAPC (2017) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS



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			TIONS E	APC (2017)
PM	CALC	CHS	DATE	05/19/15
	CHK		DATE	
	_	Critical Approach	Speed (Major)	<b>40</b> mph
	_ _	Critical Approach	Speed (Minor)	25 mpl
1	_lane	Minor Street	Approach Lanes	<b>1</b> lane
251	vpd	Minor Street	Future ADT =	<b>251</b> vpd
	`	• **	or	RURAL (R)
	1 251 et traffic > 64	CHK  1 lane  251 vpd  et traffic > 64 km/h (40 m	PM CALC CHS CHK  Critical Approach Critical Approach Minor Street	PM CALC CHS DATE CHK DATE  CHK DATE  Critical Approach Speed (Major) Critical Approach Speed (Minor)  1 lane Minor Street Approach Lanes  251 vpd Minor Street Future ADT =  et traffic > 64 km/h (40 mph);

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements						
<u></u>	NONAL			•				
XX			EA					
CONDITION A - Mil	nimum Vehicular Volume			Vehicles Per Day				
<u>Satisfied</u>	Not Satisfied	Vehicles I	Per Day on	on Higher-Volume				
	XX	Majoı	r Street	Minor Street Approach				
Number of lanes for mov	ing traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)			
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>			
1 <b>251</b>	1 <b>251</b>	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	8,000	5,600	3,200	2,240				
CONDITION B - Interru			Vehicles	s Per Day				
<u>Satisfied</u>	Vehicles	s Per Day	on Highe	er-Volume				
	on Maj	or Street	Minor Stree	et Approach				
Number of lanes for mov	ing traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)			
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>			
1 <b>251</b>	1 <b>251</b>	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 o	f CONDITIONS A + B							
<u>Satisfied</u>	Not Satisfied							
	XX	2 CON	DITIONS	2 CONDITIONS				
No one condition satisfie	No one condition satisfied, but following conditions			80%				
fulfilled 80% of more								

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS E	EAPC (20	117)
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19	/15
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	4	lO mph
Minor Street:	Driveway 2			_	Critical Approach	Speed (Minor)	2	2 <u>5</u> mpł
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lane	<u> </u>	lane
Major Street	Future ADT =		764	vpd	Minor Street	Future ADT =	262	vpd
Speed limit o	or critical speed o	·		·	. ,	or	RURAI	· L (R)

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	equirements			
·	KOKAL			•			
XX	.,		EA		D D		
	mum Vehicular Volume			Vehicles Per Day			
<u>Satisfied</u>	Not Satisfied		Per Day on	on Higher-Volume			
	XX	•	Street	Minor Street Approach			
Number of lanes for movin	g traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)		
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>		
1 <b>764</b>	1 <b>262</b>	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	8,000	5,600	3,200	2,240			
CONDITION B - Interrup			Vehicles	Per Day			
Satisfied	Vehicles	s Per Day	on Highe	er-Volume			
	on Maj	or Street	Minor Stree	et Approach			
Number of lanes for movin	g traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)		
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>		
1 <b>764</b>	1 <b>262</b>	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 CONI	DITIONS	2 CONI	DITIONS		
No one condition satisfied	No one condition satisfied, but following conditions			80% 80%			
fulfilled 80% of more							

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS <b>E</b>	APC (2017)	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15	
Jurisdiction:	<b>County of River</b>	rside		CHK		DATE		
Major Street:	Oleander Avenu	ne		_	Critical Approach	Speed (Major)	40 mp	ρŀ
Minor Street:	Driveway 3			_	Critical Approach	Speed (Minor)	<b>25</b> mp	ρŀ
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	<b>1</b> lar	16
Major Street I	Future ADT =		1,339	_vpd	Minor Street	Future ADT =	<b>313</b> vp	d
Speed limit o	r critical speed o	n major stre	eet traffic > 64	km/h (40 m	ph);	or	RURAL (R)	)
In built up are	ea of isolated con	nmunity of <	< 10,000 popu	lation				

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements						
<u></u>	NORAL			•				
XX			EA					
CONDITION A - Min	imum Vehicular Volume			Vehicles Per Day				
<u>Satisfied</u>	Not Satisfied		Per Day on	on Higher-Volume				
	XX	Major	r Street	Minor Street Approach				
Number of lanes for movi	ng traffic on each approach	(Total of Both Approaches)		(One Dire	ction Only)			
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>			
<i>1</i> <b>1,339</b>	<i>1</i> <b>313</b>	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	8,000	5,600	3,200	2,240				
CONDITION B - Interru			Vehicles	Per Day				
Satisfied	Vehicles	s Per Day	on Highe	er-Volume				
	on Maj	or Street	Minor Stree	et Approach				
Number of lanes for movi	ng traffic on each approach	(Total of Both	h Approaches)	(One Dire	ction Only)			
Major Street	Minor Street	Urban	Rural	<u>Urban</u>	Rural			
1 1,339	<i>1</i> 313	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 CONI	DITIONS	2 CONI	DITIONS			
No one condition satisfie	No one condition satisfied, but following conditions			80%				
fulfilled 80% of more								
	Ifilled 80% of more A B 11%							

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS E	APC (2017)	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15	
Jurisdiction:	<b>County of River</b>	side		CHK		DATE		
Major Street:	Oleander Avenu	ie		<u>-</u> _	Critical Approach	Speed (Major)	<b>40</b> m	pł
Minor Street:	Decker Road			_	Critical Approach	Speed (Minor)	<b>25</b> m	pł
Major Street	Approach Lanes	=	1	lane	Minor Street	Approach Lanes	<b>1</b> la	ne
Major Street	Future ADT =		1,702	vpd	Minor Street	Future ADT =	<b>51</b> vp	od
·	or critical speed on ea of isolated con	•		- km/h (40 m	• **	or	RURAL (R	)

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	aquiramente		
	Minimum Requirements					
XX	EADT					
	nimum Vehicular Volume	Vehicles Per Day			•	
<u>Satisfied</u>	Not Satisfied		Per Day on	-	er-Volume	
	XX	Major Street		Minor Street Approach		
Number of lanes for move	ving traffic on each approach	(Total of Both Approaches)		(One Direction Only)		
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	Rural	
1 <b>1,702</b>	1 <b>51</b>	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 - Interr			Vehicles Per Day			
Satisfied	•		Vehicles Per Day		on Higher-Volume	
	on Maj	or Street	Minor Stree	et Approach		
Number of lanes for moving traffic on each approach		(Total of Botl	h Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
<i>1</i> <b>1,702</b>	1 <b>51</b>	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						
<u>Satisfied</u>	Not Satisfied					
XX		2 CONDITIONS		2 CONDITIONS		
No one condition satisfied, but following conditions		8	0%	80	0%	
fulfilled 80% of more A B						
	2% 4%					

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS E	APC (2017)	ł
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15	
Jurisdiction:	<b>County of River</b>	side		CHK		DATE		
Major Street:	Oleander Avenu	ıe		<u></u>	Critical Approach	Speed (Major)	<b>40</b> m	nph
Minor Street:	Driveway 4			<u></u>	Critical Approach	Speed (Minor)	<b>25</b> m	ıpł
Major Street	Approach Lanes	=	1	lane	Minor Street	Approach Lanes	1la	ane
Major Street	Future ADT =		2,006	vpd	Minor Street	Future ADT =	<b>253</b> V	pd
Speed limit o	or critical speed on ea of isolated con	-	et traffic > 64	_ · km/h (40 m	ph);	or	RURAL (R	•

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Da	aguiromonte			
<u></u>	Minimum Requirements						
	XX			EADT			
CONDITION A - Min	nimum Vehicular Volume	Vehicles Per Day			•		
<u>Satisfied</u>	Not Satisfied	Vehicles F	Per Day on	on Higher-Volume			
	XX	Major Street		Minor Street Approach			
Number of lanes for mov	ing traffic on each approach	(Total of Both Approaches)		(One Direction Only)			
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>		
1 <b>2,006</b>	1 <b>253</b>	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			
<u>Satisfied</u>	Satisfied Not Satisfied		Vehicles Per Day		on Higher-Volume		
	on Maj	or Street	Minor Stree	et Approach			
Number of lanes for moving traffic on each approach		(Total of Both	h Approaches)	(One Dire	ction Only)		
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>		
1 <b>2,006</b>	1 <b>253</b>	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							
<u>Satisfied</u>	Not Satisfied						
	XX		2 CONDITIONS		2 CONDITIONS		
No one condition satisfied, but following conditions		80	0%	80	0%		
fulfilled 80% of more A B							
	11% 17%						

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC CONDI	TIONS <u>E</u>	APC (2017)
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE	
Major Street:	Oleander Aven	ue		<u></u>	Critical Approach	Speed (Major)	40 mpl
Minor Street:	Driveway 5			_ _	Critical Approach	Speed (Minor)	25 mpl
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	<b>1</b> lane
Major Street	Future ADT =		2,457	_vpd	Minor Street	Future ADT =	<b>197</b> vpd
Speed limit o	or critical speed o	n major stre	et traffic > 64	km/h (40 m	ph);		
In built up are	ea of isolated cor	nmunity of	< 10,000 popu	lation		or	RURAL (R)

#### (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	aquirements		
XX	Minimum Requirements					
, , ,	im	EADT Vehicles Bar Bar				
	imum Vehicular Volume			Vehicles Per Day		
<u>Satisfied</u>	Not Satisfied		Per Day on	on Higher-Volume		
	XX	Major Street		Minor Street Approach		
Number of lanes for movi	ng traffic on each approach	(Total of Both Approaches)		(One Direction Only)		
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
1 <b>2,457</b>	1 <b>197</b>	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		
<u>Satisfied</u>	Satisfied Not Satisfied		Vehicles Per Day		on Higher-Volume	
	on Maj	or Street	Minor Stree	et Approach		
Number of lanes for moving traffic on each approach		(Total of Botl	n Approaches)	(One Dire	ction Only)	
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>	
1 <b>2,457</b>	1 <b>197</b>	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		2 CONDITIONS		
No one condition satisfied, but following conditions		80% 80'		0%		
fulfilled 80% of more A B						
	8% 16%					

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



### Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = EAPC (2017) Conditions - Weekday PM Peak Hour

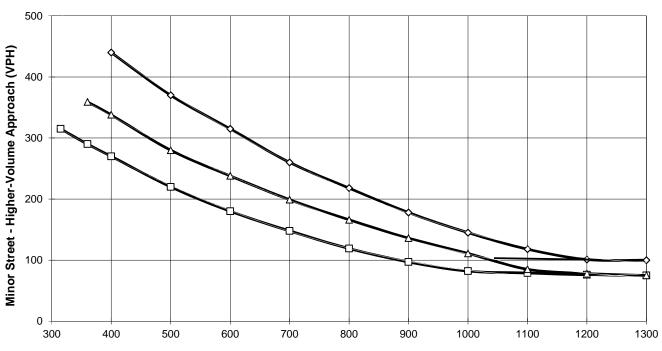
Major Street Name = Oleander Avenue Total of Both Approaches (VPH) = 199

Number of Approach Lanes Major Street = 2

Minor Street Name = Driveway 6 High Volume Approach (VPH) = 18

Number of Approach Lanes Minor Street = 1

### SIGNAL WARRANT NOT SATISFIED



Major Street - Total of Both Approaches (VPH)

1 Lane (Major) & 1 Lane (Minor)

2+ Lanes (Major) & 1 Lane (Minor) OR 1 Lane (Major) & 2+ Lanes (Minor)

2+ Lanes (Major) & 2+ Lanes (Minor)

→ Major Street Approaches

- - - Minor Street Approaches

\*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane



7.2-7

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# APPENDIX 7.3:

EAPC (2017) CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS



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	-	•	•	<b>—</b>	<b>↓</b>	4
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	510	39	266	279	1579	355
v/c Ratio	0.75	0.10	1.35	0.23	1.41	0.30
Control Delay	54.5	4.4	233.6	26.1	216.8	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.7	0.0
Total Delay	54.5	4.4	233.6	26.1	217.6	6.0
Queue Length 50th (ft)	189	0	~275	77	~1645	54
Queue Length 95th (ft)	248	14	#445	108	#1910	102
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	680	392	197	1219	1116	1195
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	1	0	0	0	163	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.10	1.35	0.23	1.66	0.30

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

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

5/15/2015

	•	-	←	•	<b>†</b>	~
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	307	1825	478	687	79	433
v/c Ratio	0.82	0.82	0.38	0.64	0.17	0.79
Control Delay	68.9	13.0	16.9	5.1	18.8	28.8
Queue Delay	0.0	43.3	0.0	0.0	0.0	0.0
Total Delay	68.9	56.3	16.9	5.1	18.8	28.8
Queue Length 50th (ft)	225	277	66	5	22	111
Queue Length 95th (ft)	m276	m159	101	71	52	#246
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	395	2216	1245	1070	475	550
Starvation Cap Reductn	0	543	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.78	1.09	0.38	0.64	0.17	0.79

<sup># 95</sup>th 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.

5/15/2015
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	-	•	•	•	¥	*
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	676	95	661	198	846	399
v/c Ratio	0.99	0.24	1.15	0.10	1.15	0.44
Control Delay	82.5	18.5	111.3	10.7	117.2	9.8
Queue Delay	36.5	0.0	0.0	0.0	0.7	0.0
Total Delay	119.0	18.5	111.3	10.7	117.9	9.8
Queue Length 50th (ft)	264	20	~600	20	~770	63
Queue Length 95th (ft)	#385	69	#830	29	#1014	145
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	680	392	577	1979	736	903
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	134	0	0	0	75	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.24	0.24	1.15	0.10	1.28	0.44

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

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

5/15/2015

	•	$\rightarrow$	•	•	Ť	
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	513	1090	857	1653	49	242
v/c Ratio	1.38	0.36	0.40	1.32	0.21	0.61
Control Delay	214.6	6.3	15.2	170.5	49.7	21.8
Queue Delay	2.3	50.3	0.1	0.0	0.0	0.0
Total Delay	216.9	56.6	15.3	170.5	49.7	21.8
Queue Length 50th (ft)	~452	195	177	~1507	35	45
Queue Length 95th (ft)	m#393	m152	216	#1743	73	126
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	372	3008	2153	1252	237	394
Starvation Cap Reductn	70	2022	0	0	0	0
Spillback Cap Reductn	0	0	230	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.70	1.11	0.45	1.32	0.21	0.61

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

<sup># 95</sup>th 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.

### APPENDIX 7.4:

**EAPC (2017) CONDITIONS BASIC FREEWAY SEGMENT ANALYSIS WORKSHEETS** 



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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour Logistics Center Phase II TIA		Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Harley Knox Bl. s
	Logistics Certi		· · · · · · · · · · · · · · · · · · ·	□ Die	nning Dota
✓ Oper.(LOS)		L	Des.(N)	∟Ріа	nning Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K	3753	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 13 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.5 )] 0.939	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1448 69.3 20.9 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year		of Harley Knox Bl. s
	Logistics Cert	ter Phase II TI/	· ,	□ Die	nning Data
✓ Oper.(LOS)		L	Des.(N)	⊔Ріа	nning Data
Flow Inputs Volume, V AADT	2867	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 8	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments		<u> </u>		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.962	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N	3	ft ft	f <sub>LW</sub>		mph mph
Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	70.0	ramps/mi mph mph	TRD Adjustment	70.0	mph mph
LOS and Performanc	e Measures	<del></del>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS		pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T		
General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour Logistics Center Phase II Th		Highway/Direction of Trave From/To Jurisdiction Analysis Year	North o Caltran	I-215 Northbound North of Harley Knox Bl. Caltrans EAP (2017)	
	Logistics Cert		· · · · · · · · · · · · · · · · · · ·	□ Die	nning Data	
✓ Oper.(LOS)		L	Des.(N)	∟Ріа	nning Data	
Flow Inputs Volume, V AADT	5279	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 9		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.957		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width Rt-Side Lat. Clearance Number of Lanes, N	3	ft ft	f <sub>LW</sub>		mph mph	
Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	70.0	ramps/mi mph mph	TRD Adjustment FFS	70.0	mph mph	
LOS and Performanc	e Measures	<del></del>	Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS		pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour Logistics Center Phase II The		Highway/Direction of Trave From/To Jurisdiction Analysis Year		of Harley Knox Bl. s
✓ Oper.(LOS)	Logistics Certi		· ,	□ Dio	nning Data
. , ,		L	Des.(N)	⊔Ріа	nning Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4941	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.92 8 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.962	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS		pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т		
General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	North of Caltran	I I-215 Southbound North of Harley Knox Bl. Caltrans EAPC (2017)	
Project Description Knox	Logistics Cent		, ,			
Oper.(LOS)		L	Des.(N)	Plai	nning Data	
Flow Inputs	F404	a la /la	Deals Have Faster DUE	0.00		
Volume, V AADT	5121	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 10		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
fp	1.00		E <sub>R</sub>	1.2		
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.952		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width		ft				
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph	
Number of Lanes, N	3		f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	mph	
Base free-flow Speed, BFFS		mph			r	
LOS and Performanc	e Measures	3	Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S	N x f <sub>HV</sub> 1948 63.5 30.7	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$	N x f <sub>HV</sub>	pc/h/ln mph	
LOS	D	r -	D = v <sub>p</sub> / S Required Number of Lane	s, N	pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour Logistics Center Phase II TI/		Highway/Direction of Trave From/To Jurisdiction Analysis Year		of Harley Knox Bl. s
✓ Oper.(LOS)	Logistics Certi		· ,	□ Dio	nning Dota
. , ,			Des.(N)	⊔Ріа	nning Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4755	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.92 10 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 )] 0.952	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performanc	e Measures	<del></del>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS		pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T		
General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour Logistics Center Phase II TIA		Highway/Direction of Trave From/To Jurisdiction Analysis Year	North o Caltran	I-215 Northbound North of Harley Knox Bl. Caltrans EAPC (2017)	
	Logistics Certi		,	□ Die	nning Dota	
✓ Oper.(LOS)		L	Pes.(N)	⊔Ріа	nning Data	
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4517	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.92 11 0 Level		
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi		
Calculate Flow Adjus	tments		·			
$f_p$ $E_T$	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 )] 0.948		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph	
LOS and Performanc	e Measures	5	Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1727 66.8 25.9 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

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General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 PM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Harley Knox Bl. S
Project Description Knox	Logistics Cent	ter Phase II TIA	4 <i>(JN 09347)</i>		
✓ Oper.(LOS)			Des.(N)	□Plar	nning Data
Flow Inputs					
Volume, V AADT	3501	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 7	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.966	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft		-	
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph		70.0	тірп
LOS and Performanc	e Measures	<b>)</b>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1313 69.9 18.8 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

# APPENDIX 7.5:

EAPC (2017) CONDITIONS FREEWAY MERGE/DIVERGE ANALYSIS WORKSHEETS



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		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET			
General Info	rmation			Site Infor						
Analyst	CHS		Fi	reeway/Dir of Tr	avel	I-215 S	Southbound			
Agency or Company	y Urba	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/			urisdiction		Caltrar				
Analysis Time Perio		eak Hour		nalysis Year		EAPC	(2017)			
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		le v								
Upstream Adj F	Ramp	· ·	ber of Lanes, N	3					Downstre	am Adj
☐ Yes [	On	Ramp Numbe	•	1					Ramp	
	_ 011		ane Length, L <sub>A</sub>						✓ Yes	✓ On
☑ No [	Off		ane Length L <sub>D</sub>	195					□No	Off
		Freeway Volu	•	3753						
L <sub>up</sub> =	ft	Ramp Volume	1.	1074					L <sub>down</sub> =	1420 ft
V,, = \	/eh/h	Freeway Free	-Flow Speed, $S_{FF}$	70.0					V <sub>D</sub> =	189 veh/h
vu ,	7011/11	Ramp Free-Fl	ow Speed, S <sub>FR</sub>	45.0						
Conversion t	to pc/h Und	der Base (	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	fp	v = V/PHI	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	3753	0.92	Level	13	0	0	.939	1.00		345
Ramp	1074	0.92	Level	26	0	_	.885	1.00	+	319
UpStream	1	1			Ť	Ť			<del>-</del>	<del></del>
DownStream	189	0.92	Level	26	0 0.885 1.00					232
		Merge Areas						Diverge Areas		
Estimation o	f v <sub>12</sub>				Estima	tion c	of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>EM</sub> )					V <sub>12</sub> =	: V <sub>R</sub> + (V <sub>F</sub> - '	$V_{\rm p})P_{\rm FD}$	
L <sub>EQ</sub> =	12 1	tion 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13		3)
P <sub>FM</sub> =		Equation (E			P <sub>FD</sub> =			591 using E		
V <sub>12</sub> =	pc/h	1 (	,		V <sub>12</sub> =			106 pc/h	4	,
V <sub>3</sub> or V <sub>av34</sub>	•	Fauation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			239 pc/h (Ec	uation 13-1	4 or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7			,					Yes ☑ No		10.1011)
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5								∃Yes ☑ No		
			-16, 13-18, or					c/h (Equatio		3-18. or 13-
If Yes,V <sub>12a</sub> =	13-19)				If Yes,V <sub>12a</sub>		19			
Capacity Ch	ecks				Capaci	ty Ch	ecks			
	Actual	C	apacity	LOS F?			Actual		Capacity	LOS F?
					V <sub>F</sub>		4345	Exhibit 13	3-8 7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V$		3026	Exhibit 13	3-8 7200	No
					$V_R$		1319	Exhibit 13	-10 2100	No
Flow Enterin	g Merge In	fluence A	rea	-	Flow E	nterir	g Dive	rge Influe	nce Area	
	Actual	Max	Desirable	Violation?			Actual	Max Desir	able	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		3106	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)		Level o	f Ser	vice De	terminati	on (if not	F)
D <sub>R</sub> = 5.475 + 0			D <sub>R</sub> = 4	4.252 + 0	.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>				
D <sub>R</sub> = (pc/mi/lr	n)				$D_R = 2$	9.2 (pc	:/mi/ln)			
LOS = (Exhibit	13-2)					) (Exhi	bit 13-2)			
Speed Deter					Speed			on		
$M_S = (Exibit 1)$					<del>                                     </del>		xhibit 13-			
-	•						(Exhibit			
	hibit 13-11)						(Exhibit			
	hibit 13-11) hibit 13-13)				I *					
		Diabte Decre	.d				(Exhibit		Conorda 1 5'	10/2015 10.10
pyright © 2014 Unive	rsity of ⊢lorida, All	Rights Reserve	a		HCS2010 <sup>™</sup>	Versio	n 6.65		Generated: 5/	19/2015 10:12

General Infori			RAMP JUNG	Site Infor					
Analyst	CHS	<u> </u>		eeway/Dir of Tr		215 Southboun			
Agency or Company		an Crossroads,		nction		arley Knox On-			
Date Performed		/2015		risdiction		altrans			
Analysis Time Period		Peak Hour		alysis Year		APC (2017)			
Project Description				uryono i <del>c</del> ai		-1 0 (2011)			
Inputs	NIIOX LOGISTICS	S Center Friase	TITIA (3N 09341)						
		Freeway Num	nber of Lanes, N	3				L .	
Jpstream Adj Ramp		1 '						Downstre	am Adj
✓ Yes ☐ On		Ramp Numbe		1				Ramp	
res On		Acceleration I	Lane Length, L <sub>A</sub>	260				☐Yes	On
□ No ☑ Off		Deceleration	Lane Length L <sub>D</sub>					□ NI=	□ o#
		Freeway Volu	ıme, V <sub>r</sub>	2678				✓ No	Off
- <sub>up</sub> = 1420 f	t	Ramp Volume		189				L <sub>down</sub> =	ft
ир			11						
/ <sub></sub> = 1074 v	eh/h		e-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h
<u> </u>			low Speed, S <sub>FR</sub>	45.0					
Conversion to		der Base	Conditions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	fp	v = V/PHF	x f <sub>HV</sub> x f,
Freeway	2678	0.92	Level	7	0	0.966	1.00		3013
		+			<del>                                     </del>				
Ramp	189	0.92	Level	26	0	0.885	1.00	<b>-</b>	232
UpStream	1074	0.92	Level	26	0	0.885	1.00	<u> </u>	319
DownStream		Manus A					Discours: A		
Eatimatic - : f		Merge Areas			Eatim - 4: -		Diverge Areas		
Estimation of					Estimatio	11 Of V <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P	
- <sub>EQ</sub> =	761.27	(Equation	13-6 or 13-7)		_				2)
_			tion (Exhibit 13-6)		L <sub>EQ</sub> =		(Equation 13-		
2 <sub>FM</sub> = / =			1011 (EXHIDIC 10-0)		P <sub>FD</sub> =		using Equation	n (Exhibit 1	3-7)
12 -	1762				V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$		pc/n (Equati	on 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation 1	3-14 or 13-1	7)
Is $V_3$ or $V_{av34} > 2,700$	17) ) nc/h2 □ ∨o	o Wha				> 2,700 pc/h? i	Yes No		
							☐ Yes ☐ No		
Is $V_3$ or $V_{av34} > 1.5 *$			40.15.15		"""		res No pc/h (Equatio	n 13-16 1	3-18 or
f Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =		3-19)	11 13-10, 1	o-10, 01
Capacity Che		13-19)			Capacity	Chocks	•		
Sapacity Cite	Actual		Capacity	LOS F?	Capacity	1	Car	pacity	LOSF
	Actual		Зарасну	LOGIT	V	Actual			1 2001
					V <sub>F</sub>		Exhibit 13-	+	
$V_{FO}$	3245	Exhibit 13-8		No	$V_{FO} = V_{F} - Y_{FO}$	V <sub>R</sub>	Exhibit 13-		
. ~					V <sub>R</sub>		Exhibit 13	-	
							10	<u> </u>	1
Flow Entering		_		\n · · · -	Flow Ente		rge Influen		10
	Actual	i i	Desirable	Violation?		Actual	Max Desi	rable	Violation
V <sub>R12</sub>	1994	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
Level of Servi	ce Deterr	mination (	if not F)		Level of S	Service De	eterminatio	n (if not	<i>F</i> )
D <sub>R</sub> = 5.475 + 0	0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> - 0.	00627 L <sub>A</sub>		D <sub>F</sub>	<sub>R</sub> = 4.252 + 0	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
O <sub>R</sub> = 19.3 (pc/mi			••		L	· /mi/ln)		-	
OS = B (Exhibit 1	-					hibit 13-2)			
					<del></del>				
	iination				<del>1 '</del>	terminati	on		
Speed Determ	it 13-11)				$D_s = (Exh$	nibit 13-12)			
•						(Exhibit 13-12	)		
M <sub>S</sub> = 0.326 (Exib	-				PR IIIPII	(EXHIBIT TO TE	,		
$M_{\rm S} = 0.326 \text{ (Exibos)}$ $S_{\rm R} = 60.9 \text{ mph (I)}$	Exhibit 13-11)				I				
$S_R = 60.9 \text{ mph (I)}$ $S_0 = 67.3 \text{ mph (I)}$	-				S <sub>0</sub> = mph	(Exhibit 13-12)	)		

General Inform		MPS AND		Site Infor					
Analyst	CHS	<u> </u>		eeway/Dir of Tr		-215 Northboun	ıd		
Analyst Agency or Company		o an Crossroads, I		eeway/Dir or Tr nction		-215 Northboun Harley Knox On			
Date Performed		/2015		risdiction		naney knox on Caltrans	-ι ταιτιμ		
Analysis Time Period		Peak Hour		alysis Year		EAPC (2017)			
Project Description				aryoro rear		_m 0 (2011)			
Inputs	THON LOGISTICS	J JOHNOI I HASE	11 11/1 (UIV UUUTI)						
		Freeway Num	ber of Lanes, N	3				Days: -t-	ana A -1:
Jpstream Adj Ramp		Ramp Number		1				Downstre Ramp	am Auj
✓ Yes ☐ On		· ·						1 '	
			ane Length, L <sub>A</sub>	300				☐Yes	On
☐ No ☑ Off			ane Length L <sub>D</sub>					✓ No	Off
		Freeway Volur	ne, V <sub>F</sub>	4615				1	_
<sub>-up</sub> = 1395 ff	t	Ramp Volume	, V <sub>R</sub>	665				L <sub>down</sub> =	ft
		Freeway Free-	Flow Speed, S <sub>FF</sub>	70.0				\/ -	vah/h
$l_{\rm u} = 327 \text{ ve}$	h/h		ow Speed, S <sub>FR</sub>	45.0				V <sub>D</sub> =	veh/h
Conversion to	pc/h Un		. 110						
(pc/h)	V	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	- x f, x f
" /	(Veh/hr)						-	<b></b>	
reeway	4615	0.92	Level	8	0	0.962	1.00		5217
Ramp	665	0.92	Level	18	0	0.917	1.00		788
UpStream	327	0.92	Level	18	0	0.917	1.00		387
DownStream		Maraa A			-		Diverge Areas		
Estimation of		Merge Areas			Ectimoti				
Estimation of					Estimation	011 01 V <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	= V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	P <sub>ED</sub>	
- <sub>EQ</sub> =	1369.6	7 (Equation	13-6 or 13-7)		L <sub>50</sub> =	12	(Equation 13		3)
P <sub>FM</sub> =	0.586	using Equat	ion (Exhibit 13-6)		L <sub>EQ</sub> = P =		using Equation		
/ <sub>12</sub> =	3057		. ,		P <sub>FD</sub> =			ייי (באוווטונ זי	J-1 j
		•	on 13-14 or 13-		V <sub>12</sub> =		pc/h		-\
$V_3$ or $V_{av34}$	17)	. (=4-30)			V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation		7)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,700	pc/h? Ye	es 🗹 No					☐ Yes ☐ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 * '	V <sub>12</sub> /2 <b>▼</b> Ye	es 🗌 No			Is $V_3$ or $V_{av34}$	<sub>4</sub> > 1.5 * V <sub>12</sub> /2	☐Yes ☐No		
		pc/h (Equatio	on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
f Yes,V <sub>12a</sub> =	18, or	13-19)	-,				13-19)		
Capacity Chec	ks				Capacity				
	Actual	C	apacity	LOS F?		Actua		pacity	LOS F
l					$V_{F}$		Exhibit 13-	8	
V <sub>FO</sub>	6005	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13-	8	
- 60	5500					1.1	Exhibit 13	i-	1
					V <sub>R</sub>		10		
Flow Entering		-1		10.00	Flow Ent		erge Influer		
	Actual	1	Desirable	Violation?	ļ ,,	Actual	Max Des	irable	Violation
V <sub>R12</sub>	3845	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
Level of Servi		<u> </u>			<del></del>		eterminatio	_	<i>F</i> )
$D_R = 5.475 + 0$	0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> - 0.0	00627 L <sub>A</sub>			O <sub>R</sub> = 4.252 +	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
	ln)				$D_R = (pc)$	c/mi/ln)			
O <sub>R</sub> = 33.2 (pc/mi/	3-2)				I	xhibit 13-2)			
					<u> </u>	eterminati	ion		
.OS = D (Exhibit 1	ination				<del></del>		· · · · · · · · · · · · · · · · · · ·		
OS = D (Exhibit 1					D = /=-	thihit 13-191			
OS = D (Exhibit 1) Speed Determ $M_S = 0.476$ (Exhibit	it 13-11)				I *	khibit 13-12)	)\		
OS = D (Exhibit 1) <b>Speed Determ</b> $M_S = 0.476$ (Exhibit 2) $M_S = 0.476$ (Exhibit 2) $M_S = 0.476$ (Exhibit 2)	it 13-11) Exhibit 13-11)				S <sub>R</sub> = mp	oh (Exhibit 13-12	*		
OS = D (Exhibit 1) <b>Speed Determ</b> $M_S = 0.476$ (Exibit 5) $S_R = 56.7$ mph (Exibit 6) $S_R = 64.0$ mph (Exibit 6)	it 13-11)				S <sub>R</sub> = mp	•	*		

		RAMP	S AND RAM	IP JUNCTI	ONS WC	RKS	HEET			
General Info	rmation			Site Infor						
Analyst	CHS		Fr	reeway/Dir of Tr	avel	I-215 N	lorthbound			
Agency or Compan	y Urba	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/			urisdiction		Caltrar				
Analysis Time Perio		eak Hour		nalysis Year		EAPC	(2017)			
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		le v								
Upstream Adj	Ramp	1	ber of Lanes, N	3					Downstre	am Adj
□Vaa I		Ramp Numbe	•	1					Ramp	
Yes	On		ane Length, L <sub>A</sub>						✓ Yes	On
✓ No	Off	Deceleration I	Lane Length L <sub>D</sub>	280					□No	Off
		Freeway Volu	me, V <sub>F</sub>	4941						
L <sub>up</sub> =	ft	Ramp Volume	e, V <sub>R</sub>	327					L <sub>down</sub> =	1395 ft
			-Flow Speed, S <sub>FF</sub>	70.0						
V <sub>u</sub> = -	veh/h		low Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	665 veh/h
Conversion	to nc/h Un/		111	10.0						
	V PEAT OTT									
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHI	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	4941	0.92	Level	8	0	0.	962	1.00	5	585
Ramp	327	0.92	Level	18	0	0.	917	1.00	;	387
UpStream										
DownStream	665	0.92	Level	18	0	0.	917	1.00		788
		Merge Areas						Diverge Areas		
Estimation o	of v <sub>12</sub>				Estimat	tion c	of V <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	V <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13	-12 or 13-1	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	603 using E	guation (Ex	nibit 13-7)
V <sub>12</sub> =	pc/h		,		V <sub>12</sub> =			519 pc/h	1 (	,
V <sub>3</sub> or V <sub>av34</sub>	•	Fauation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			066 pc/h (Eq	uation 13 <sub>-</sub> 1	4 or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7			110.1011			>27		Yes ☑ No		7 01 10 17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7 Is V <sub>3</sub> or V <sub>av34</sub> > 1.5								_ res ☑ No		
			-16, 13-18, or					_ Yes ⊻ No oc/h (Equatio		3_18 or 13_
If Yes,V <sub>12a</sub> =	13-19)		-10, 10-10, 01		If Yes,V <sub>12a</sub>	=		9)	/// 10-10, 10	)- 10, 01 10-
Capacity Ch	ecks				Capacit	ty Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	(	Capacity	LOS F?
					V <sub>F</sub>		5585	Exhibit 13	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	5198	Exhibit 13	3-8 7200	No
					V <sub>R</sub>		387	Exhibit 13	-10 2100	No
Flow Enterin	na Morao In	fluonco A	lroa					rge Influe		
TIOW LINEIN	Actual	T	Desirable	Violation?	I IOW LI	_	Actual	Max Desir		Violation?
V <sub>R12</sub>	7101001	Exhibit 13-8	Boomablo	VIOIGGOTT.	V <sub>12</sub>	_	3519	Exhibit 13-8	4400:All	No
Level of Ser	vice Detern		if not E)					termination		
$D_R = 5.475 + 0$					.0086 V <sub>12</sub> - (		1)			
l '`					.0000 v <sub>12</sub> - v	J.009 L <sub>D</sub>				
$D_R = (pc/mi/l)$	*				I ''	2.0 (pc				
LOS = (Exhibit							bit 13-2)			
Speed Deter	mination				Speed I	Deter	minatio	on		
$M_S = (Exibit)^{-1}$	13-11)		$D_s = 0$	.333 (E	xhibit 13	-12)				
S <sub>R</sub> = mph (Ex	thibit 13-11)				$S_R = 6$	0.7 mph	(Exhibit	13-12)		
	hibit 13-11)				$S_0 = 7$	2.6 mph	(Exhibit	13-12)		
	hibit 13-13)				S = 6	4.6 mph	(Exhibit	13-13)		
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		•				. 5.5.5				

		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET			
General Info	rmation			Site Infor						
Analyst	CHS		Fi	reeway/Dir of Tr	avel	I-215 S	outhbound			
Agency or Compan	y Urba	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/	2015	Ju	urisdiction		Caltrar	IS			
Analysis Time Perio		eak Hour		nalysis Year		EAPC	(2017)			
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		<u>.</u>							1	
Upstream Adj	Ramp	Freeway Num Ramp Numbe	ber of Lanes, N	3 1					Downstre Ramp	am Adj
□Yes	On	l '	ane Length, L <sub>A</sub>	'					✓ Yes	<b>☑</b> On
✓ No	Off		Lane Length L <sub>D</sub>	195					□No	Off
	C.	Freeway Volu	•	5121						1420 ft
L <sub>up</sub> =	ft	Ramp Volume		803					L <sub>down</sub> =	1420 11
V,, = ,	veh/h	Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	438 veh/h
*u	VOIIII	Ramp Free-Fl	low Speed, S <sub>FR</sub>	45.0					Б	
Conversion	to pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHI	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	5121	0.92	Level	10	0	0.	952	1.00	5	845
Ramp	803	0.92	Level	19	0	0.	913	1.00	(	956
UpStream										
DownStream	438	0.92	Level	22	0	0.	901	1.00	į	528
<b>-</b>	•	Merge Areas				4.		Diverge Areas		
Estimation o	of V <sub>12</sub>				Estima	tion c	of V <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - '	V <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13	-12 or 13-1	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	570 using E	quation (Ext	nibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			742 pc/h		•
V <sub>3</sub> or V <sub>av34</sub>	•	Fauation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			103 pc/h (Ed	uation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,7$			,,					Yes ☑ No		,
Is $V_3$ or $V_{av34} > 1.5$								_ Yes ☑ No		
			-16, 13-18, or					oc/h (Equatio		8-18. or 13-
If Yes,V <sub>12a</sub> =	13-19)		,,		If Yes,V <sub>12a</sub>		19			,
Capacity Ch	ecks				Capaci	ty Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	(	Capacity	LOS F?
					$V_{F}$		5845	Exhibit 13	3-8 7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{I}$	F-V <sub>R</sub>	4889	Exhibit 13	3-8 7200	No
					$V_R$		956	Exhibit 13	-10 2100	No
Flow Enterin	g Merge In	fluence A	rea		Flow E	nterin	g Dive	rge Influe	nce Area	-
	Actual	T	Desirable	Violation?		_	Actual	Max Desir		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		3742	Exhibit 13-8	4400:All	No
Level of Serv	vice Detern	nination (	if not F)	•	Level o	f Ser	vice De	terminati	on (if not	<del>.</del> F)
D <sub>R</sub> = 5.475 + 0					.0086 V <sub>12</sub> -					
D <sub>R</sub> = (pc/mi/l	• • • • • • • • • • • • • • • • • • • •	12	^		D <sub>R</sub> = 3	4.7 (pc		12	Б	
LOS = (Exhibit	•						bit 13-2)			
Speed Deter	•				Speed			<u> </u>		
_					1 -					
M <sub>S</sub> = (Exibit 1	*				xhibit 13-					
	hibit 13-11)						(Exhibit			
	hibit 13-11)			1		(Exhibit				
S = mph (Ex	hibit 13-13)				•		(Exhibit	13-13)		
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Conoral	nformati		MILO HIND	NAIVIT JUN	CTIONS W		<u> </u>			
General I	ntormatic				Site Infor					
Analyst		CHS			reeway/Dir of Tr		I-215 Southbou			
Agency or Cor			n Crossroads, Ir		unction		Harley Knox O	n-Ramp		
Date Performe		5/19/			urisdiction		Caltrans			
Analysis Time			Peak Hour		Analysis Year	ļ	EAPC (2017)			
Inputs	DUOII KIIOX L	ogistics	Center Phase i	I TIA (JN 09347)	<u> </u>					
			Freeway Numb	or of Longo N	2				1	
Jpstream Adj	Ramp		1		3					ream Adj
			Ramp Number	of Lanes, N	1				Ramp	
✓ Yes	On		Acceleration La	ane Length, L <sub>A</sub>	260				Yes	On
□No	✓ Off		Deceleration La	ane Length L <sub>D</sub>						
	- OII		Freeway Volun	ne, V	4317				✓ No	Off
- <sub>up</sub> = 1	420 ft		Ramp Volume,	•	438				L <sub>down</sub> =	ft
ир				Flow Speed, S <sub>FF</sub>						
/ <sub>u</sub> = 8	03 veh/h		1						$V_D =$	veh/h
			Ramp Free-Flo	. 117	45.0					
Conversi			der Base C	conditions				_		
(pc/h)		/ h/hr\	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PI	HF x f <sub>HV</sub> x f <sub>D</sub>
Francis		h/hr)	0.00	Laval	+ ,		_		+	
Freeway	43		0.92	Level	8	0	0.962	1.00		4880
Ramp	43		0.92	Level	22	0	0.901	1.00	+	528
UpStream	80	3	0.92	Level	19	0	0.913	1.00		956
DownStream			M					Bi A		
- otim otic			Merge Areas			Fatimati	ion of w	Diverge Areas		
Stimatio	11 01 V <sub>12</sub>					Esumau	on of v <sub>12</sub>			
	V	<sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )				V.,	= V <sub>R</sub> + (V <sub>F</sub> - V	'-)P	
- <sub>EQ</sub> =		1224.15	(Equation	13-6 or 13-7)			* 12	(Equation 13		12\
P <sub>FM</sub> =				on (Exhibit 13-6	3)	L <sub>EQ</sub> =				•
/ <sub>12</sub> =		2854		(=:::::::::::::::::::::::::::::::::::::	- /	P <sub>FD</sub> =		using Equat	ion (Exnibit	13-7)
			•	n 13-14 or 13	_	V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$		17)	pc/ii (Equatio	11 13-14 01 13		$V_3$ or $V_{av34}$		pc/h (Equation	13-14 or 13	3-17)
Is V <sub>2</sub> or V <sub>21/24</sub>	> 2,700 pc/h?	⊢̈́Ye	s 🗸 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>4</sub> > 2,700 pc/h	? ☐ Yes ☐ No	5	
	> 1.5 * V <sub>12</sub> /2					Is V <sub>3</sub> or V <sub>av3</sub>	1.5 * V <sub>12</sub> /2	☐ Yes ☐ No	5	
			s ⊡ No pc/h (Equatio	n 13_16 13_		If Yes,V <sub>12a</sub> =		pc/h (Equati		13-18, or
Yes,V <sub>12a</sub> =			13-19)	11 13-10, 13-		11 163, v <sub>12a</sub> –		13-19)		
Capacity		,	,			Capacity	/ Checks			
, , , ,		tual	Ca	pacity	LOS F?		Actu	al C	apacity	LOS F?
			i i	.po.oy	1	V <sub>F</sub>		Exhibit 13		
							1/	_		
$V_{FO}$	54	80	Exhibit 13-8		No	$V_{FO} = V_{F}$	- v <sub>R</sub>	Exhibit 13		
						$V_R$		Exhibit 1 10	3-	
Jour Ent	orina Moi	ao Ir	fluonos A	roo		Flow En	toring Div		noo Aro	
IUW EIIT		<b>ge in</b> tual	fluence A		Violation?	i∟iom EU	Actual	verge Influe Max De		Violation
\/	33		Exhibit 13-8	esirable	<del>1</del>	\/	Actual	_	ioii auie	violation
V <sub>R12</sub>				4600:All	No	V <sub>12</sub>	00000	Exhibit 13-8		<u> </u>
			nination (i					Determinati		ρτ <i>Ի)</i>
		4 V <sub>R</sub> + 1	0.0078 V <sub>12</sub> - 0.0	0627 L <sub>A</sub>		[	ر <sub>R</sub> = 4.252 +	- 0.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
$O_{R} = 30.0$	(pc/mi/ln)					$D_R = (p$	c/mi/ln)			
.OS = D (E	Exhibit 13-2)					LOS = (E	xhibit 13-2)			
•	terminat	ion				<u>.                                    </u>	etermina	tion		
•						<del>'                                    </del>	xhibit 13-12)			
· ·	2 (Exibit 13-1						•	10)		
$S_{R} = 58.5$	mph (Exhibit	13-11)				I ''	oh (Exhibit 13-	•		
	/	12 11\				$S_0 = mp$	oh (Exhibit 13-1	12)		
	mph (Exhibit					1 ° '				
$6_0 = 64.5$ 6 = 60.6	mph (Exhibit mph (Exhibit					I *	oh (Exhibit 13-1	13)		

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	RA	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET				
General Infor				Site Infor						
Analyst Agency or Company Date Performed		in Crossroads, I /2015	nc. Ju	reeway/Dir of Trunction	I	-215 North Harley Kno Caltrans	nbound ox On-Ram	p		
analysis Time Period		Peak Hour		nalysis Year		EAPC (201	17)			
Project Description				, 0.0 . 00.	•	_/ O (20	,			
nputs			,							
lpstream Adj Ramp			ber of Lanes, N	3					Downstre	am Adj
✓ Yes 🗌 Or	า	Ramp Number	•	1					Ramp	
		Deceleration L	ane Length, L <sub>A</sub>	300					Yes	☐ On
□ No   ☑ Of	f	Freeway Volui		3302					✓ No	Off
<sub>up</sub> = 1395	ft	Ramp Volume	•	1215				ļ	L <sub>down</sub> =	ft
			·Flow Speed, S <sub>FF</sub>	70.0						
$v_{u} = 199 \text{ v}$	eh/h		ow Speed, S <sub>FR</sub>	45.0				ľ	V <sub>D</sub> =	veh/h
Conversion t	o no/h Un		- 110	43.0						
	o pc/ii oii □ ∨					Τ.		. 1	=	
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>H∨</sub>	,	f <sub>p</sub>	v = V/PHI	x f <sub>HV</sub> x f <sub>p</sub>
reeway	3302	0.92	Level	7	0	0.966		1.00		3715
Ramp	1215	0.92	Level	22	0	0.901		1.00		1466
JpStream	199	0.92	Level	14	0	0.935		1.00		231
DownStream		Merge Areas				Divo	erge Areas			
stimation of		Meige Aleas			Estimati	on of v	ige Aleas			
		/D \					12			
_	$V_{12} = V_F$		10.0 - 10.7)			,	$V_{12} = V_{R}$	+ (V <sub>F</sub> - V <sub>R</sub> )	$P_{FD}$	
EQ =			13-6 or 13-7)		L <sub>EQ</sub> =		(Eq	uation 13-	12 or 13-1	13)
FM =			ion (Exhibit 13-6)	)	P <sub>FD</sub> =		usir	ng Equation	n (Exhibit 1	3-7)
12 =	2177		n 12 14 or 12		V <sub>12</sub> =		pc/l	h		
<sub>3</sub> or V <sub>av34</sub>	17)	pc/ii (Equalic	on 13-14 or 13-	•	$V_3$ or $V_{av34}$		pc/h	n (Equation 13	3-14 or 13-1	17)
s V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h?	s 🗹 No			Is V <sub>3</sub> or V <sub>av3</sub>					
s V <sub>3</sub> or V <sub>av34</sub> > 1.5					Is V <sub>3</sub> or V <sub>av3</sub>	<sub>4</sub> > 1.5 * V				
Yes,V <sub>12a</sub> =	2177		on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/l 13-1	h (Equatior 9)	13-16, 1	3-18, or
Capacity Che	ecks				Capacity	/ Chec	ks			
	Actual	C	apacity	LOS F?			Actual	Сар	acity	LOS F?
					$V_{F}$			Exhibit 13-8		
$V_{FO}$	5181	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		Exhibit 13-8		
10					V <sub>R</sub>			Exhibit 13-		
F		- fl				4	D :	10	4	
low Entering	Actual		<b>rea</b> Desirable	Violation?	Flow En	Actu		Max Desir		Violation?
V <sub>R12</sub>	3643	Exhibit 13-8	4600:All	No	V <sub>12</sub>	٨٠١١		xhibit 13-8	asic	v iolation?
evel of Serv			1		Servic		rminatio	n (if not	· <i>F</i> )	
		0.0078 V <sub>12</sub> - 0.0	<del></del>					86 V <sub>12</sub> - 0.0	_	- /
$_{R} = 31.3 (\text{pc/m})$		12	A			c/mi/ln)		12	<del>-</del> υ	
OS = D (Exhibit	•				1	xhibit 13	-2)			
Speed Deterr					Speed D					
•					<del>  '                                   </del>	chibit 13-1				
M <sub>S</sub> = 0.443 (Exi	•				1 "	oh (Exhibit	•			
	(Exhibit 13-11)				I '' '	•	,			
•	(Exhibit 13-11)				1 '	h (Exhibit				
<u>.</u>	(Exhibit 13-13)					h (Exhibit				
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		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET			
General Info	rmation			Site Infor						
Analyst	CHS		F	reeway/Dir of Tr	avel	I-215 N	Northbound			
Agency or Compan	y Urbai	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/2	2015	Jı	urisdiction		Caltrar	าร			
Analysis Time Perio		eak Hour		nalysis Year		EAPC	(2017)			
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		l							1	
Upstream Adj I	Ramp	· ·	ber of Lanes, N	3					Downstre	am Adj
	$\neg$	Ramp Numbe	r of Lanes, N	1					Ramp	
☐ Yes [	On	Acceleration L	ane Length, L <sub>A</sub>						✓ Yes	✓ On
✓ No [	Off	Deceleration L	ane Length L <sub>D</sub>	280						
	_ 0	Freeway Volu	me, V <sub>F</sub>	3501					□No	Off
L <sub>up</sub> =	ft	Ramp Volume	•	199					L <sub>down</sub> =	1395 ft
.,			-Flow Speed, S <sub>FF</sub>							
V <sub>u</sub> = \(\dagger\)	/eh/h		ow Speed, S <sub>FR</sub>	45.0					$V_D =$	1215 veh/h
Comyonolon	to no/b 11nd		111	45.0						
Conversion	to pc/n Und	ier base (	Conditions	1	1				1	
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHI	F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	3501	0.92	Level	7	0	0	.966	1.00	3	939
Ramp	199	0.92	Level	14	0	0	.935	1.00		231
UpStream	1									
DownStream	1215	0.92	Level	22	0	0	.901	1.00	1	466
	Ī	Merge Areas					Ī	Diverge Areas	•	
Estimation o	of v <sub>12</sub>				Estima	tion c	of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(Pr., )						V <sub>R</sub> + (V <sub>F</sub> - '	V <sub>D</sub> )P <sub>ED</sub>	
l =	12 1	tion 13-6 or	13_7)		I =			Equation 13		3)
L <sub>EQ</sub> = P =		Equation (			L <sub>EQ</sub> = P =			-		
P <sub>FM</sub> =	_	Equation (	EXHIBIT 13-0)		P <sub>FD</sub> =			651 using E	quation (Exi	11011 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			645 pc/h		
V <sub>3</sub> or V <sub>av34</sub>			-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			294 pc/h (Ed	-	4 or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7								☐Yes ☑ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5					Is V <sub>3</sub> or V <sub>a</sub>	<sub>v34</sub> > 1.5		☐Yes ☑ No		
If Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub>	=		oc/h (Equatio	on 13-16, 13	3-18, or 13-
Capacity Ch	13-19)				Capacia			9)		
Capacity Off	Actual	Ι	apacity	LOS F?	l	ty On	Actual	1 (	Capacity	LOS F?
	Actual	<del>l ĭ</del>	apacity	LO31 !	V <sub>F</sub>		3939	Exhibit 13		No No
.,		E 1 11 11 40 0								
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V		3708	Exhibit 13		No
					V <sub>R</sub>		231	Exhibit 13	-10 2100	No
Flow Enterin	g Merge In	fluence A	rea		Flow E	nterir	g Dive	rge Influe		
	Actual		Desirable	Violation?			Actual	Max Desir	able	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		2645	Exhibit 13-8	4400:All	No
Level of Serv	vice Detern	nination (	if not F)		Level o	f Ser	vice De	terminati	on (if not	· <b>F</b> )
D <sub>R</sub> = 5.475 + 0	$D_R = 5.475 + 0.00734 \text{ v}_R + 0.0078 \text{ V}_{12} - 0.00627 \text{ L}_A$						4.252 + 0	.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/li	n)				$D_R = 2$	24.5 (pc	/mi/ln)			
LOS = (Exhibit	13-2)						bit 13-2)			
Speed Deter					Speed			<u> </u>		
_					-					
$M_S = (Exibit 1)$	•				1 -		xhibit 13			
''	hibit 13-11)						(Exhibit			
	hibit 13-11)				I *		ı (Exhibit			
S = mph (Ex	hibit 13-13)						(Exhibit	13-13)		
pyright © 2014 Unive	rsity of Florida, All	Rights Reserve	ed		HCS2010 <sup>TM</sup>	Versio	n 6.65		Generated: 5/	19/2015 10:16

# APPENDIX 7.6:

EAPC (2017) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
WITH IMPROVEMENTS



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	•	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	^↑	7	ሻሻ	^↑	7	7	<b>↑</b>	77	ሻ	<b>∱</b> ∱	
Volume (veh/h)	0	21	8	534	45	17	8	5	487	8	6	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	25	8	636	54	20	10	6	207	10	7	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	274	1045	462	1013	1821	805	21	507	1765	21	1013	0
Arrive On Green	0.00	0.28	0.28	0.28	0.48	0.48	0.01	0.27	0.27	0.01	0.27	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1680	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	25	8	636	54	20	10	6	207	10	7	0
Grp Sat Flow(s),veh/h/ln	1810	1900	1680	1810	1900	1680	1810	1900	1615	1810	1900	0
Q Serve(g_s), s	0.0	0.6	0.4	18.4	0.9	0.6	0.7	0.3	0.4	0.7	0.2	0.0
Cycle Q Clear(g_c), s	0.0	0.6	0.4	18.4	0.9	0.6	0.7	0.3	0.4	0.7	0.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	274	1045	462	1013	1821	805	21	507	1765	21	1013	0
V/C Ratio(X)	0.00	0.02	0.02	0.63	0.03	0.02	0.47	0.01	0.12	0.47	0.01	0.00
Avail Cap(c_a), veh/h	274	1045	462	1013	1821	805	83	507	1765	83	1013	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	31.7	23.9	37.8	16.5	11.0	58.9	32.4	6.8	58.9	32.3	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.9	0.0	0.1	5.8	0.0	0.1	5.8	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	0.0	0.3	0.2	9.3	0.5	0.3	0.4	0.2	1.2	0.4	0.1	0.0
LnGrp Delay(d),s/veh	0.0	31.8	24.0	38.7	16.5	11.1	64.7	32.4	6.9	64.7	32.3	0.0
LnGrp LOS	0.0	С	C	D	В	В	E	C	A	E	C	0.0
Approach Vol, veh/h		33			710			223			17	
Approach Delay, s/veh		29.9			36.2			10.2			51.4	
Approach LOS		C			D			В			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	38.1	38.5	5.9	37.5	13.6	63.0	5.9	37.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	29.5	33.0	5.5	32.0	5.0	57.5	5.5	32.0				
<b>0</b> , ,	29.5		2.7		0.0	2.9	2.7	2.4				
Max Q Clear Time (g_c+l1), s Green Ext Time (p_c), s	0.9	2.6 0.1	0.0	2.2 0.4	0.0	0.2	0.0	0.4				
, , , , , , , , , , , , , , , , , , ,	0.9	U. I	0.0	U.4	0.0	U.Z	0.0	U.4				
Intersection Summary			00.4									
HCM 2010 Ctrl Delay			30.4									
HCM 2010 LOS			С									

EAPC (2017) Conditions - AM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

Lane Configurations         ††         †         †         †         †         †         †         †         †         †         †         †         †         †         †         †         †         †         *		۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	Ţ	✓
Volume (veh/h) 0 479 37 250 262 0 0 0 0 1482 2 334	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Number 5 2 12 1 6 16 16 7 4 14 Initial O (Qb), veh 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
Initial O (Ob), weh	` ,				250	262		0	0	0	1482	2	
Ped-Bike Adj(A_pbT)											•		14
Parking Bus, Adj	Initial Q (Qb), veh		0			0						0	0
Adj Saf Flow, vehrhin 0 1900 1900 1900 1900 0 1900 1900 1900													
Adj Flow Rate, veh/h		1.00	1.00		1.00	1.00	1.00					1.00	1.00
Adj No. of Lanes         0         2         1         2         2         0         2         1         0           Peak Hour Factor         0.94         0.90         0.90         0.90         0.90         0.90         0.90         0.90         0.90         0.90         0.90<	Adj Sat Flow, veh/h/ln	0					0					1900	1900
Peak Hour Factor         0.94         0.00         0.00         0.00         0.00         0.00	Adj Flow Rate, veh/h	0	510	34	266	279	0				1850	0	0
Percent Heavy Veh, % 0 0 0 0 0 0 0 0 0 1987 1043 0 Cap, wehlh 0 889 378 318 1365 0 1987 1043 0 0.5	Adj No. of Lanes	0	2	1	2	2	0				2	1	0
Cap, veh/h         0         889         378         318         1365         0         1987         1043         0           Arrive On Green         0.00         0.08         0.18         0.72         0.00         0.55         0.00         0.00         0.00         0.00         0.05         0.00         0.00         0.05         0.00         0.00         3619         1900         0           Sat Flow, veh/h         0         3800         1615         3419         266         279         0         1850         0         0           Grp Sat Flow(s), veh/h/In         0         1900         1615         1810         1900         0         1810         1900         0           OServe(g_S), s         0.0         15.6         2.3         8.5         2.9         0.0         56.6         0.0         0.0           Ozele Q Clear(g_c, e), s         0.0         15.6         2.3         8.5         2.9         0.0         56.6         0.0         0.0           VCR Patio(X)         0.0         0.0         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00 </td <td>Peak Hour Factor</td> <td>0.94</td> <td>0.94</td> <td>0.94</td> <td>0.94</td> <td>0.94</td> <td>0.94</td> <td></td> <td></td> <td></td> <td>0.94</td> <td>0.94</td> <td>0.94</td>	Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Arrive On Green 0.00 0.08 0.08 0.18 0.72 0.00 0.55 0.00 0.00 Sat Flow, weh/h 0 3800 1615 3619 3800 0 3619 1900 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Sat Flow, veh/h         0         3800         1615         3619         3800         0         3619         1900         0           Grp Volume(v), veh/h         0         510         34         266         279         0         1850         0         0           Grp Sat Flow(s), veh/h/h         0         1615         1810         1900         0         56.6         0.0         0.0           OServe(g. s), s         0.0         15.6         2.3         8.5         2.9         0.0         56.6         0.0         0.0           Cycle Q Clear(g. c), s         0.0         15.6         2.3         8.5         2.9         0.0         56.6         0.0         0.0           Prop In Lane         0.00         1.00         1.00         0.00         1.00         1.00         0.00           Alan Cap(c. a), veh/h         0         889         378         318         1365         0         1987         1043         0           V/C Ratio(X)         0.00         0.57         0.09         0.84         0.20         0.00         0.93         0.00         0.00           HCM Platon Ratio         1.00         0.33         3.33         2.00         2.00 </td <td>Cap, veh/h</td> <td>0</td> <td>889</td> <td>378</td> <td>318</td> <td>1365</td> <td>0</td> <td></td> <td></td> <td></td> <td>1987</td> <td>1043</td> <td>0</td>	Cap, veh/h	0	889	378	318	1365	0				1987	1043	0
Grp Volume(v), veh/h         0         510         34         266         279         0         1850         0         0           Grp Sat Flow(s), veh/h/ln         0         1900         1615         1810         1900         0         1810         1900         0           Ocycle Q Clear(g_c), s         0.0         15.6         2.3         8.5         2.9         0.0         56.6         0.0         0.0           Cycle Q Clear(g_c), s         0.0         15.6         2.3         8.5         2.9         0.0         56.6         0.0         0.0           Prop In Lane         0.00         1.00         1.00         0.00         1.00         1.00         0.00           Lane Grp Cap(c), veh/h         0         889         378         318         1365         0         1987         1043         0           V/C Ratio(X)         0.00         0.57         0.09         0.84         0.20         0.00         0.93         0.00         0.00           HCM Platon Ratio         1.00         0.33         0.33         2.00         2.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00 <t< td=""><td>Arrive On Green</td><td>0.00</td><td>0.08</td><td>0.08</td><td>0.18</td><td>0.72</td><td>0.00</td><td></td><td></td><td></td><td>0.55</td><td>0.00</td><td>0.00</td></t<>	Arrive On Green	0.00	0.08	0.08	0.18	0.72	0.00				0.55	0.00	0.00
Grp Sat Flow(s),veh/h/ln	Sat Flow, veh/h	0	3800	1615	3619	3800	0				3619	1900	0
Grp Sat Flow(s), veh/h/ln	Grp Volume(v), veh/h	0	510	34	266	279	0				1850	0	0
Q Serve(g_s), s		0										1900	
Cycle Q Clear(g_c), s         0.0         15.6         2.3         8.5         2.9         0.0         56.6         0.0         0.0           Prop In Lane         0.00         1.00         1.00         0.00         1.00         0.00           Lane Grp Cap(c), veh/h         0         889         378         318         1365         0         1987         1043         0           V/C Ratio(X)         0.00         0.57         0.09         0.84         0.20         0.00         0.93         0.00         0.00           Avail Cap(c_a), veh/h         0         889         378         335         1365         0         2187         1148         0           HCM Platoon Ratio         1.00         0.33         0.33         2.00         2.00         1.00         1.00         1.00         1.00           Uniform Delay (d), s/veh         0.0         49.6         43.5         48.6         11.2         0.0         25.0         0.0         0.0           Initial Q Delay(d3), s/veh         0.0         2.7         0.5         14.3         0.3         0.0         7.5         0.0         0.0         1.0         0.0         0.0         0.0         0.0         0.0													
Prop In Lane         0.00         1.00         1.00         0.00         1.00         0.00           Lane Grp Cap(c), veh/h         0         889         378         318         1365         0         1987         1043         0           V/C Ratio(X)         0.00         0.57         0.09         0.84         0.20         0.00         0.93         0.00         0.00           Avail Cap(c_a), veh/h         0         889         378         335         1365         0         2187         1148         0           HCM Platoon Ratio         1.00         0.33         0.33         2.00         2.00         1.00													
Lane Grp Cap(c), veh/h  V/C Ratio(X)  0.00  0.57  0.09  0.84  0.20  0.00  0.00  0.93  0.00  0.00  0.00  Avail Cap(c_a), veh/h  0  889  378  335  1365  0  2187  1148  0  0 HCM Platoon Ratio  1.00  0.33  0.33  0.00  0.													
V/C Ratio(X)         0.00         0.57         0.09         0.84         0.20         0.00         0.93         0.00         0.00           Avail Cap(c_a), veh/h         0         889         378         335         1365         0         2187         1148         0           HCM Platoon Ratio         1.00         0.33         0.33         2.00         2.00         1.00         1.00         1.00         1.00           Upstream Filter(I)         0.00         0.99         0.96         0.96         0.00         1.00         1.00         0.00         1.00           Uniform Delay (d), s/veh         0.0         49.6         43.5         48.6         11.2         0.0         25.0         0.0         0.0           Incorp Delay (d2), s/veh         0.0         2.7         0.5         14.3         0.3         0.0         7.5         0.0         0.0           Incorp Delay (d2), s/veh         0.0			889			1365						1043	
Avail Cap(c_a), veh/h													
HCM Platoon Ratio													
Upstream Filter(I)         0.00         0.99         0.99         0.96         0.96         0.00         1.00         0.00         0.00           Uniform Delay (d), s/veh         0.0         49.6         43.5         48.6         11.2         0.0         25.0         0.0         0.0           Incr Delay (d2), s/veh         0.0         2.7         0.5         14.3         0.3         0.0         7.5         0.0         0.0           Mile BackOfQ(50%), veh/ln         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0           Mile BackOfQ(50%), veh/ln         0.0         8.5         1.1         4.8         1.5         0.0         30.1         0.0         0.0           LnGrp Delay(d), s/veh         0.0         52.2         44.0         63.0         11.5         0.0         32.4         0.0         0.0           LnGrp LOS         D         D         D         E         B         C         C           Approach Vol, veh/h         544         545         1850         32.4         Approach LOS         C         C           Timer         1         2         3         4         5         6         7													
Uniform Delay (d), s/veh													
Incr Delay (d2), s/veh         0.0         2.7         0.5         14.3         0.3         0.0         7.5         0.0         0.0           Initial Q Delay(d3), s/veh         0.0													
Initial Q Delay(d3),s/veh       0.0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>													
%ile BackOfQ(50%),veh/ln       0.0       8.5       1.1       4.8       1.5       0.0       30.1       0.0       0.0       0.0       0.0       11.5       0.0       32.4       0.0													
LnGrp Delay(d),s/veh         0.0         52.2         44.0         63.0         11.5         0.0         32.4         0.0         0.0           LnGrp LOS         D         D         E         B         C           Approach Vol, veh/h         544         545         1850           Approach Delay, s/veh         51.7         36.6         32.4           Approach LOS         D         D         C           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         7         8           Assigned Phs Duration (G+Y+Rc), s         15.1         33.6         71.4         48.6         7         8           Change Period (Y+Rc), s         4.5         5.5         5.5         5.5         5.5         Max Green Setting (Gmax), s         11.1         20.9         72.5         36.5         36.5         Assigned Gmax), s         11.1         20.9         72.5         36.5         36.5         Assigned Gmax), s         10.5         17.6         58.6         4.9         4.9         4.9         4.9         4.9         4.9         4.9         4.9         4.9													
LnGrp LOS         D         D         E         B         C           Approach Vol, veh/h         544         545         1850           Approach Delay, s/veh         51.7         36.6         32.4           Approach LOS         D         D         C           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         6         7         8           Assigned Phs         1         2         4         6         6         7         8           Assigned Phs         1         2         4         6         7         8         8           Assigned Phs         1         2         4         6         7         8         8         8           Change Period (Y+Rc), s         15.1         33.6         71.4         48.6         48.6         5.5         5.5         5.5         Max Green Setting (Gmax), s         11.1         20.9         72.5         36.5         36.5         4.9         9         36.8         4.9         36.8         4.9         36.8         4.													
Approach Vol, veh/h Approach Delay, s/veh Approach LOS D D C  Timer 1 2 3 4 5 6 7 8  Assigned Phs 1 2 4 6 Phs Duration (G+Y+Rc), s 15.1 33.6 71.4 48.6 Change Period (Y+Rc), s 4.5 5.5 5.5 Max Green Setting (Gmax), s 11.1 20.9 72.5 36.5 Max Q Clear Time (g_c+ 1), s 10.5 17.6 Green Ext Time (p_c), s 0.0 1.2 7.3 36.8 HCM 2010 Ctrl Delay HCM 2010 LOS D		0.0					0.0					0.0	0.0
Approach Delay, s/veh Approach LOS D D C Timer 1 2 3 4 5 6 7 8  Assigned Phs 1 2 4 6 Phs Duration (G+Y+Rc), s 15.1 33.6 71.4 48.6 Change Period (Y+Rc), s 4.5 5.5 5.5 5.5 Max Green Setting (Gmax), s 11.1 20.9 72.5 36.5 Max Q Clear Time (g_c+I1), s 10.5 17.6 58.6 4.9 Green Ext Time (p_c), s 0.0 1.2 7.3 3.3  Intersection Summary HCM 2010 Ctrl Delay HCM 2010 LOS D												1850	
Approach LOS D D C  Timer 1 2 3 4 5 6 7 8  Assigned Phs 1 2 4 6  Phs Duration (G+Y+Rc), s 15.1 33.6 71.4 48.6  Change Period (Y+Rc), s 4.5 5.5 5.5 5.5  Max Green Setting (Gmax), s 11.1 20.9 72.5 36.5  Max Q Clear Time (g_c+l1), s 10.5 17.6 58.6 4.9  Green Ext Time (p_c), s 0.0 1.2 7.3 3.3  Intersection Summary  HCM 2010 Ctrl Delay 36.8  HCM 2010 LOS D													
Timer 1 2 3 4 5 6 7 8  Assigned Phs 1 2 4 6  Phs Duration (G+Y+Rc), s 15.1 33.6 71.4 48.6  Change Period (Y+Rc), s 4.5 5.5 5.5  Max Green Setting (Gmax), s 11.1 20.9 72.5 36.5  Max Q Clear Time (g_c+I1), s 10.5 17.6 58.6 4.9  Green Ext Time (p_c), s 0.0 1.2 7.3 3.3  Intersection Summary  HCM 2010 Ctrl Delay 36.8  HCM 2010 LOS D													
Assigned Phs 1 2 4 6 Phs Duration (G+Y+Rc), s 15.1 33.6 71.4 48.6 Change Period (Y+Rc), s 4.5 5.5 5.5 5.5 Max Green Setting (Gmax), s 11.1 20.9 72.5 36.5 Max Q Clear Time (g_c+I1), s 10.5 17.6 58.6 4.9 Green Ext Time (p_c), s 0.0 1.2 7.3 3.3  Intersection Summary HCM 2010 Ctrl Delay 36.8 HCM 2010 LOS D	• • • • • • • • • • • • • • • • • • • •												
Phs Duration (G+Y+Rc), s       15.1       33.6       71.4       48.6         Change Period (Y+Rc), s       4.5       5.5       5.5       5.5         Max Green Setting (Gmax), s       11.1       20.9       72.5       36.5         Max Q Clear Time (g_c+I1), s       10.5       17.6       58.6       4.9         Green Ext Time (p_c), s       0.0       1.2       7.3       3.3         Intersection Summary         HCM 2010 Ctrl Delay       36.8         HCM 2010 LOS       D		1	2	3	4	5	6	7	8				
Change Period (Y+Rc), s 4.5 5.5 5.5 5.5 5.5 Max Green Setting (Gmax), s 11.1 20.9 72.5 36.5 Max Q Clear Time (g_c+I1), s 10.5 17.6 58.6 4.9 Green Ext Time (p_c), s 0.0 1.2 7.3 3.3 Intersection Summary  HCM 2010 Ctrl Delay 36.8 HCM 2010 LOS D	Assigned Phs	1	2		4		6						
Max Green Setting (Gmax), s       11.1       20.9       72.5       36.5         Max Q Clear Time (g_c+l1), s       10.5       17.6       58.6       4.9         Green Ext Time (p_c), s       0.0       1.2       7.3       3.3         Intersection Summary         HCM 2010 Ctrl Delay       36.8         HCM 2010 LOS       D													
Max Q Clear Time (g_c+l1), s       10.5       17.6       58.6       4.9         Green Ext Time (p_c), s       0.0       1.2       7.3       3.3         Intersection Summary         HCM 2010 Ctrl Delay       36.8         HCM 2010 LOS       D	Change Period (Y+Rc), s	4.5	5.5		5.5		5.5						
Green Ext Time (p_c), s         0.0         1.2         7.3         3.3           Intersection Summary           HCM 2010 Ctrl Delay         36.8           HCM 2010 LOS         D		11.1			72.5		36.5						
Intersection Summary  HCM 2010 Ctrl Delay 36.8  HCM 2010 LOS D	Max Q Clear Time (g_c+l1), s	10.5	17.6		58.6		4.9						
HCM 2010 Ctrl Delay 36.8 HCM 2010 LOS D	Green Ext Time (p_c), s	0.0	1.2		7.3		3.3						
HCM 2010 Ctrl Delay 36.8 HCM 2010 LOS D	Intersection Summary												
HCM 2010 LOS D				36.8									
Notes													
	Notes												

EAPC (2017) Conditions - AM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

User approved volume balancing among the lanes for turning movement.

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	~	<b>/</b>	<b>↓</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	J.J.	<b>^</b>			^↑	7		र्स	7			
Volume (veh/h)	282	1679	0	0	440	632	73	0	398	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	307	1825	0	0	478	0	79	0	347			
Adj No. of Lanes	2	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	418	2217	0	0	1556	661	452	0	404			
Arrive On Green	0.15	0.78	0.00	0.00	0.41	0.00	0.25	0.00	0.25			
Sat Flow, veh/h	3619	3800	0	0	3800	1615	1810	0	1615			
Grp Volume(v), veh/h	307	1825	0	0	478	0	79	0	347			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	4.9	17.9	0.0	0.0	5.1	0.0	2.1	0.0	12.3			
Cycle Q Clear(g_c), s	4.9	17.9	0.0	0.0	5.1	0.0	2.1	0.0	12.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	418	2217	0	0	1556	661	452	0	404			
V/C Ratio(X)	0.74	0.82	0.00	0.00	0.31	0.00	0.17	0.00	0.86			
Avail Cap(c_a), veh/h	513	2217	0	0	1556	661	452	0	404			
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.46	0.46	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	24.5	4.8	0.0	0.0	12.0	0.0	17.6	0.0	21.5			
Incr Delay (d2), s/veh	1.4	1.7	0.0	0.0	0.5	0.0	8.0	0.0	20.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.5	9.3	0.0	0.0	2.8	0.0	1.1	0.0	7.8			
LnGrp Delay(d),s/veh	25.9	6.5	0.0	0.0	12.5	0.0	18.5	0.0	42.1			
LnGrp LOS	С	Α			В		В		D			
Approach Vol, veh/h		2132			478			426				
Approach Delay, s/veh		9.3			12.5			37.7				
Approach LOS		Α			В			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		40.0			10.4	29.6		20.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		35.0			8.5	23.0		15.0				
Max Q Clear Time (g_c+l1), s		19.9			6.9	7.1		14.3				
Green Ext Time (p_c), s		9.7			0.1	10.1		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			13.8									
HCM 2010 LOS			В									

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	<b>^</b>	7	ሻሻ	<b>^</b>	7	*	<b>↑</b>	77	*	<b>∱</b> ∱	
Volume (veh/h)	0	50	12	518	37	6	5	6	665	9	9	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	52	9	534	38	6	5	6	401	9	9	0
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	278	1077	476	986	1821	804	12	507	1742	20	1030	0
Arrive On Green	0.00	0.28	0.28	0.27	0.48	0.48	0.01	0.27	0.27	0.01	0.27	0.00
Sat Flow, veh/h	3619	3800	1680	3619	3800	1679	1810	1900	3230	1810	3800	0
Grp Volume(v), veh/h	0	52	9	534	38	6	5	6	401	9	9	0
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1679	1810	1900	1615	1810	1900	0
Q Serve(q_s), s	0.0	1.2	0.4	15.1	0.6	0.2	0.3	0.3	0.8	0.6	0.2	0.0
Cycle Q Clear(g_c), s	0.0	1.2	0.4	15.1	0.6	0.2	0.3	0.3	0.8	0.6	0.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	278	1077	476	986	1821	804	12	507	1742	20	1030	0
V/C Ratio(X)	0.00	0.05	0.02	0.54	0.02	0.01	0.43	0.01	0.23	0.46	0.01	0.00
Avail Cap(c_a), veh/h	278	1077	476	986	1821	804	83	507	1742	83	1030	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	31.2	23.7	37.2	16.4	11.0	59.4	32.4	7.6	59.0	32.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.1	0.3	0.0	0.0	9.2	0.0	0.3	6.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.6	0.2	7.6	0.3	0.1	0.2	0.2	2.5	0.3	0.1	0.0
LnGrp Delay(d),s/veh	0.0	31.3	23.8	37.6	16.5	11.0	68.6	32.4	7.9	65.2	32.0	0.0
LnGrp LOS		С	С	D	В	В	Е	С	Α	Е	С	
Approach Vol, veh/h		61			578			412			18	
Approach Delay, s/veh		30.2			35.9			9.0			48.6	
Approach LOS		C			D			A			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	37.2	39.5	5.3	38.0	13.7	63.0	5.8	37.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	28.5	34.0	5.5	32.0	5.0	57.5	5.5	32.0				
Max Q Clear Time (q_c+l1), s	17.1	3.2	2.3	2.2	0.0	2.6	2.6	2.8				
Green Ext Time (p_c), s	0.8	0.2	0.0	0.9	0.0	0.1	0.0	0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			25.4									
HCM 2010 LOS			С									

EAPC (2017) Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	ሻሻ	<b>^</b>					ሻ	4	
Volume (veh/h)	0	635	89	621	186	0	0	0	0	793	2	375
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	676	95	661	198	0				584	366	322
Adj No. of Lanes	0	2	1	2	2	0				1	1	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, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	871	370	804	1889	0				744	384	338
Arrive On Green	0.00	0.08	0.08	0.37	0.83	0.00				0.41	0.41	0.41
Sat Flow, veh/h	0	3800	1615	3619	3800	0				1810	934	821
Grp Volume(v), veh/h	0	676	95	661	198	0				584	0	688
Grp Sat Flow(s), veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1755
Q Serve(g_s), s	0.0	21.0	6.7	19.8	1.2	0.0				33.7	0.0	45.6
Cycle Q Clear(g_c), s	0.0	21.0	6.7	19.8	1.2	0.0				33.7	0.0	45.6
Prop In Lane	0.00		1.00	1.00		0.00				1.00		0.47
Lane Grp Cap(c), veh/h	0	871	370	804	1889	0				744	0	722
V/C Ratio(X)	0.00	0.78	0.26	0.82	0.10	0.00				0.78	0.00	0.95
Avail Cap(c_a), veh/h	0	871	370	804	1889	0				762	0	739
HCM Platoon Ratio	1.00	0.33	0.33	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.98	0.90	0.90	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	52.4	45.8	35.6	5.2	0.0				30.7	0.0	34.2
Incr Delay (d2), s/veh	0.0	6.6	1.6	5.8	0.1	0.0				5.3	0.0	22.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	11.8	3.2	10.4	0.6	0.0				17.8	0.0	26.4
LnGrp Delay(d),s/veh	0.0	59.0	47.5	41.4	5.3	0.0				36.0	0.0	56.3
LnGrp LOS	0.0	E	D	D	A	0.0				D	0.0	E
Approach Vol, veh/h		771			859						1272	
Approach Delay, s/veh		57.6			33.1						47.0	
Approach LOS		57.0 E			C						T7.0	
• •											D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	32.2	33.0		54.8		65.2						
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5						
Max Green Setting (Gmax), s	26.5	* 28		50.5		58.5						
Max Q Clear Time (g_c+l1), s	21.8	23.0		47.6		3.2						
Green Ext Time (p_c), s	1.1	1.3		1.8		2.0						
Intersection Summary												
HCM 2010 Ctrl Delay			45.7									
HCM 2010 LOS			D									
Notes												
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EAPC (2017) Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

User approved volume balancing among the lanes for turning movement.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14.54	<b>^</b>			^↑	7		र्स	7			
Volume (veh/h)	457	970	0	0	763	1471	43	1	215	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	513	1090	0	0	857	0	48	1	133			
Adj No. of Lanes	2	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	594	2692	0	0	1957	832	370	8	336			
Arrive On Green	0.05	0.23	0.00	0.00	0.52	0.00	0.21	0.21	0.21			
Sat Flow, veh/h	3619	3800	0	0	3800	1615	1774	37	1615			
Grp Volume(v), veh/h	513	1090	0	0	857	0	49	0	133			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1615	1811	0	1615			
Q Serve(g_s), s	16.9	29.1	0.0	0.0	16.9	0.0	2.6	0.0	8.5			
Cycle Q Clear(g_c), s	16.9	29.1	0.0	0.0	16.9	0.0	2.6	0.0	8.5			
Prop In Lane	1.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	594	2692	0	0	1957	832	377	0	336			
V/C Ratio(X)	0.86	0.40	0.00	0.00	0.44	0.00	0.13	0.00	0.40			
Avail Cap(c_a), veh/h	950	2692	0	0	1957	832	377	0	336			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.53	0.53	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	55.4	24.6	0.0	0.0	18.2	0.0	38.6	0.0	41.0			
Incr Delay (d2), s/veh	1.5	0.2	0.0	0.0	0.7	0.0	0.7	0.0	3.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.6	15.5	0.0	0.0	9.0	0.0	1.4	0.0	4.1			
LnGrp Delay(d),s/veh	57.0	24.8	0.0	0.0	18.9	0.0	39.4	0.0	44.4			
LnGrp LOS	Е	С			В		D		D			
Approach Vol, veh/h		1603			857			182				
Approach Delay, s/veh		35.1			18.9			43.1				
Approach LOS		D			В			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		90.0			23.2	66.8		30.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		85.0			31.5	50.0		25.0				
Max Q Clear Time (g_c+l1), s		31.1			18.9	18.9		10.5				
Green Ext Time (p_c), s		11.7			8.0	10.6		0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			30.4									
HCM 2010 LOS			С									

EAPC (2017) Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

## APPENDIX 7.7:

EAPC (2017) CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS WITH IMPROVEMENTS



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Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	510	39	266	279	994	940
v/c Ratio	0.71	0.09	0.78	0.23	0.89	0.82
Control Delay	52.7	4.4	56.5	35.7	32.0	25.7
Queue Delay	0.0	0.0	0.0	0.0	48.4	49.3
Total Delay	52.7	4.4	56.5	35.7	80.4	75.0
Queue Length 50th (ft)	192	1	102	94	602	507
Queue Length 95th (ft)	251	12	#154	134	#845	708
Internal Link Dist (ft)	844			267		1109
Turn Bay Length (ft)		100	80			
Base Capacity (vph)	720	411	354	1206	1147	1166
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	321	321
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.09	0.75	0.23	1.20	1.11
Intersection Summary						

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

5/21/2015

	•	<b>→</b>	•	•	<b>†</b>	/
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	307	1825	478	687	79	433
v/c Ratio	0.60	0.82	0.32	0.36	0.17	0.79
Control Delay	18.5	16.0	13.6	0.5	18.8	28.8
Queue Delay	0.0	6.0	0.0	0.0	0.0	0.0
Total Delay	18.5	21.9	13.6	0.5	18.8	28.8
Queue Length 50th (ft)	55	452	59	0	22	111
Queue Length 95th (ft)	53	529	89	0	52	#246
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	538	2216	1487	1900	475	550
Starvation Cap Reductn	0	346	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.98	0.32	0.36	0.17	0.79
Intersection Summary						

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# Queues

10: I-215 SB On Ramp/I-215 SB Off Ramp & Harley Knox Blvd./Harley Knox. Blvd.

	-	•	•	←	<b>&gt;</b>	ļ
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	676	95	661	198	650	595
v/c Ratio	0.68	0.17	0.79	0.10	0.88	0.74
Control Delay	46.7	14.7	85.9	30.8	47.8	31.2
Queue Delay	0.0	0.0	51.0	0.0	0.0	0.0
Total Delay	46.7	14.7	136.9	30.8	47.8	31.2
Queue Length 50th (ft)	248	15	274	64	442	313
Queue Length 95th (ft)	316	58	333	98	599	445
Internal Link Dist (ft)	844			267		1109
Turn Bay Length (ft)		100	80			
Base Capacity (vph)	987	547	839	1969	799	860
Starvation Cap Reductn	0	0	240	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.17	1.10	0.10	0.81	0.69
Intersection Summary						

## Queues

11: I-215 NB Off Ramp/I-215 NB On Ramp & Harley Knox. Blvd./Harley Knox Blvd. 5/21/2015

	۶	<b>→</b>	<b>←</b>	•	<b>†</b>	/
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	513	1090	857	1653	49	242
v/c Ratio	0.79	0.41	0.44	0.88	0.12	0.48
Control Delay	35.4	5.5	20.3	6.8	39.7	20.2
Queue Delay	0.2	0.6	0.4	0.0	0.0	0.0
Total Delay	35.6	6.2	20.7	6.8	39.7	20.2
Queue Length 50th (ft)	188	106	204	0	31	64
Queue Length 95th (ft)	208	131	273	0	65	140
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	997	2691	1927	1877	395	509
Starvation Cap Reductn	107	1122	0	0	0	0
Spillback Cap Reductn	0	0	565	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.69	0.63	0.88	0.12	0.48
Intersection Summary						

## **APPENDIX 8.1:**

HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS

ANALYSIS WORKSHEETS



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Intersection													
Int Delay, s/veh	0.3												
, ·													
Movement	EBL	EBT	EBR	WBL	WBT	WBR		NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	25	207	50	50	284	25		25	830	25	25	91	25
Conflicting Peds, #/hr	0	0	0	0	0	0		0	0	0	0	0	C
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop		Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	·-	None .		-	-	None	-	-	None
Storage Length	50	-	-	100	-	-		-	-	-	-	-	-
Veh in Median Storage, #	_	0	-	-	0	-		-	2	-	-	2	
Grade, %	-	0	-	-	0	-		-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92		92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0		0	0	0	0	0	0
Mvmt Flow	27	225	54	54	309	27		27	902	27	27	99	27
Major/Minor	Minor2			Minor1			<u> </u>	Major1			Major2		
Conflicting Flow All	1305	1151	113	1277	1150	916		126	0	0	929	0	0
Stage 1	167	167	-	970	970	-		-	-	-	-	-	-
Stage 2	1138	984	_	307	180	-		_	_	_	-	_	_
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2		4.1	_	_	4.1	_	_
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-			_	_	-	_	_
Critical Hdwy Stg 2	6.1	5.5	_	6.1	5.5	_		_	_	_	_	_	_
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3		2.2	_	_	2.2	_	_
Pot Cap-1 Maneuver	138	~ 200	945	145		333		1473	_	_	744	_	_
Stage 1	840	764	-	307	334	-		-	_	_	-	_	_
Stage 2	247	329	-	707	754	_		_	_	_	-	_	_
Platoon blocked, %									-	_		_	-
Mov Cap-1 Maneuver		~ 185	945	-	~ 185	333		1473	_	-	744	-	
Mov Cap-2 Maneuver		~ 185	-		~ 185	-			-	_	-	_	
Stage 1	808	734	-	295	321	_		_	_	-	-	-	
Stage 2	~ 8	316	-	444	725	-		-	-	-	-	-	-
J. J. J.													
Approach	EB			WB				NB			SB		
HCM Control Delay, s	LD			WD				0.2			1.8		
HCM LOS								0.2			1.0		
HOW LOS	-			-									
NA'	NDI	NDT	NDD EDI	1 FDL0\	MDI 11	MDI 0	CDI	CDT	CDD				
Minor Lane/Major Mvmt	NBL	NBT		n1 EBLn2\			SBL	SBT	SBR				
Capacity (veh/h)	1473	-	-	- 219	-	192	744	-	-				
HCM Cantral Dalay (a)	0.018	-	-	- 1.276		1.749		-	-				
HCM Long LOS	7.5	0	-	- 198.7		400.2	10	0	-				
HCM Lane LOS	A	Α	-	- F	-	F	В	Α	-				
HCM 95th %tile Q(veh)	0.1	-	-	- 14.7	-	23.4	0.1	-	-				
Notes													
~: Volume exceeds capa	city \$: De	elav exc	eeds 300s	+: Com	putation	n Not D	efined	*: All	major v	olume i	n platoon		

Intersection	0									
Int Delay, s/veh	0									
Movement	EBL	EBT			WB <sup>*</sup>	T۱	WBR	SB	SL.	SBR
Vol, veh/h	0	257			35	9	0		0	0
Conflicting Peds, #/hr	0	0				0	0		0	0
Sign Control	Free	Free			Fre	е	Free	Sto	р	Stop
RT Channelized	-	None				- [	None		-	None
Storage Length	100	-				-	-		0	-
Veh in Median Storage, #	-	0				0	-		2	-
Grade, %	-	0				0	-		0	-
Peak Hour Factor	67	67			6	7	67	6	7	67
Heavy Vehicles, %	0	0				0	0		0	0
Mvmt Flow	0	384			53	6	0		0	0
Major/Minor	Major1				Major	2		Minor	.)	
Conflicting Flow All	536	0			Major	_	0	92		536
Stage 1	-	-				-	-	53		-
Stage 2		_				_	_	38		_
Critical Hdwy	4.1	_					_	6.		6.2
Critical Hdwy Stg 1	-	-				_	-	5.		-
Critical Hdwy Stg 2	-	-					-	5.		
Follow-up Hdwy	2.2	-				-	-	3.		3.3
Pot Cap-1 Maneuver	1042	-					-	30		549
Stage 1	-	-				-	-	59		-
Stage 2	-	-					-	69		-
Platoon blocked, %		-				-	-			
Mov Cap-1 Maneuver	1042	-				-	-	30	13	549
Mov Cap-2 Maneuver	-	-				-	-	49	6	-
Stage 1	-	-				-	-	59	1	-
Stage 2	-	-				-	-	69	3	-
Approach	EB				WI	R		S	B	
HCM Control Delay, s	0					0			0	
HCM LOS	U					J			A	
HOW LOS									, \	
Minor Lang/Major Muret	EBL	EBT	WDT	WBR SI	DI n1					
Minor Lane/Major Mvmt			VVDI	WDR 31	DLIII					
Capacity (veh/h)	1042	-	-	-	-					
HCM Cantral Dalay (a)	-	-	-	-	-					
HCM Long LOS	0	-	-	-	0					
HCM Lane LOS	A	-	-	-	Α					
HCM 95th %tile Q(veh)	0	-	-	-	-					

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<b>/</b>	<b>/</b>	<b></b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	<b>^</b>	7	ሻሻ	<b>^</b>	7	ሻ	<b>†</b>	77	ሻ	<b>ተ</b> ኈ	
Volume (veh/h)	4	201	11	558	499	49	17	6	719	56	7	12
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	5	239	9	664	594	58	20	7	527	67	8	14
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	24	1300	575	891	2251	994	39	640	1088	87	690	586
Arrive On Green	0.01	0.34	0.34	0.25	0.59	0.59	0.02	0.34	0.34	0.05	0.36	0.36
Sat Flow, veh/h	3619	3800	1680	3619	3800	1679	1810	1900	3230	1810	1900	1614
Grp Volume(v), veh/h	5	239	9	664	594	58	20	7	527	67	8	14
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1679	1810	1900	1615	1810	1900	1614
Q Serve(g_s), s	0.1	4.2	0.4	16.1	7.2	1.4	1.0	0.2	9.2	3.5	0.3	0.5
Cycle Q Clear(g_c), s	0.1	4.2	0.4	16.1	7.2	1.4	1.0	0.2	9.2	3.5	0.3	0.5
Prop In Lane	1.00	1200	1.00	1.00	2251	1.00	1.00	/ 10	1.00	1.00	/00	1.00
Lane Grp Cap(c), veh/h	24	1300	575	891	2251	994	39	640	1088	87 0.77	690	586
V/C Ratio(X)	0.21 190	0.18	0.02 575	0.75 891	0.26 2251	0.06 994	0.51 95	0.01 640	0.48 1088	95	0.01 690	0.02 586
Avail Cap(c_a), veh/h HCM Platoon Ratio	1.00	1300 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	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.9	21.9	25.1	33.0	9.4	8.2	46.0	21.0	13.9	44.7	19.4	19.4
Incr Delay (d2), s/veh	1.6	0.3	0.0	2.6	0.2	0.2	3.8	0.0	1.5	25.9	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.2	0.0	8.3	3.8	0.7	0.6	0.0	4.3	2.4	0.0	0.0
LnGrp Delay(d),s/veh	48.6	22.3	25.2	35.7	9.6	8.3	49.8	21.0	15.5	70.6	19.4	19.5
LnGrp LOS	D	ZZ.3	23.2 C	D	7.0 A	Α	T7.0	C C	В	70.0 E	В	17.3
Approach Vol, veh/h		253			1316	71		554			89	
Approach Delay, s/veh		22.9			22.7			16.8			57.9	
Approach LOS		C			C			В			57.7 E	
	1		2	4		,	7				<u> </u>	
Timer Assigned Dhs	1	2	3	4	5	6	<u>7</u> 7	8				
Assigned Phs  Phs Duration (C+V+Ps) s	20.4				5 5.1	6						
Phs Duration (G+Y+Rc), s Change Period (Y+Rc), s	29.4 5.5	38.0 * 5.5	6.6 4.5	40.0	5. I 4.5	62.3 5.5	9.0 4.5	37.5				
Max Green Setting (Gmax), s	5.5	* 33	5.0	5.5 32.0	5.0	33.0	5.0	5.5 32.0				
Max Q Clear Time (g_c+l1), s	18.1	6.2	3.0	32.0 2.5	2.1	9.2	5.5	32.0 11.2				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.2	0.0	3.8	0.0	1.2				
•	0.0	0.9	0.0	1.2	0.0	ა.0	0.0	1.2				
Intersection Summary			00.7									
HCM 2010 Ctrl Delay			22.7									
HCM 2010 LOS			С									
Notes												

Notes

2035 Without Project Conditions - AM Peak Hour Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

	ၨ	<b>→</b>	•	•	<b>—</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	ţ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	1>		ሻ	₽		7	<b>∱</b> ∱		7	<b>^</b>	7
Volume (veh/h)	131	10	117	10	10	10	211	641	11	11	454	138
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	158	12	141	12	12	12	254	772	13	13	547	166
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	195	20	231	26	43	43	280	2300	39	27	1814	770
Arrive On Green	0.11	0.15	0.15	0.01	0.05	0.05	0.16	0.62	0.62	0.02	0.48	0.48
Sat Flow, veh/h	1810	128	1506	1810	873	873	1810	3726	63	1810	3800	1613
Grp Volume(v), veh/h	158	0	153	12	0	24	254	394	391	13	547	166
Grp Sat Flow(s), veh/h/ln	1810	0	1634	1810	0	1746	1810	1900	1889	1810	1900	1613
Q Serve(g_s), s	8.5	0.0	8.7	0.7	0.0	1.3	13.8	10.0	10.0	0.7	8.8	3.5
Cycle Q Clear(g_c), s	8.5	0.0	8.7	0.7	0.0	1.3	13.8	10.0	10.0	0.7	8.8	3.5
Prop In Lane	1.00	0.0	0.92	1.00	0.0	0.50	1.00	10.0	0.03	1.00	0.0	1.00
Lane Grp Cap(c), veh/h	195	0	251	26	0	87	280	1173	1166	27	1814	770
V/C Ratio(X)	0.81	0.00	0.61	0.47	0.00	0.28	0.91	0.34	0.34	0.47	0.30	0.22
Avail Cap(c_a), veh/h	279	0	523	90	0	377	280	1173	1166	90	1814	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.6	0.0	39.5	48.9	0.0	45.8	41.5	9.2	9.2	48.8	16.0	5.2
Incr Delay (d2), s/veh	7.4	0.0	0.9	4.9	0.0	0.6	29.9	0.8	0.8	4.7	0.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	4.0	0.4	0.0	0.7	9.2	5.5	5.5	0.4	4.7	1.7
LnGrp Delay(d),s/veh	51.0	0.0	40.4	53.8	0.0	46.4	71.4	10.0	10.0	53.5	16.4	5.8
LnGrp LOS	D D	0.0	D	D	0.0	D	71.4 E	В	В	D	В	Α
Approach Vol, veh/h	D	311	D	D	36	D		1039	D	D D	726	
Approach Delay, s/veh		45.8			48.9			25.0			14.6	
		45.6 D						25.0 C			14.0 B	
Approach LOS		D			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	67.2	5.9	20.8	20.0	53.2	16.3	10.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	5.5	* 5.5				
Max Green Setting (Gmax), s	5.0	38.0	5.0	32.0	15.5	27.5	15.4	* 22				
Max Q Clear Time (g_c+l1), s	2.7	12.0	2.7	10.7	15.8	10.8	10.5	3.3				
Green Ext Time (p_c), s	0.0	5.4	0.0	0.8	0.0	4.8	0.4	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			24.9									
HCM 2010 LOS			С									
Notes												

User approved pedestrian interval to be less than phase max green.

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b></b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	7	<b>^</b>						4	7
Volume (veh/h)	0	846	130	239	476	0	0	0	0	1449	2	630
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	900	138	254	506	0				1541	2	593
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	839	357	671	2422	0				1002	1	895
Arrive On Green	0.00	0.22	0.22	0.12	0.21	0.00				0.55	0.55	0.55
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1807	2	1615
Grp Volume(v), veh/h	0	900	138	254	506	0				1543	0	593
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	26.5	8.7	15.5	13.2	0.0				66.5	0.0	31.0
Cycle Q Clear(g_c), s	0.0	26.5	8.7	15.5	13.2	0.0				66.5	0.0	31.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	839	357	671	2423	0				1003	0	895
V/C Ratio(X)	0.00	1.07	0.39	0.38	0.21	0.00				1.54	0.00	0.66
Avail Cap(c_a), veh/h	0	839	357	671	2423	0				1003	0	895
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.92	0.92	0.75	0.75	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	46.7	39.8	39.9	22.4	0.0				26.8	0.0	18.8
Incr Delay (d2), s/veh	0.0	51.2	2.9	0.1	0.1	0.0				247.4	0.0	1.8
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	0.0	19.8	4.2	7.8	7.0	0.0				101.8	0.0	14.1
LnGrp Delay(d),s/veh	0.0	97.9	42.7	40.0	22.5	0.0				274.2	0.0	20.7
LnGrp LOS		F	D	D	С					F		С
Approach Vol, veh/h		1038			760						2136	
Approach Delay, s/veh		90.6			28.4						203.8	
Approach LOS		F			С						F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	51.0	32.0		72.0		83.0						
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5						
Max Green Setting (Gmax), s	11.5	* 27		66.5		42.5						
Max Q Clear Time (g_c+l1), s	17.5	28.5		68.5		15.2						
Green Ext Time (p_c), s	0.0	0.0		0.0		2.3						
Intersection Summary												
HCM 2010 Ctrl Delay			140.0									
HCM 2010 LOS			F									
Notes												

Notes

2035 Without Project Conditions - AM Peak Hour Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

	۶	<b>→</b>	•	•	<b>←</b>	•	•	†	~	<b>\</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b>			<b>^</b>	7		Ą	7			
Volume (veh/h)	553	1742	0	0	580	628	135	0	426	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	601	1893	0	0	630	659	147	0	358			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	637	2509	0	0	1013	430	467	0	417			
Arrive On Green	0.70	1.00	0.00	0.00	0.27	0.27	0.26	0.00	0.26			
Sat Flow, veh/h	1810	3800	0	0	3800	1613	1810	0	1615			
Grp Volume(v), veh/h	601	1893	0	0	630	659	147	0	358			
Grp Sat Flow(s), veh/h/ln	1810	1900	0	0	1900	1613	1810	0	1615			
Q Serve(g_s), s	35.2	0.0	0.0	0.0	17.5	32.0	7.9	0.0	25.3			
Cycle Q Clear(g_c), s	35.2	0.0	0.0	0.0	17.5	32.0	7.9	0.0	25.3			
Prop In Lane	1.00	2500	0.00	0.00	1010	1.00	1.00	0	1.00			
Lane Grp Cap(c), veh/h	637	2509	0	0	1013	430	467	0	417			
V/C Ratio(X)	0.94	0.75	0.00	0.00	0.62	1.53	0.31	0.00	0.86			
Avail Cap(c_a), veh/h	656	2509	1.00	1.00	1013	430	467	1.00	417			
HCM Platoon Ratio	2.00 0.09	2.00 0.09	1.00	1.00 0.00	1.00 1.00	1.00 1.00	1.00 1.00	1.00	1.00 1.00			
Upstream Filter(I) Uniform Delay (d), s/veh	16.7	0.09	0.00	0.00	38.7	44.0	35.9	0.00	42.4			
Incr Delay (d2), s/veh	3.2	0.0	0.0	0.0	2.9	250.9	1.8	0.0	19.9			
Initial Q Delay(d3),s/veh	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	17.6	0.0	0.0	0.0	9.6	44.2	4.1	0.0	13.6			
LnGrp Delay(d),s/veh	19.9	0.1	0.0	0.0	41.6	294.9	37.7	0.0	62.3			
LnGrp LOS	В	Α	0.0	0.0	D T1.0	F	D	0.0	62.5 E			
Approach Vol, veh/h		2494			1289	•		505				
Approach Delay, s/veh		5.0			171.1			55.1				
Approach LOS		Α.			F			55.1 E				
	1		0			,	7					
Timer		2	3	4	5	6	7	8				
Assigned Phs  Phs Duration (C. V. Ps) s		2			5 47.2	6 37.0		8 36.0				
Phs Duration (G+Y+Rc), s		84.2 5.0			5.0	* 5		5.0				
Change Period (Y+Rc), s					43.5	* 32		31.0				
Max Green Setting (Gmax), s Max Q Clear Time (g_c+11), s		79.0 2.0			37.2	34.0		27.3				
Green Ext Time (p_c), s		17.0			4.8	0.0		0.8				
•		17.0			4.0	0.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			60.8									
HCM 2010 LOS			E									
Notes												

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

2035 Without Project Conditions - AM Peak Hour Urban Crossroads, Inc.

Intersection													
	0.2												
, <b></b>													
Movement	EBL	EBT	EBR	WBL	WBT	WBR		NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	25	397	50	50	311	25		25	251	25	25	790	25
Conflicting Peds, #/hr	0	0	0	0	0	0		0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop		Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None		-	-	None	-	-	None
Storage Length	50	-	-	100	-	-		-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-		-	2	-	-	2	-
Grade, %	-	0	-	-	0	-		-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92		92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0		0	0	0	0	0	0
Mvmt Flow	27	432	54	54	338	27		27	273	27	27	859	27
Major/Minor	Minor2			Minor1			<u> </u>	Major1			Major2		
Conflicting Flow All	1450	1281	872	1511	1281	286		886	0	0	300	0	0
Stage 1	927	927	-	341	341	-		-	-	-	-	-	-
Stage 2	523	354	-	1170	940	-		-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2		4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-		-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-		-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3		2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	110	~ 167	353	100	~ 167	758		773	-	-	1273	-	-
Stage 1	324	~ 350	-	678	642	-		-	-	-	-	-	-
Stage 2	541	634	-	237	345	-		-	-	-	-	-	-
Platoon blocked, %									-	-		-	-
Mov Cap-1 Maneuver		~ 153	353		~ 153	758		773	-	-	1273	-	-
Mov Cap-2 Maneuver		~ 153	-		~ 153	-		-	-	-	-	-	-
Stage 1		~ 335	-	650	615	-		-	-	-	-	-	-
Stage 2	225	607	-	-	~ 331	-		-	-	-	-	-	-
Approach	EB			WB				NB			SB		
HCM Control Delay, s								0.8			0.2		
HCM LOS	-			-									
Minor Lane/Major Mvmt	NBL	NBT	NBR F	BLn1 EBLn2\	NBI n1\	WBI n2	SBL	SBT	SBR				
Capacity (veh/h)	773	-	-	- 163	-	163	1273	-	-				
HCM Lane V/C Ratio	0.035	-	_	- 2.981	_	2.241		_	_				
HCM Control Delay (s)	9.8	0	_	-\$ 950.5		622.7	7.9	0	_				
HCM Lane LOS	7.0 A	A	_	- F	-	F	Α	A	_				
HCM 95th %tile Q(veh)	0.1	-	_	- 44.5	_	29.9	0.1	-	_				
/ 5 / 5 6 (1011)	J. 1			1 1.0		_ /./	5.1						

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\$: Delay exceeds 300s

Notes

~: Volume exceeds capacity

\*: All major volume in platoon

+: Computation Not Defined

Interception										
Intersection	0									
Int Delay, s/veh	0									
Movement	EBL	EBT			WBT	WBR	2	SBL	SBR	
Vol, veh/h	0	447			386	(	)	0	0	
Conflicting Peds, #/hr	0	0			0	(	)	0	0	
Sign Control	Free	Free			Free	Free	<u>;</u>	Stop	Stop	
RT Channelized	-	None			-	None	<u>)</u>	-	None	
Storage Length	100	-			-			0	-	
Veh in Median Storage, #	-	0			0			2	-	
Grade, %	-	0			0		-	0	-	
Peak Hour Factor	67	67			67	67	'	67	67	
Heavy Vehicles, %	0	0			0	(	)	0	0	
Mvmt Flow	0	667			576	(	)	0	0	
Major/Minor	Major1				Major2			Minor2		
Conflicting Flow All	576	0			iviajoiz	(	)	1243	576	
Stage 1	370	-			_			576	-	
Stage 2	_	_			-			667	_	
Critical Hdwy	4.1	_			_			6.4	6.2	
Critical Hdwy Stg 1	-	_			_			5.4	-	
Critical Hdwy Stg 2	_	_			_			5.4	_	
Follow-up Hdwy	2.2	_			_			3.5	3.3	
Pot Cap-1 Maneuver	1007	_			-			194	521	
Stage 1	-	-			-			566	-	
Stage 2	_	-			-			514	-	
Platoon blocked, %		-			-					
Mov Cap-1 Maneuver	1007	-			-			194	521	
Mov Cap-2 Maneuver	-	-			_			401	-	
Stage 1	-	-			-			566	-	
Stage 2	-	-			-			514	-	
- J										
Approach	EB				WB			SB		
HCM Control Delay, s	0				0			0		
HCM LOS	U				U			A		
FIGIVI LOS								A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR SB	Ln1					
Capacity (veh/h)	1007	-	-	-	-					
HCM Lane V/C Ratio	-	-	-	-	-					
HCM Control Delay (s)	0	-	-	-	0					
HCM Lane LOS	А	-	-	-	А					
HCM 95th %tile Q(veh)	0	-	-	-	-					

	۶	<b>→</b>	•	•	<b>←</b>	•	•	<b>†</b>	<b>/</b>	<b>/</b>	<b>+</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	<b>*</b>	7	1,4	<b>^</b>	7	ች		77	7	<b>∱</b> ∱	
Volume (veh/h)	497	143	740	661	572	406	248	149	793	10	331	128
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	512	147	760	681	590	419	256	154	533	10	341	132
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	190	1300	575	2724	4000	1767	95	737	1253	22	884	336
Arrive On Green	0.05	0.34	0.34	0.75	1.00	1.00	0.05	0.39	0.39	0.01	0.34	0.34
Sat Flow, veh/h	3619	3800	1680	3619	3800	1679	1810	1900	3230	1810	2625	998
Grp Volume(v), veh/h	512	147	760	681	590	419	256	154	533	10	245	228
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1679	1810	1900	1615	1810	1900	1723
Q Serve(g_s), s	5.0	2.5	32.5	5.4	0.0	0.0	5.0	5.1	8.6	0.5	9.3	9.6
Cycle Q Clear(g_c), s	5.0	2.5	32.5	5.4	0.0	0.0	5.0	5.1	8.6	0.5	9.3	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	190	1300	575	2724	4000	1767	95	737	1253	22	640	580
V/C Ratio(X)	2.69	0.11	1.32	0.25	0.15	0.24	2.69	0.21	0.43	0.45	0.38	0.39
Avail Cap(c_a), veh/h	190	1300	575	2724	4000	1767	95	737	1253	95	640	580
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	0.66	0.66	0.66	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.0	21.4	31.2	3.6	0.0	0.0	45.0 788.6	19.4	12.0	46.6 5.3	24.0	24.1
Incr Delay (d2), s/veh	774.4	0.2	157.1 0.0	0.0	0.1	0.2	0.0	0.6	1.1	0.0	1.7 0.0	2.0
Initial Q Delay(d3),s/veh %ile BackOfQ(50%),veh/ln	23.0	1.3	40.0	2.7	0.0	0.0	23.3	2.8	4.0	0.0	5.2	4.9
LnGrp Delay(d),s/veh	819.4	21.6	188.3	3.6	0.0	0.1	833.6	20.0	13.1	51.9	25.7	26.1
LnGrp LOS	619.4 F	21.0 C	F	3.0 A	Α	0.2 A	633.0 F	20.0 C	13.1 B	D D	25.7 C	20.1 C
Approach Vol, veh/h		1419		A	1690	A		943	D	D	483	
		398.7			1.5			237.0			26.4	
Approach Delay, s/veh Approach LOS		390. <i>1</i>			1.5 A			237.0 F			20.4 C	
											C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	79.0	38.0	10.5	37.5	9.5	107.5	5.7	42.3				
Change Period (Y+Rc), s	5.5	* 5.5	5.5	* 5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	5.5	* 33	5.0	* 32	5.0	33.0	5.0	32.0				
Max Q Clear Time (g_c+l1), s	7.4	34.5	7.0	11.6	7.0	2.0	2.5	10.6				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.5	0.0	4.8	0.0	1.9				
Intersection Summary												
HCM 2010 Ctrl Delay			177.4									
HCM 2010 LOS			F									

Notes

2035 Without Project Conditions - PM Peak Hour Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b>+</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Ť	1•		ሻ	ĵ∍		ሻ	ተኈ		ሻ	<b>^</b>	7
Volume (veh/h)	230	10	207	10	10	10	100	983	10	10	1479	276
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	242	11	218	11	11	11	105	1035	11	11	1557	291
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	281	16	323	24	48	48	101	2036	22	24	1901	807
Arrive On Green	0.16	0.21	0.21	0.01	0.06	0.06	0.06	0.54	0.54	0.01	0.50	0.50
Sat Flow, veh/h	1810	78	1549	1810	873	873	1810	3753	40	1810	3800	1613
Grp Volume(v), veh/h	242	0	229	11	0	22	105	524	522	11	1557	291
Grp Sat Flow(s),veh/h/ln	1810	0	1627	1810	0	1746	1810	1900	1893	1810	1900	1613
Q Serve(g_s), s	11.7	0.0	11.7	0.5	0.0	1.1	5.0	15.7	15.7	0.5	31.2	4.4
Cycle Q Clear(g_c), s	11.7	0.0	11.7	0.5	0.0	1.1	5.0	15.7	15.7	0.5	31.2	4.4
Prop In Lane	1.00		0.95	1.00		0.50	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	281	0	339	24	0	97	101	1031	1027	24	1901	807
V/C Ratio(X)	0.86	0.00	0.67	0.46	0.00	0.23	1.04	0.51	0.51	0.46	0.82	0.36
Avail Cap(c_a), veh/h	310	0	578	101	0	419	101	1031	1027	101	1901	807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.1	0.0	32.8	44.1	0.0	40.7	42.5	13.0	13.0	44.1	19.0	2.7
Incr Delay (d2), s/veh	18.3	0.0	0.9	4.9	0.0	0.4	102.3	1.8	1.8	4.9	4.1	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.0	5.3	0.3	0.0	0.5	5.3	8.7	8.6	0.3	17.3	2.2
LnGrp Delay(d),s/veh	55.4	0.0	33.7	49.0	0.0	41.1	145.5	14.8	14.8	49.0	23.1	4.0
LnGrp LOS	E		С	D		D	F	В	В	D	С	Α
Approach Vol, veh/h		471			33			1151			1859	
Approach Delay, s/veh		44.8			43.7			26.7			20.3	
Approach LOS		D			D			С			С	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	54.3	5.7	24.3	9.5	50.5	19.5	10.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	5.5	* 5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	15.4	* 22				
Max Q Clear Time (g_c+I1), s	2.5	17.7	2.5	13.7	7.0	33.2	13.7	3.1				
Green Ext Time (p_c), s	0.0	7.7	0.0	1.2	0.0	0.0	0.3	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			25.9									
HCM 2010 LOS			С									
Notes												

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User approved pedestrian interval to be less than phase max green.

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	~	<b>/</b>	Ţ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			7	ሻ	<b>^</b>						र्स	7
Volume (veh/h)	0	784	163	666	932	0	0	0	0	796	2	707
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	834	173	709	991	0				847	2	675
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	681	289	550	1979	0				700	2	626
Arrive On Green	0.00	0.18	0.18	0.10	0.17	0.00				0.39	0.39	0.39
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1805	4	1615
Grp Volume(v), veh/h	0	834	173	709	991	0				849	0	675
Grp Sat Flow(s), veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	21.5	11.8	36.5	28.4	0.0				46.5	0.0	46.5
Cycle Q Clear(g_c), s	0.0	21.5	11.8	36.5	28.4	0.0				46.5	0.0	46.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	681	289	550	1979	0				701	0	626
V/C Ratio(X)	0.00	1.22	0.60	1.29	0.50	0.00				1.21	0.00	1.08
Avail Cap(c_a), veh/h	0	681	289	550	1979	0				701	0	626
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.94	0.94	0.71	0.71	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	49.3	45.3	54.0	35.5	0.0				36.8	0.0	36.8
Incr Delay (d2), s/veh	0.0	113.4	8.4	139.4	0.6	0.0				107.8	0.0	59.0
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	0.0	22.0	6.0	39.6	15.1	0.0				44.2	0.0	30.9
LnGrp Delay(d),s/veh	0.0	162.6	53.6	193.4	36.2	0.0				144.5	0.0	95.8
LnGrp LOS		F	D	F	D					F		F
Approach Vol, veh/h		1007			1700						1524	
Approach Delay, s/veh		143.9			101.7						122.9	
Approach LOS		F			F						F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						_
Phs Duration (G+Y+Rc), s	41.0	27.0		52.0		68.0						
Change Period (Y+Rc), s	4.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	36.5	21.5		46.5		62.5						
Max Q Clear Time (g_c+I1), s	38.5	23.5		48.5		30.4						
Green Ext Time (p_c), s	0.0	0.0		0.0		10.2						
Intersection Summary												
HCM 2010 Ctrl Delay			119.4									
HCM 2010 LOS			F									

2035 Without Project Conditions - PM Peak Hour Urban Crossroads, Inc.

	۶	<b>→</b>	•	•	<b>←</b>	•	•	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b>			<b>^</b>	7		र्स	7			
Volume (veh/h)	587	992	0	0	1245	1555	353	3	227	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	660	1115	0	0	1399	1722	397	3	146			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	354	3008	0	0	2153	915	225	2	202			
Arrive On Green	0.39	1.00	0.00	0.00	0.57	0.57	0.13	0.13	0.13			
Sat Flow, veh/h	1810	3800	0	0	3800	1614	1797	14	1615			
Grp Volume(v), veh/h	660	1115	0	0	1399	1722	400	0	146			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1614	1810	0	1615			
Q Serve(g_s), s	23.5	0.0	0.0	0.0	30.3	68.0	15.0	0.0	10.4			
Cycle Q Clear(g_c), s	23.5	0.0	0.0	0.0	30.3	68.0	15.0	0.0	10.4			
Prop In Lane	1.00		0.00	0.00		1.00	0.99		1.00			
Lane Grp Cap(c), veh/h	354	3008	0	0	2153	915	226	0	202			
V/C Ratio(X)	1.86	0.37	0.00	0.00	0.65	1.88	1.77	0.00	0.72			
Avail Cap(c_a), veh/h	354	3008	0	0	2153	915	226	0	202			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	36.5	0.0	0.0	0.0	17.8	26.0	52.5	0.0	50.5			
Incr Delay (d2), s/veh	389.1	0.0	0.0	0.0	1.5	401.3	362.9	0.0	20.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	49.9	0.0	0.0	0.0	16.2	132.0	30.3	0.0	5.8			
LnGrp Delay(d),s/veh	425.6	0.0	0.0	0.0	19.4	427.3	415.4	0.0	70.6			
LnGrp LOS	F	А			В	F	F		Е			
Approach Vol, veh/h		1775			3121			546				
Approach Delay, s/veh		158.3			244.5			323.2				
Approach LOS		F			F			F				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		100.0			27.0	73.0		20.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		95.0			23.5	68.0		15.0				
Max Q Clear Time (g_c+l1), s		2.0			25.5	70.0		17.0				
Green Ext Time (p_c), s		61.0			0.0	0.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			224.3									
HCM 2010 LOS			F									

## **APPENDIX 8.2:**

HORIZON YEAR (2035) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS

ANALYSIS WORKSHEETS



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h		<b>n</b>	' '	( )	h

Interception							
Intersection	0.3						
Int Delay, s/veh	0.3						
Movement	EBT	EBR		BL WE		NBL	NBR
Vol, veh/h	282			16 33		0	7
Conflicting Peds, #/hr	0				0	0	0
Sign Control	Free		Fr	ee Fre		Stop	Stop
RT Channelized	-	None		- Nor	ne	-	None
Storage Length	-	-	1	00	-	0	-
Veh in Median Storage, #				-	0	2	-
Grade, %	0			-	0	0	-
Peak Hour Factor	92				92	92	92
Heavy Vehicles, %	0			0	0	0	0
Mvmt Flow	307	0		17 36	53	0	8
Major/Minor	Major1		Majo	or2		Minor1	
Conflicting Flow All	0			07	0	705	307
Stage 1	-			-	-	307	-
Stage 2	-	-		-	-	398	-
Critical Hdwy	-	-		1.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-		-	-	5.4	-
Critical Hdwy Stg 2	-	-		-	-	5.4	-
Follow-up Hdwy	-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-		65	-	406	738
Stage 1	-	-		-	-	751	-
Stage 2	-	-		-	-	683	-
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	12	65	-	401	738
Mov Cap-2 Maneuver	-	-		-	-	574	-
Stage 1	-	-		-	-	751	-
Stage 2	-	-		-	-	674	-
Approach	EB		_\/	VB		NB	
HCM Control Delay, s	0			).4		9.9	
HCM LOS	0			J. <del>T</del>		9.9 A	
HOW LOS						A	
	NDI		IIID: III	D.T.			
Minor Lane/Major Mvmt	NBLn1 EBT	EBR	WBL W	BI			
Capacity (veh/h)	738 -			-			
HCM Lane V/C Ratio	0.01 -		0.014	-			
HCM Control Delay (s)	9.9 -	-	7.9	-			
HCM Lane LOS	Α -	-	А	-			
HCM 95th %tile Q(veh)	0 -	-	0	-			

Intersection								
Int Delay, s/veh	0.5							
in Boldy sivon	0.0							
Movement		EBT	EBR		WBL	WBT	NBL	NBR
Vol, veh/h		289	0		28	350	0	12
Conflicting Peds, #/hr		209	0		0	330	0	0
Sign Control		Free	Free		Free	Free	Stop	Stop
RT Channelized		-	None		-	None	310p	None
Storage Length		_	None		100	-	0	-
Veh in Median Storage, #	<u>.</u>	0	_		-	0	2	_
Grade, %		0	_		_	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		314	0		30	380	0	13
					50	-00		.0
Nacion/Nainon		1-:1			-12		NA! 4	
Major/Minor	IV	1ajor1		IVI	ajor2		Minor1	04.1
Conflicting Flow All		0	0		314	0	755	314
Stage 1		-	-		-	-	314	-
Stage 2		-	-		- 11	-	441	- / 2
Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4 5.4	-
Critical Hdwy Stg 2 Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		1258	-	3.5	731
Stage 1		-	-		1208	-	745	/31
Stage 2		-	-		-	_	653	-
Platoon blocked, %		-	-		-	-	000	-
Mov Cap-1 Maneuver		-	-		1258	-	370	731
Mov Cap-1 Maneuver		_	_		1230	_	547	7.51
Stage 1		_	_		_	_	745	_
Stage 2		_	_		_	_	637	_
Jugo Z								
Annroach		ĘD			WB		NB	
Approach		EB						
HCM LOS		0			0.6		10	
HCM LOS							В	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR		WBT			
Capacity (veh/h)	731	-		1258	-			
HCM Lane V/C Ratio	0.018	-	-	0.024	-			
HCM Control Delay (s)	10	-	-	7.9	-			
HCM Lane LOS	В	-	-	Α	-			
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-			

Intersection									
Int Delay, s/veh	0.4								
2 o.a.y									
Movement		EBT	EBR	1	WBL	WBT	NI	BL	NBR
Vol, veh/h		302	0		23	378		0	10
Conflicting Peds, #/hr		0	0		0	0		0	0
Sign Control		Free	Free		Free	Free	St	ор	Stop
RT Channelized		-	None		-	None		-	None
Storage Length		-	-		50	-		0	-
Veh in Median Storage, #	#	0	-		-	0		2	-
Grade, %		0	-		-	0		0	-
Peak Hour Factor		92	92		92	92		92	92
Heavy Vehicles, %		0	0		0	0		0	0
Mvmt Flow		328	0		25	411		0	11
Major/Minor	N	1ajor1		Ma	ajor2		Mino	or1	
Conflicting Flow All		0	0		328	0		89	328
Stage 1		-	-		-	-		28	-
Stage 2		-	-		-	-		61	-
Critical Hdwy		-	-		4.1	-		5.4	6.2
Critical Hdwy Stg 1		-	-		-	-	Ę	5.4	-
Critical Hdwy Stg 2		-	-		-	-	Ę	5.4	-
Follow-up Hdwy		-	-		2.2	-	3	3.5	3.3
Pot Cap-1 Maneuver		-	-	•	1243	-	3	62	718
Stage 1		-	-		-	-	7	34	-
Stage 2		-	-		-	-	6	39	-
Platoon blocked, %		-	-			-			
Mov Cap-1 Maneuver		-	-	•	1243	-		55	718
Mov Cap-2 Maneuver		-	-		-	-		35	-
Stage 1		-	-		-	-		34	-
Stage 2		-	-		-	-	6	26	-
Approach		EB			WB			NΒ	
HCM Control Delay, s		0			0.5			).1	
HCM LOS								В	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL \	NBT				
Capacity (veh/h)	718		-	1243	-				
HCM Lane V/C Ratio	0.015	_	_	0.02	_				
HCM Control Delay (s)	10.1	_	_	8	_				
HCM Lane LOS	В	_	-	A	_				
HCM 95th %tile Q(veh)	0	_	_	0.1	_				
115/VI / JUII / JUII C (VCII)	J			0.1					

,	
5/19/2015	

Intersection													
	0.2												
in belay, siven	U. <u>Z</u>												
Movement	EBL	EBT	EBR	WBL	WBT	WBR		NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	25	237	50	50	351	25		25	830	25	25	91	25
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	- Otop	-	None		-	-	None	-	-	None
Storage Length	50	_	-	100	_	-		_	_	-	-	_	-
Veh in Median Storage, #	-	0	_	100	0	_		_	2	_	_	2	
Grade, %	-	0	_	_	0	_		_	0	_	_	0	
Peak Hour Factor	92	92	92	92	92	92		92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0		0	0	0	0	0	0
Mvmt Flow	27	258	54	54	382	27		27	902	27	27	99	27
WWW. Tiow	21	230	34	34	302	21		21	702	21	21	77	21
Major/Minor	Minor2			Minor1			N	Major1			Major2		
Conflicting Flow All	1341	1151	113	1293	1150	916		126	0	0	929	0	0
Stage 1	167	167	_	970	970	_		_	-	-	-	_	_
Stage 2	1174	984	-	323	180	_		_	_	_	-	_	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2		4.1	_	_	4.1	_	_
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-		-	_	_	-	-	-
Critical Hdwy Stg 2	6.1	5.5	_	6.1	5.5	_		_	_	_	_	_	_
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3		2.2	_	-	2.2	_	_
Pot Cap-1 Maneuver	131	~ 200	945	141	~ 200	333		1473	_	_	744	_	_
Stage 1	840	764	-	307	~ 334	-		-	_	_	-	_	_
Stage 2	236	329	_	693	754	_		_	_	_	_	_	_
Platoon blocked, %	200	027		0,0	, , ,				_	_		-	_
Mov Cap-1 Maneuver	_	~ 185	945	_	~ 185	333		1473	_	_	744	_	_
Mov Cap-2 Maneuver		~ 185	-		~ 185	-		-	_	-	-	_	_
Stage 1	808	734	_		~ 321	_		_		_	_	_	_
Stage 2	-	316	_	407	725	_		_	_	-	_	_	_
Otago 2		010		107	720								
Approach	EB			WB				NB			SB		
HCM Control Delay, s								0.2			1.8		
HCM LOS	-			-									
Minor Lane/Major Mvmt	NBL	NBT	NBR EBL	n1 EBLn2\	WBLn1V	VBLn2	SBL	SBT	SBR				
Capacity (veh/h)	1473	-	-	- 215	-	191	744	-	-				
HCM Lane V/C Ratio	0.018	-	-	- 1.451	-	2.14	0.037	-	-				
HCM Control Delay (s)	7.5	0	-	- 268.9	-		10	0	-				
HCM Lane LOS	A	Α	-	- F	-	F	В	Α	-				
HCM 95th %tile Q(veh)	0.1	-	-	- 18.5	-	32	0.1	-	-				
Notes													
~: Volume exceeds capac	ity ¢ Da	alay ovo	eeds 300s	±. Com	nutatio	n Not D	ofinod	*· \ \	maiory	/olumo i	in platoon		
~. volume exceeds capac	ıty ⊅. D€	ciay exc	.ccus 3005	+. CUII	ιμαιαιιθί	ו ואטנ טי	ciiiidu	. All	пајог у	volullie i	ιτι μιαιυυπ		

2035 WP Conditions - AM Peak Hour Urban Crossroads, Inc.

Intersection								
Int Delay, s/veh	0.3							
<b>,</b>								
Movement		EBT	EBR		WBL	WBT	NBL	NBR
Vol, veh/h		287	0		16	426	0	7
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control		Free	Free		Free	Free	Stop	Stop
RT Channelized		-	None		-	None	-	None
Storage Length		-	-		50	-	0	-
Veh in Median Storage, #		0	-		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		312	0		17	463	0	8
Major/Minor		/lajor1		M	lajor2		Minor1	
Conflicting Flow All		0	0	IV	312	0	810	312
Stage 1		-	-		- 312	-	312	512
Stage 2		_	_		_	_	498	-
Critical Hdwy		_	_		4.1	_	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4	-
Critical Hdwy Stg 2		_	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		1260	-	352	733
Stage 1		-	-		-	-	747	-
Stage 2		-	-		-	-	615	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-		1260	-	347	733
Mov Cap-2 Maneuver		-	-		-	-	526	-
Stage 1		-	-		-	-	747	-
Stage 2		-	-		-	-	607	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			0.3		10	
HCM LOS							В	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT			
Capacity (veh/h)	733		-	1260	-			
HCM Lane V/C Ratio	0.01	-		0.014	-			
HCM Control Delay (s)	10	-	-	7.9	-			
HCM Lane LOS	В	-	-	Α	-			
HCM 95th %tile Q(veh)	0	-	-	0	-			
_(-3.1)	•			-				

Intersection								
Int Delay, s/veh	0.4							
in Boldy Groon	0.1							
Movement		EBT	EBR		WBL	WBT	NBL	NBR
Vol, veh/h		294	0		21	442	0	9
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control		Free	Free		Free	Free	Stop	Stop
RT Channelized		-	None		-		- Stop	None
Storage Length		_	-		100	-	0	-
Veh in Median Storage, #	‡	0	_		-	0	2	_
Grade, %		0	-		_	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		320	0		23	480	0	10
Major/Minor	N.	laior1		Λ.	/aior2		Minor1	
Major/Minor	IV	1ajor1	0	IV	<u>Major2</u> 320	0	Minor1	320
Conflicting Flow All		0	0		320	0	846 320	320
Stage 1		-	-		-	-	526	-
Stage 2 Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		4.1	-	5.4	0.2
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		1251		335	725
Stage 1			_		1231	_	741	725
Stage 2		_	_		_	_	597	_
Platoon blocked, %		_	-			_	371	
Mov Cap-1 Maneuver		_	_		1251	_	329	725
Mov Cap-2 Maneuver		-	-		-	-	509	-
Stage 1		-	-		-	-	741	-
Stage 2		-	-		-	-	586	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			0.4		10	
HCM LOS		U			0.4		В	
HOW LOO							D	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT			
Capacity (veh/h)	725	LDI -		1251	-			
HCM Lane V/C Ratio	0.013	-		0.018	-			
HCM Control Delay (s)	10	-	-	7.9	-			
HCM Lane LOS	В	-	-	7.9 A	-			
HCM 95th %tile Q(veh)	0	-	-	0.1	-			
HOW FOUT MILE CE(VEH)	U	-	-	U. I	-			

Labora a Plan												
Intersection	0.5											
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	304	0	30	463	0	0	0	13	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	92	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	454	0	45	691	0	0	0	19	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	691	0	0	454	0	0	1235	1235	457	1244	1235	691
Stage 1	-	-	-	-	-	-	454	454	-	781	781	-
Stage 2	-	-	_	_	_	-	781	781	_	463	454	_
Critical Hdwy	4.1	_	-	4.1	_	_	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1		-	_	-	_	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	_	_	-	_	_	_	6.1	5.5	_	6.1	5.5	_
Follow-up Hdwy	2.2	-	_	2.2	_	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	913	_	-	1117		-	155	178	608	152	178	448
Stage 1	-	-	_	-	-	-	589	573	-	391	408	-
Stage 2	-	_	-	_		-	391	408	-	583	573	
Platoon blocked, %		_	-		-	-						
Mov Cap-1 Maneuver	913	-	-	1114	-	-	150	171	606	142	171	448
Mov Cap-2 Maneuver	-	_	-	-	-	-	324	338	-	322	332	_
Stage 1	-	-	-	-	-	-	589	573	-	391	392	-
Stage 2	-	_	-	-	-	-	375	392	-	563	573	-
J. J.												
Approach	ED			\MD			ND			CD		
Approach Dalay a	EB			WB			NB			SB		
HCM Control Delay, s	0			0.5			11.1			0		
HCM LOS							В			А		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR WBL	WBT	WBR S	BLn1					
Capacity (veh/h)	606	913	-	- 1114	-	-	-					
HCM Lane V/C Ratio	0.032	-	-	- 0.04	-	-	-					
HCM Control Delay (s)	11.1	0	-	- 8.4	-	-	0					
HCM Lane LOS	В	Α	-	- A	-	-	А					
HCM 95th %tile Q(veh)	0.1	0	-	- 0.1	-	-	-					

	ၨ	<b>→</b>	•	•	<b>←</b>	•	•	<b>†</b>	~	<b>/</b>	<b>+</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1,4	<b>^</b>	7	ሻሻ	<b>^</b>	7	ሻ	<b>•</b>	77	ሻ	<b>∱</b> ∱	
Volume (veh/h)	4	201	11	675	499	49	17	6	771	56	7	12
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	5	239	11	804	594	58	20	7	545	67	8	14
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	23	1176	520	534	1713	757	38	579	984	86	630	535
Arrive On Green	0.01	0.31	0.31	0.15	0.45	0.45	0.02	0.30	0.30	0.05	0.33	0.33
Sat Flow, veh/h	3619	3800	1680	3619	3800	1680	1810	1900	3230	1810	1900	1615
Grp Volume(v), veh/h	5	239	11	804	594	58	20	7	545	67	8	14
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1680	1810	1900	1615	1810	1900	1615
Q Serve(g_s), s	0.1	4.9	0.5	15.5	10.7	2.1	1.1	0.3	14.8	3.8	0.3	0.6
Cycle Q Clear(g_c), s	0.1	4.9	0.5	15.5	10.7	2.1	1.1	0.3	14.8	3.8	0.3	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	23	1176	520	534	1713	757	38	579	984	86	630	535
V/C Ratio(X)	0.21	0.20	0.02	1.50	0.35	0.08	0.53	0.01	0.55	0.78	0.01	0.03
Avail Cap(c_a), veh/h	172	1176	520	534	1713	757	86	579	984	86	630	535
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	0.81	0.81	0.81	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	26.7	25.2	44.7	18.8	16.4	50.9	25.5	30.5	49.4	23.6	23.7
Incr Delay (d2), s/veh	1.7	0.4	0.1	235.0	0.4	0.2	4.1	0.0	2.2	32.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.6	0.2	25.2	5.7	1.0	0.6	0.1	6.9	2.7	0.2	0.3
LnGrp Delay(d),s/veh	53.6	27.1	25.3	279.8	19.2	16.6	55.0	25.5	32.8	82.0	23.6	23.8
LnGrp LOS	D	С	С	F	В	В	D	С	С	F	С	С
Approach Vol, veh/h		255			1456			572			89	
Approach Delay, s/veh		27.5			163.0			33.5			67.6	
Approach LOS		С			F			С			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	38.0	6.7	40.3	5.2	52.8	9.5	37.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	15.5	32.5	5.0	32.0	5.0	43.0	5.0	32.0				
Max Q Clear Time (g_c+I1), s	17.5	6.9	3.1	2.6	2.1	12.7	5.8	16.8				
Green Ext Time (p_c), s	0.0	3.5	0.0	1.2	0.0	3.5	0.0	1.2				
Intersection Summary												
HCM 2010 Ctrl Delay			113.6									
HCM 2010 LOS			F									

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	f.		7	<b>₽</b>		7	<b>∱</b> β		7	<b>^</b>	7
Volume (veh/h)	183	10	125	10	10	10	228	641	11	11	454	255
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	220	12	150	12	12	12	275	772	13	13	547	307
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	254	21	266	26	43	43	280	2216	37	27	1729	735
Arrive On Green	0.14	0.18	0.18	0.01	0.05	0.05	0.16	0.59	0.59	0.02	0.45	0.45
Sat Flow, veh/h	1810	121	1512	1810	873	873	1810	3726	63	1810	3800	1615
Grp Volume(v), veh/h	220	0	162	12	0	24	275	394	391	13	547	307
Grp Sat Flow(s), veh/h/ln	1810	0	1633	1810	0	1746	1810	1900	1889	1810	1900	1615
Q Serve(g_s), s	11.9	0.0	9.1	0.7	0.0	1.3	15.1	10.6	10.6	0.7	9.2	12.8
Cycle Q Clear(g_c), s	11.9	0.0	9.1	0.7	0.0	1.3	15.1	10.6	10.6	0.7	9.2	12.8
Prop In Lane	1.00	0.0	0.93	1.00	0.0	0.50	1.00	10.0	0.03	1.00	7.2	1.00
Lane Grp Cap(c), veh/h	254	0	287	26	0	87	280	1130	1123	27	1729	735
V/C Ratio(X)	0.87	0.00	0.56	0.47	0.00	0.28	0.98	0.35	0.35	0.47	0.32	0.42
Avail Cap(c_a), veh/h	358	0.00	523	90	0.00	300	280	1130	1123	90	1729	735
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	0.0	37.7	48.9	0.0	45.8	42.1	10.4	10.4	48.8	17.4	18.3
Incr Delay (d2), s/veh	11.2	0.0	0.6	4.9	0.0	0.6	48.0	0.8	0.9	4.7	0.5	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	0.0	4.1	0.4	0.0	0.7	11.3	5.7	5.7	0.4	4.9	6.0
LnGrp Delay(d),s/veh	53.3	0.0	38.3	53.8	0.0	46.4	90.1	11.2	11.2	53.5	17.8	20.1
LnGrp LOS	D	0.0	D	D	0.0	D	70.1 F	В	В	D	17.0	20.1 C
Approach Vol, veh/h	D	382	D	D	36	D		1060	D	D	867	
Approach Delay, s/veh		47.0			48.9			31.7			19.2	
					40.9 D			31.7 C			19.2 B	
Approach LOS		D			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.0	65.0	5.9	23.1	20.0	51.0	18.5	10.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	5.0	38.0	5.0	32.0	15.5	27.5	19.8	17.2				
Max Q Clear Time (g_c+l1), s	2.7	12.6	2.7	11.1	17.1	14.8	13.9	3.3				
Green Ext Time (p_c), s	0.0	5.7	0.0	0.7	0.0	4.6	0.2	0.6				
Intersection Summary												
HCM 2010 Ctrl Delay			29.8									
HCM 2010 LOS			C									
Notes												

User approved pedestrian interval to be less than phase max green.

2035 WP Conditions - AM Peak Hour Urban Crossroads, Inc.

	•	<b>→</b>	•	•	<b>—</b>	•	•	<b>†</b>	<i>&gt;</i>	<b>\</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	ሻ	<b>^</b>						ર્ન	7
Volume (veh/h)	0	886	142	239	516	0	0	0	0	1449	2	707
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	943	146	254	549	0				1541	2	688
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	839	357	173	1346	0				1002	1	895
Arrive On Green	0.00	0.22	0.22	0.10	0.35	0.00				0.55	0.55	0.55
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1807	2	1615
Grp Volume(v), veh/h	0	943	146	254	549	0				1543	0	688
Grp Sat Flow(s), veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	26.5	9.3	11.5	13.1	0.0				66.5	0.0	39.7
Cycle Q Clear(g_c), s	0.0	26.5	9.3	11.5	13.1	0.0				66.5	0.0	39.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	839	357	173	1346	0				1003	0	895
V/C Ratio(X)	0.00	1.12	0.41	1.46	0.41	0.00				1.54	0.00	0.77
Avail Cap(c_a), veh/h	0	839	357	173	1346	0				1003	0	895
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.89	0.89	0.72	0.72	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	46.7	40.0	54.3	29.3	0.0				26.8	0.0	20.8
Incr Delay (d2), s/veh	0.0	69.6	3.1	230.6	0.7	0.0				247.4	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	22.0	4.4	16.8	7.0	0.0				101.8	0.0	18.6
LnGrp Delay(d),s/veh	0.0	116.3 F	43.1 D	284.8	29.9	0.0				274.2 F	0.0	24.9
LnGrp LOS			U	F	C					Г	2221	С
Approach Polov alvoh		1089			803						2231	
Approach LOS		106.5			110.5						197.3	
Approach LOS		F			F						F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	16.0	32.0		72.0		48.0						
Change Period (Y+Rc), s	4.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	11.5	26.5		66.5		42.5						
Max Q Clear Time (g_c+I1), s	13.5	28.5		68.5		15.1						
Green Ext Time (p_c), s	0.0	0.0		0.0		7.4						
Intersection Summary												
HCM 2010 Ctrl Delay			156.4									
HCM 2010 LOS			F									

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ř	<b>^</b>			<b>†</b>	7		4	7			
Volume (veh/h)	587	1748	0	0	594	628	162	0	426	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	638	1900	0	0	646	648	176	0	377			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	653	2491	0	0	971	413	422	0	377			
Arrive On Green	0.36	0.66	0.00	0.00	0.26	0.26	0.23	0.00	0.23			
Sat Flow, veh/h	1810	3800	0	0	3800	1615	1810	0	1615			
Grp Volume(v), veh/h	638	1900	0	0	646	648	176	0	377			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	31.3	31.0	0.0	0.0	13.7	23.0	7.4	0.0	21.0			
Cycle Q Clear(g_c), s	31.3	31.0	0.0	0.0	13.7	23.0	7.4	0.0	21.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	653	2491	0	0	971	413	422	0	377			
V/C Ratio(X)	0.98	0.76	0.00	0.00	0.67	1.57	0.42	0.00	1.00			
Avail Cap(c_a), veh/h	653	2491	0	0	971	413	422	0	377			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	28.4	10.7	0.0	0.0	30.0	33.5	29.3	0.0	34.5			
Incr Delay (d2), s/veh	6.2	0.2	0.0	0.0	3.6	268.0	3.0	0.0	46.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	16.7	16.2	0.0	0.0	7.7	40.9	4.1	0.0	14.2			
LnGrp Delay(d),s/veh	34.6	10.9	0.0	0.0	33.6	301.5	32.3	0.0	81.0			
LnGrp LOS	С	В			С	F	С		F			
Approach Vol, veh/h		2538			1294			553				
Approach Delay, s/veh		16.8			167.8			65.5				
Approach LOS		В			F			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		64.0			36.0	28.0		26.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		59.0			32.5	23.0		21.0				
Max Q Clear Time (g_c+I1), s		33.0			33.3	25.0		23.0				
Green Ext Time (p_c), s		17.2			0.0	0.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			67.5									
HCM 2010 LOS			Ε									

2035 WP Conditions - AM Peak Hour Urban Crossroads, Inc.

Intersection								
Int Delay, s/veh	0.4							
iii Deiay, Siveri	0.4							
		FDT	EDD		VD.	MOT	ND	NDD
Movement		EBT	EBR	V	VBL	WBT	NBL	NBR
Vol, veh/h		472	0		10	361	0	22
Conflicting Peds, #/hr		0	0	_	0	0	0	0
Sign Control		Free	Free	F	ree	Free	Stop	Stop
RT Channelized		-	None		-	None	-	None
Storage Length		-	-		100	-	0	-
Veh in Median Storage, #	#	0	-		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		513	0		11	392	0	24
Major/Minor	Ma	ajor1		Ma	jor2		Minor1	
Conflicting Flow All		0	0		513	0	927	513
Stage 1		-	-		-	-	513	-
Stage 2		-	-		-	-	414	-
Critical Hdwy		-	-		4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4	-
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-	1	063	-	300	565
Stage 1		-	-		-	-	605	-
Stage 2		-	-		-	-	671	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-	1	063	-	297	565
Mov Cap-2 Maneuver		-	-		-	-	493	-
Stage 1		-	-		-	-	605	-
Stage 2		-	-		-	-	664	-
<u> </u>								
Approach		EB			WB		NB	
HCM Control Delay, s		0			0.2		11.7	
HCM LOS					0.2		В	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL W	/BT			
Capacity (veh/h)	565			1063				
HCM Lane V/C Ratio	0.042	-	-		-			
		-	-	0.01	-			
HCM Control Delay (s) HCM Lane LOS	11.7	-	-	8.4	-			
	B	-	-	A	-			
HCM 95th %tile Q(veh)	0.1	-	-	0	-			

Intersection								
	0.5							
int Delay, Siveri	0.5							
Movement		BT	EBR	W	/BL	WBT	NBL	NBR
Vol, veh/h	2	194	0		12	371	0	28
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control	Fı	ee	Free	F	ree	Free	Stop	Stop
RT Channelized		-	None		-	None	-	None
Storage Length		-	-	•	100	-	0	-
Veh in Median Storage, #		0	-		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow	5	37	0		13	403	0	30
Major/Minor	Maj	nr1		Maj	or2		Minor1	
Conflicting Flow All	iviaj	0	0		537	0	966	537
Stage 1		-	-		)	-	537	557
Stage 2		-	-		-	-	429	-
Critical Hdwy		-	_		4.1	-	6.4	6.2
Critical Hdwy Stg 1		-	-		4.1	-	5.4	0.2
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		2.2 )41	-	285	5.3 548
Stage 1		-	-	11	J4 I -	-	590	J40 -
						-		-
Stage 2		-	-		-	-	661	-
Platoon blocked, %		-	-	1/	1/1	-	201	E 40
Mov Cap-1 Maneuver		-	-	10	)41	-	281	548
Mov Cap-2 Maneuver		-	-		-	-	480	-
Stage 1		-	-		-	-	590	-
Stage 2		-	-		-	-	653	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			0.3		12	
HCM LOS							В	
Minor Long/Maior Myssel	NDI ~1 F	пΤ	<b>LDD</b>	M/DL M	וחד.			
Minor Lane/Major Mvmt		BT	EBR		/BT			
Capacity (veh/h)	548	-		1041	-			
HCM Lane V/C Ratio	0.056	-		0.013	-			
HCM Control Delay (s)	12	-	-	8.5	-			
HCM Lane LOS	В	-	-	Α	-			
HCM 95th %tile Q(veh)	0.2	-	-	0	-			

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	522	2 0	13	383	0	28
Conflicting Peds, #/hr	(	) 0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized		- None	-	None	-	None
Storage Length			50	-	0	-
Veh in Median Storage, #	(	) -	-	0	2	-
Grade, %	(		-	0	0	-
Peak Hour Factor	92		92		92	92
Heavy Vehicles, %	(		0		0	0
Mvmt Flow	567	7 0	14	416	0	30
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	(		567	0	1012	567
Stage 1				-	567	-
Stage 2			-	-	445	-
Critical Hdwy			4.1	-	6.4	6.2
Critical Hdwy Stg 1			-	-	5.4	-
Critical Hdwy Stg 2			-	-	5.4	-
Follow-up Hdwy			2.2	-	3.5	3.3
Pot Cap-1 Maneuver			1015	-	267	527
Stage 1			-	-	572	-
Stage 2			-	-	650	-
Platoon blocked, %				-		
Mov Cap-1 Maneuver			1015	-	263	527
Mov Cap-2 Maneuver			-	-	464	-
Stage 1			-	-	572	-
Stage 2			-	-	641	-
Approach	EB	}	WB		NB	
HCM Control Delay, s	(		0.3		12.2	
HCM LOS					В	
Minor Lane/Major Mvmt	NBLn1 EBT	EBR	WBL WBT			
Capacity (veh/h)			1015 -			
HCM Lane V/C Ratio	0.058		0.014 -			
HCM Control Delay (s)	12.2		8.6 -			
HCM Lane LOS	В .		A -			
HCM 95th %tile Q(veh)	0.0	_	0 -			
110.W 7001 70010 Q(VOII)	0.2		J			

Intersection													
	0.2												
, ·													
Movement	EBL	EBT	EBR	WBL	WBT	WBR		NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	25	475	50	50	346	25		25	251	25	25	790	25
Conflicting Peds, #/hr	0	0	0	0	0	0		0	0	0	0	0	C
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop		Free	Free	Free	Free	Free	Free
RT Channelized	-	'-	None	<u>'</u> -	<u>'</u> -	None		-	-	None	-	-	None
Storage Length	50	-	-	100	-	-		-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-		-	2	-	-	2	
Grade, %	-	0	-	-	0	-		-	0	-	-	0	
Peak Hour Factor	92	92	92	92	92	92		92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0		0	0	0	0	0	0
Mvmt Flow	27	516	54	54	376	27		27	273	27	27	859	27
Major/Minor	Minor2			Minor1			N	/lajor1			Major2		
Conflicting Flow All	1469	1281	872	1553	1281	286		886	0	0	300	0	0
Stage 1	927	927	-	341	341	-		-	-	-	-	-	-
Stage 2	542	354	-	1212	940	-		_	_	_	-	_	_
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2		4.1	_	_	4.1	_	_
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-			_	_	-	_	
Critical Hdwy Stg 2	6.1	5.5	_	6.1	5.5	_		_	_	_	_	_	_
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3		2.2	_	_	2.2	_	_
Pot Cap-1 Maneuver	107	~ 167	353	93	~ 167	758		773	_	_	1273	_	_
Stage 1		~ 350	-	678	642	-		-	_	_	-	_	_
Stage 2	528	634	_	225		_		_	_	_	-	_	_
Platoon blocked, %									-	-		-	
Mov Cap-1 Maneuver	-	~ 153	353	_	~ 153	758		773		-	1273	-	
Mov Cap-2 Maneuver		~ 153	-		~ 153	-			-	-	-	-	
Stage 1		~ 335	_	650	615	_				-	-	-	
Stage 2	189	607	-		~ 331	-		-	-	-	-	-	-
Approach	EB			WB				NB			SB		
HCM Control Delay, s				***				0.8			0.2		
HCM LOS	_			_				0.0			0.2		
HOW LOS													
Minor Lane/Major Mvmt	NBL	NBT	NIDD EDI	n1 EBLn2\	MDI n1\	M/DI n2	SBL	SBT	SBR				
Capacity (veh/h)	773		NDK LDL	- 162	VDLIIIV -	162	1273	<u> </u>	JDK -				
HCM Lane V/C Ratio	0.035	-	-	- 3.523		2.489			-				
HCM Control Delay (s)	9.8	0		\$ 1192.6	-	732.7	7.9	0	-				
HCM Lane LOS	9.8 A	A	-			F 732.7	7.9 A	A					
HCM 95th %tile Q(veh)	0.1	A -	-	- F - 55	-	34.5	0.1		-				
	U. I	-	-	- 55	-	34.3	U. I	-	-				
Notes													
~: Volume exceeds capac	city \$: De	elay exc	eeds 300s	+: Com	putation	n Not D	efined	*: All	major	volume i	n platoon		

Intersection								
Int Delay, s/veh	0.4							
in Delay, erren	<b></b>							
Movement		EBT	EBR		WBL	WBT	NBL	NBR
Vol, veh/h		525	0		10	421	0	22
Conflicting Peds, #/hr		0	0		0	0	0	0
Sign Control		Free	Free		Free	Free	Stop	Stop
RT Channelized		-	None		-	None	- -	None
Storage Length		_	-		50	-	0	-
Veh in Median Storage, #	<b>#</b>	0	_		-	0	2	-
Grade, %		0	-		-	0	0	-
Peak Hour Factor		92	92		92	92	92	92
Heavy Vehicles, %		0	0		0	0	0	0
Mvmt Flow		571	0		11	458	0	24
Major/Minor	IV.	1ajor1		Λ	/lajor2		Minor1	
Conflicting Flow All		0	0	- 10	571	0	1050	571
Stage 1		-	-		-	-	571	
Stage 2		-	-		_	-	479	_
Critical Hdwy		_	_		4.1	_	6.4	6.2
Critical Hdwy Stg 1		-	-		-	-	5.4	-
Critical Hdwy Stg 2		-	-		-	-	5.4	-
Follow-up Hdwy		-	-		2.2	-	3.5	3.3
Pot Cap-1 Maneuver		-	-		1012	-	254	524
Stage 1		-	-		-	-	569	-
Stage 2		-	-		-	-	627	-
Platoon blocked, %		-	-			-		
Mov Cap-1 Maneuver		-	-		1012	-	251	524
Mov Cap-2 Maneuver		-	-		-	-	454	-
Stage 1		-	-		-	-	569	-
Stage 2		-	-		-	-	620	-
Approach		EB			WB		NB	
HCM Control Delay, s		0			0.2		12.2	
HCM LOS							В	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT			
Capacity (veh/h)	524	-		1012	-			
HCM Lane V/C Ratio	0.046	-		0.011	_			
HCM Control Delay (s)	12.2	_	-	8.6	_			
HCM Lane LOS	В	-	-	Α	-			
HCM 95th %tile Q(veh)	0.1	-	-	0	_			
	0.1			J				

Movement	Intersection									
Movement         EBT         EBR         WBL         WBT         NBL         NBR           Vol, veh/h         547         0         9         431         0         21           Conflicting Peds, #/hr         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - None         - None         - None         - None           Storage Length         100         - 0         2         0         0         0           Veh in Median Storage, #         0 0         0         0         0         0         2           Grade, %         0 0         0         0         0         0         2         92 <td< td=""><td></td><td>0.3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>		0.3								
Vol. veh/h         547         0         9         431         0         21           Conflicting Peds, #/hr         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         -         None         -         None         -         None           Storage Length         -         -         100         -         0         -         -         None         Stop         0 <td< td=""><td> 2 e.a.y, e, ve</td><td>0.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	2 e.a.y, e, ve	0.0								
Vol. veh/h         547         0         9         431         0         21           Conflicting Peds, #/hr         0         0         0         0         0         0           Sign Control         Free         Free         Free         Free         Free         Free         Stop         Stop           RT Channelized         - None         - None         - None         - None         - None           Storage Length         100         - 0         2         - Gade,         - 0         2         - Gade,         - 0         0         - 0         - 0         - 0         - 0         - 0         - 0         - 0         - 0         - 0         - 2         - 2         - 9         92	Movement		EBT	EBR		WBL	WBT	NE	3L	NBR
Sign Control         Free Free Free         Free Free Free Free Free Free Free Free	Vol, veh/h		547	0		9	431		0	21
Sign Control         Free Free Free         Free Free Free Free Free Free Free Free			0	0		0	0		0	0
RT Channelized         None         None         None         None         None         None         None         Storage Length         -         100         -         0         -         Veh in Median Storage, #         0         -         -         0         2         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         -         -         0         0         0         -         -         0		F	Free	Free		Free	Free	Sto	р	Stop
Veh in Median Storage, #         0         -         -         0         2         -           Grade, %         0         -         -         0         0         -           Peak Hour Factor         92         92         92         92         92         92           Heavy Vehicles, %         0         0         0         0         0         0         0           Mwnt Flow         595         0         10         468         0         23           Major/Minor         Major/Minor         Major/Minor         Minor1         Minor1           Conflicting Flow All         0         0         595         0         1083         595           Stage 1         -         -         -         -         595         -         1083         595           Stage 2         -         -         -         -         488         -         -         -         488         -         -         -         488         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -	RT Channelized		-	None		-	None		-	None
Grade, %         0         -         -         0         0         -         Peak Hour Factor         92         93         93         93         95         595         595         595         595         595         595         595         595         595         595         62         82         92         92         92         92         488         92         92         92         488         92         92         92         <	Storage Length		-	-		100	-		0	-
Peak Hour Factor         92         93         93         93         94	Veh in Median Storage,	#	0	-		-	0		2	-
Heavy Vehicles, %	Grade, %		0	-		-	0		0	-
Mymt Flow         595         0         10         468         0         23           Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         595         0         1083         595           Stage 1         -         -         -         595         -           Stage 2         -         -         -         488         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         5.4         -         -           Critical Hdwy Stg 2         -         -         -         5.4         -         -           Critical Hdwy Stg 2         -         -         -         5.4         -         -           Critical Hdwy Stg 2         -         -         -         5.4         -         -           Critical Hdwy Stg 2         -         -         -         5.4         -         -           Stage 1         -         -         -         991         -         243         508           Stage 1         -         -         -	Peak Hour Factor		92	92		92	92	Ç	92	92
Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         595         0         1083         595           Stage 1         -         -         -         -         595         -           Stage 2         -         -         -         488         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Follow-up Hdwy         -         -         2.2         -         3.5         3.3           Pot Cap-1 Maneuver         -         -         991         -         243         508           Mov Cap-1 Maneuver         -         -         -         -         -         -	Heavy Vehicles, %		0	0		0	0		0	0
Conflicting Flow All         0         0         595         0         1083         595           Stage 1         -         -         -         -         595         -           Stage 2         -         -         -         -         488         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Follow-up Hdwy         -         -         2.2         -         3.5         3.3           Pot Cap-1 Maneuver         -         991         -         243         508           Stage 2         -         -         -         -         621         -           Platoon blocked, %         -	Mvmt Flow		595	0		10	468		0	23
Conflicting Flow All       0       0       595       0       1083       595         Stage 1       -       -       -       -       595       -         Stage 2       -       -       -       -       488       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       991       -       243       508         Stage 2       -										
Conflicting Flow All         0         0         595         0         1083         595           Stage 1         -         -         -         -         595         -           Stage 2         -         -         -         -         488         -           Critical Hdwy         -         -         4.1         -         6.4         6.2           Critical Hdwy Stg 1         -         -         -         5.4         -           Critical Hdwy Stg 2         -         -         -         5.4         -           Follow-up Hdwy         -         -         2.2         -         3.5         3.3           Pot Cap-1 Maneuver         -         -         991         -         243         508           Stage 2         -         -         -         -         621         -           Platoon blocked, %         -         -         -         -         -         -           Mov Cap-1 Maneuver         -         -         -         -         444         -           Stage 1         -         -         -         -         -         444         -           Stage 2 <td< td=""><td>Major/Minor</td><td>Ma</td><td>ajor1</td><td></td><td>M</td><td>lajor2</td><td></td><td>Mino</td><td>r1</td><td></td></td<>	Major/Minor	Ma	ajor1		M	lajor2		Mino	r1	
Stage 1       -       -       -       595       -         Stage 2       -       -       -       488       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       991       -       243       508         Stage 1       -       -       -       -       -       555       -         Stage 2       - <td< td=""><td></td><td></td><td>_</td><td>0</td><td></td><td></td><td>0</td><td></td><td></td><td>595</td></td<>			_	0			0			595
Stage 2       -       -       -       -       488       -         Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       -       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       -       -       555       -         Stage 1       -       -       -       -       -       621       -         Platoon blocked, %       -       -       -       -       -       -       -         Mov Cap-1 Maneuver       -       -       991       -       241       508         Mov Cap-2 Maneuver       -										
Critical Hdwy       -       -       4.1       -       6.4       6.2         Critical Hdwy Stg 1       -       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       -       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       991       -       243       508         Stage 1       -       -       -       -       555       -         Stage 2       -       -       -       -       -       -         Mov Cap-1 Maneuver       -<			-	-		-	-			-
Critical Hdwy Stg 1       -       -       -       5.4       -         Critical Hdwy Stg 2       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       991       -       243       508         Stage 1       -       -       -       -       621       -         Platoon blocked, %       -       -       -       -       -         Mov Cap-1 Maneuver       -       -       991       -       241       508         Mov Cap-2 Maneuver       -       -       -       -       444       -         Stage 1       -       -       -       -       555       -         Stage 2       -       -       -       -       615       -         Approach       EB       WB       NB         HCM Control Delay, s       0       0.2       12.4         HCM LOS       B			-	-		4.1	-			6.2
Critical Hdwy Stg 2       -       -       -       -       5.4       -         Follow-up Hdwy       -       -       2.2       -       3.5       3.3         Pot Cap-1 Maneuver       -       -       991       -       243       508         Stage 1       -       -       -       -       621       -         Stage 2       -       -       -       -       621       -         Platoon blocked, %       -       -       -       -       -         Mov Cap-1 Maneuver       -       -       991       -       241       508         Mov Cap-2 Maneuver       -       -       -       -       444       -         Stage 1       -       -       -       -       555       -         Stage 2       -       -       -       -       615       -     Approach  EB  WB  NB  HCM Control Delay, s  0 0 0.2 12.4 HCM LOS B			-	-		-	-	5	.4	-
Follow-up Hdwy 2.2 - 3.5 3.3  Pot Cap-1 Maneuver - 991 - 243 508  Stage 1 5555 - 514ge 2 621 621 621 - 621			-	-		-	-	5	.4	-
Stage 1       -       -       -       555       -         Stage 2       -       -       -       621       -         Platoon blocked, %       -       -       -       -         Mov Cap-1 Maneuver       -       -       991       -       241       508         Mov Cap-2 Maneuver       -       -       -       -       444       -         Stage 1       -       -       -       -       555       -         Stage 2       -       -       -       615       -     Approach  EB  WB  NB  HCM Control Delay, s  0 0 0.2 12.4 HCM LOS B			-	-		2.2	-	3	.5	3.3
Stage 1       -       -       -       555       -         Stage 2       -       -       -       621       -         Platoon blocked, %       -       -       -       -         Mov Cap-1 Maneuver       -       -       991       -       241       508         Mov Cap-2 Maneuver       -       -       -       -       444       -         Stage 1       -       -       -       -       555       -         Stage 2       -       -       -       615       -         Approach       EB       WB       NB         HCM Control Delay, s       0       0.2       12.4         HCM LOS       B			-	-		991	-	24	13	508
Stage 2       -       -       -       -       621       -         Platoon blocked, %       - <td< td=""><td></td><td></td><td>-</td><td>-</td><td></td><td>-</td><td>-</td><td>55</td><td>55</td><td>-</td></td<>			-	-		-	-	55	55	-
Mov Cap-1 Maneuver       -       -       991       -       241       508         Mov Cap-2 Maneuver       -       -       -       -       444       -         Stage 1       -       -       -       -       555       -         Stage 2       -       -       -       -       615       -            Approach       EB       WB       NB         HCM Control Delay, s       0       0.2       12.4         HCM LOS       B	Stage 2		-	-		-	-	62	21	-
Mov Cap-2 Maneuver       -       -       -       -       444       -         Stage 1       -       -       -       -       555       -         Stage 2       -       -       -       615       -         Approach       EB       WB       NB         HCM Control Delay, s       0       0.2       12.4         HCM LOS       B			-	-			-			
Stage 1         -         -         -         555         -           Stage 2         -         -         -         -         615         -           Approach         EB         WB         NB           HCM Control Delay, s         0         0.2         12.4           HCM LOS         B			-	-		991	-			508
Stage 2         -         -         -         -         615         -           Approach         EB         WB         NB           HCM Control Delay, s         0         0.2         12.4           HCM LOS         B			-	-		-	-			-
Approach EB WB NB HCM Control Delay, s 0 0.2 12.4 HCM LOS B			-	-		-	-			-
HCM Control Delay, s 0 0.2 12.4 HCM LOS B	Stage 2		-	-		-	-	61	15	-
HCM Control Delay, s 0 0.2 12.4 HCM LOS B										
HCM Control Delay, s 0 0.2 12.4 HCM LOS B	Approach		EB			WB		N	ΙB	
HCM LOS B			0			0.2		12	.4	
Minor Lane/Major Mymt NRI n1 FRT FRR WRI WRT										
Minor Lane/Major Mymt NRI n1 FRT FRR WRI WRT										
Willion Earle, Major William 196111 EDT EDT WDE WDT	Minor Lane/Major Mvmt	NBLn1 I	EBT	EBR	WBL	WBT				
Capacity (veh/h) 508 991 -										
HCM Lane V/C Ratio 0.045 0.01 -			-	-		-				
HCM Control Delay (s) 12.4 - 8.7 -			-	-		-				
HCM Lane LOS B A -			-	-		-				
HCM 95th %tile Q(veh) 0.1 0 -			-	-		-				

Intersection													
Int Delay, s/veh	0.7												
·													
Movement	EBL	EBT	EBR	\	WBL	WBT	WBR	NB	L NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	568	0		16	440	0		0 0		0	0	0
Conflicting Peds, #/hr	0	0	0		0	0	0		0 0	0	0	0	0
Sign Control	Free	Free	Free		Free	Free	Free	Sto	p Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None		-	-	None			None	-	-	None
Storage Length	100	-	-		100	-	-			-	-	-	-
Veh in Median Storage, #	-	0	-		-	0	-		- 2		-	2	-
Grade, %	-	0	-		-	0	-		- 0		-	0	-
Peak Hour Factor	67	67	92		67	67	67	6			67	67	67
Heavy Vehicles, %	0	0	0		0	0	0		0 0		0	0	0
Mvmt Flow	0	848	0		24	657	0		0 0	54	0	0	0
Major/Minor	Major1			Ma	ajor2			Minor	1		Minor2		
Conflicting Flow All	657	0	0		848	0	0	155	2 1552	848	1579	1552	657
Stage 1	-	-	-		-	-	-	84	8 848	-	704	704	-
Stage 2	-	-	-		-	-	-	70	4 704	-	875	848	-
Critical Hdwy	4.1	-	-		4.1	-	-	7.	1 6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-		-	-	-	6.	1 5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-		-	-	-	6.	1 5.5		6.1	5.5	-
Follow-up Hdwy	2.2	-	-		2.2	-	-	3.			3.5	4	3.3
Pot Cap-1 Maneuver	940	-	-		798	-	-	9			89	115	468
Stage 1	-	-	-		-	-	-	35			431	443	-
Stage 2	-	-	-		-	-	-	43	1 443	-	347	380	-
Platoon blocked, %		-	-			-	-						
Mov Cap-1 Maneuver	940	-	-		798	-	-	9			74	112	468
Mov Cap-2 Maneuver	-	-	-		-	-	-	27			227	280	-
Stage 1	-	-	-		-	-	-	35			431	430	-
Stage 2	-	-	-		-	-	-	41	8 430	-	296	380	-
Approach	EB				WB			N	В		SB		
HCM Control Delay, s	0				0.3			16.	6		0		
HCM LOS									C		А		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR \	WBL	WBT	WBR SI	BLn1					
Capacity (veh/h)	364	940	-	-	798	-	-	-					
HCM Lane V/C Ratio	0.148	-	-	-	0.03	-	-	-					
HCM Control Delay (s)	16.6	0	-	-	9.7	-	-	0					
HCM Lane LOS	С	Α	-	-	Α	-	-	Α					
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	-					

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	~	<b>/</b>	<b>+</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	<b>^</b>	7	ሻሻ	<b>^</b>	7	7	<b>^</b>	77	Ť	<b>∱</b> ∱	
Volume (veh/h)	497	143	740	723	572	406	248	149	932	10	331	128
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	512	147	760	745	590	419	256	154	676	10	341	132
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	190	1300	575	1467	2680	1184	95	717	1219	22	884	336
Arrive On Green	0.05	0.34	0.34	0.41	0.71	0.71	0.05	0.38	0.38	0.01	0.34	0.34
Sat Flow, veh/h	3619	3800	1680	3619	3800	1679	1810	1900	3230	1810	2625	998
Grp Volume(v), veh/h	512	147	760	745	590	419	256	154	676	10	245	228
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1679	1810	1900	1615	1810	1900	1723
Q Serve(g_s), s	5.0	2.5	32.5	14.6	5.1	9.3	5.0	5.2	11.6	0.5	9.3	9.6
Cycle Q Clear(g_c), s	5.0	2.5	32.5	14.6	5.1	9.3	5.0	5.2	11.6	0.5	9.3	9.6
Prop In Lane	1.00	1000	1.00	1.00	0.400	1.00	1.00	747	1.00	1.00		0.58
Lane Grp Cap(c), veh/h	190	1300	575	1467	2680	1184	95	717	1219	22	640	580
V/C Ratio(X)	2.69	0.11	1.32	0.51	0.22	0.35	2.69	0.21	0.55	0.45	0.38	0.39
Avail Cap(c_a), veh/h	190	1300	575	1467	2680	1184	95	717	1219	95	640	580
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	0.60	0.60	0.60	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.0	21.4	79.3	21.2	4.9	5.5	45.0	20.0	12.7	46.6	24.0	24.1
Incr Delay (d2), s/veh	774.4	0.2	157.1	0.1	0.1	0.5	788.6	0.7	1.8	5.3	1.7	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0 25.1	0.0 7.3	0.0 2.7	0.0 4.4	0.0 23.3	0.0 2.9	0.0 5.4	0.0	0.0 5.2	0.0 4.9
%ile BackOfQ(50%),veh/ln LnGrp Delay(d),s/veh	819.4	21.6	236.4	21.2	5.0	6.0	833.6	2.9	14.5	51.9	25.7	26.1
LnGrp LOS	619.4 F	21.0 C	230.4 F	21.2 C	3.0 A	0.0 A	033.0 F	20.7 C	14.5 B	51.9 D	25.7 C	20.1 C
	Г	1419	Г	C	1754	A	Г		D	D		C
Approach Vol, veh/h								1086 208.5			483 26.4	
Approach LOS		424.5			12.1						20.4 C	
Approach LOS		F			В			F			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	45.0	38.0	9.5	37.5	9.5	73.5	5.7	41.3				
Change Period (Y+Rc), s	5.5	* 5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	5.5	* 33	5.0	32.0	5.0	33.0	5.0	32.0				
Max Q Clear Time (g_c+I1), s	16.6	34.5	7.0	11.6	7.0	11.3	2.5	13.6				
Green Ext Time (p_c), s	0.0	0.0	0.0	3.6	0.0	4.8	0.0	3.5				
Intersection Summary												
HCM 2010 Ctrl Delay			181.9									
HCM 2010 LOS			F									
Notos												

Notes

2035 WP Conditions - PM Peak Hour Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	<u>ነ</u>	₽		ሻ	₽		ሻ	<b>ተ</b> ኈ		ሻ	<b>^</b>	7
Volume (veh/h)	369	10	225	10	10	10	108	983	10	10	1479	338
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	388	11	237	11	11	11	114	1035	11	11	1557	356
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	310	16	349	24	48	48	101	1977	21	24	1841	782
Arrive On Green	0.17	0.22	0.22	0.01	0.06	0.06	0.06	0.53	0.53	0.01	0.48	0.48
Sat Flow, veh/h	1810	72	1554	1810	873	873	1810	3753	40	1810	3800	1613
Grp Volume(v), veh/h	388	0	248	11	0	22	114	524	522	11	1557	356
Grp Sat Flow(s), veh/h/ln	1810	0	1626	1810	0	1746	1810	1900	1893	1810	1900	1613
Q Serve(g_s), s	15.4	0.0	12.6	0.5	0.0	1.1	5.0	16.2	16.2	0.5	32.2	5.7
Cycle Q Clear(g_c), s	15.4	0.0	12.6	0.5	0.0	1.1	5.0	16.2	16.2	0.5	32.2	5.7
Prop In Lane	1.00	0.0	0.96	1.00	0.0	0.50	1.00	10.2	0.02	1.00	02.2	1.00
Lane Grp Cap(c), veh/h	310	0	365	24	0	97	101	1001	997	24	1841	782
V/C Ratio(X)	1.25	0.00	0.68	0.46	0.00	0.23	1.13	0.52	0.52	0.46	0.85	0.46
Avail Cap(c_a), veh/h	310	0.00	578	101	0.00	419	101	1001	997	101	1841	782
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.3	0.0	31.9	44.1	0.0	40.7	42.5	13.9	13.9	44.1	20.3	2.9
Incr Delay (d2), s/veh	137.7	0.0	0.8	4.9	0.0	0.4	130.4	2.0	2.0	4.9	5.0	1.9
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	19.5	0.0	5.7	0.3	0.0	0.5	6.1	9.0	9.0	0.3	17.9	2.9
LnGrp Delay(d),s/veh	175.0	0.0	32.8	49.0	0.0	41.1	172.9	15.9	15.9	49.0	25.3	4.8
LnGrp LOS	173.0 F	0.0	02.0 C	T7.0	0.0	D	F	В	13.7 B	47.0 D	23.3 C	Α.
Approach Vol, veh/h		636	<u> </u>	D	33	D D	•	1160	D	D D	1924	
Approach Delay, s/veh		119.5			43.7			31.3			21.6	
		F						31.3 C			21.0 C	
Approach LOS		Г			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	52.9	5.7	25.7	9.5	49.1	20.9	10.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	5.5	* 5.5				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	15.4	* 22				
Max Q Clear Time (g_c+I1), s	2.5	18.2	2.5	14.6	7.0	34.2	17.4	3.1				
Green Ext Time (p_c), s	0.0	7.4	0.0	1.5	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			41.4									
HCM 2010 LOS			D									
Notes												

User approved pedestrian interval to be less than phase max green.

2035 WP Conditions - PM Peak Hour Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		^↑	7	ሻ	<b>^</b>						ર્ન	7
Volume (veh/h)	0	891	194	666	953	0	0	0	0	796	2	748
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	948	206	709	1014	0				847	2	719
Adj No. of Lanes	0	2	1	1	2	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	681	289	550	1979	0				700	2	626
Arrive On Green	0.00	0.18	0.18	0.10	0.17	0.00				0.39	0.39	0.39
Sat Flow, veh/h	0	3800	1615	1810	3800	0				1805	4	1615
Grp Volume(v), veh/h	0	948	206	709	1014	0				849	0	719
Grp Sat Flow(s), veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1615
Q Serve(g_s), s	0.0	21.5	14.4	36.5	29.1	0.0				46.5	0.0	46.5
Cycle Q Clear(g_c), s	0.0	21.5	14.4	36.5	29.1	0.0				46.5	0.0	46.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00	_	1.00
Lane Grp Cap(c), veh/h	0	681	289	550	1979	0				701	0	626
V/C Ratio(X)	0.00	1.39	0.71	1.29	0.51	0.00				1.21	0.00	1.15
Avail Cap(c_a), veh/h	0	681	289	550	1979	0				701	0	626
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.92	0.92	0.71	0.71	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	49.3	46.3	54.0	35.8	0.0				36.8	0.0	36.8
Incr Delay (d2), s/veh	0.0	184.8	12.9	139.3	0.7	0.0				107.8	0.0	84.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	28.7	7.4	39.6	15.5	0.0				44.2	0.0	35.4
LnGrp Delay(d),s/veh	0.0	234.1	59.2	193.3	36.5	0.0				144.5	0.0	121.3
LnGrp LOS		F 1154	E	F	D 1700					F	15/0	F
Approach Vol, veh/h		1154			1723						1568	
Approach LOS		202.9			101.0						133.9	
Approach LOS		F			F						F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	41.0	27.0		52.0		68.0						
Change Period (Y+Rc), s	4.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	36.5	21.5		46.5		62.5						
Max Q Clear Time (g_c+I1), s	38.5	23.5		48.5		31.1						
Green Ext Time (p_c), s	0.0	0.0		0.0		11.3						
Intersection Summary												
HCM 2010 Ctrl Delay			139.1									
HCM 2010 LOS			F									

2035 WP Conditions - PM Peak Hour Urban Crossroads, Inc.

-	•	<b>→</b>	•	•	<b>—</b>	•	•	<b>†</b>	<i>&gt;</i>	<b>\</b>	<b></b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ň	<b>^</b>			<b>^</b>	7		र्स	7			
Volume (veh/h)	679	1007	0	0	1252	1555	367	3	227	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	763	1131	0	0	1407	1722	412	3	146			
Adj No. of Lanes	1	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	354	3008	0	0	2153	915	225	2	202			
Arrive On Green	0.39	1.00	0.00	0.00	0.57	0.57	0.13	0.13	0.13			
Sat Flow, veh/h	1810	3800	0	0	3800	1614	1797	13	1615			
Grp Volume(v), veh/h	763	1131	0	0	1407	1722	415	0	146			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1614	1810	0	1615			
Q Serve(g_s), s	23.5	0.0	0.0	0.0	30.6	68.0	15.0	0.0	10.4			
Cycle Q Clear(g_c), s	23.5	0.0	0.0	0.0	30.6	68.0	15.0	0.0	10.4			
Prop In Lane	1.00		0.00	0.00		1.00	0.99		1.00			
Lane Grp Cap(c), veh/h	354	3008	0	0	2153	915	226	0	202			
V/C Ratio(X)	2.15	0.38	0.00	0.00	0.65	1.88	1.83	0.00	0.72			
Avail Cap(c_a), veh/h	354	3008	0	0	2153	915	226	0	202			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	36.5	0.0	0.0	0.0	17.9	26.0	52.5	0.0	50.5			
Incr Delay (d2), s/veh	519.8	0.0	0.0	0.0	1.6	401.3	392.1	0.0	20.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	62.8	0.0	0.0	0.0	16.3	132.0	32.1	0.0	5.8			
LnGrp Delay(d),s/veh	556.3	0.0	0.0	0.0	19.5	427.3	444.6	0.0	70.6			
LnGrp LOS	F	А			В	F	F		Е			
Approach Vol, veh/h		1894			3129			561				
Approach Delay, s/veh		224.1			243.9			347.3				
Approach LOS		F			F			F				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		100.0			27.0	73.0		20.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		95.0			23.5	68.0		15.0				
Max Q Clear Time (g_c+I1), s		2.0			25.5	70.0		17.0				
Green Ext Time (p_c), s		61.6			0.0	0.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			247.6									
HCM 2010 LOS			F									

2035 WP Conditions - PM Peak Hour Urban Crossroads, Inc.

# **APPENDIX 8.3:**

HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS



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					TRAFFIC COND	ITIONS	2035 NI	P
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19	/15
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Decker Road			<u></u>	Critical Approach	Speed (Major)	4	.0 mpl
Minor Street:	Oleander Aven	ue		_	Critical Approach	Speed (Minor)	4	0 mp
Major Street	Approach Lanes	= .	2	_lane	Minor Street	Approach Lanes	1	lane
Major Street	Future ADT =		9,750	_vpd	Minor Street	Future ADT =	3,530	vpd
	or critical speed of	·		`	• /-	or	RURAI	L (R)
iii buiit up ait	sa oi isolaleu coi	initiality of <	10,000 popu	ialioi i				

# (Based on Estimated Average Daily Traffic - See Note)

LIDDANI	DUDAL		Minimo una Da		
<u>URBAN</u>	<u>RURAL</u>		Minimum Re	•	
XX			EA		
CONDITION A - Min	imum Vehicular Volume			Vehicles	Per Day
<u>Satisfied</u>	Not Satisfied	Vehicles F	Per Day on	on Highe	r-Volume
XX		Major	Street	Minor Stree	et Approach
Number of lanes for moving	ng traffic on each approach	(Total of Both	n Approaches)	(One Direc	ction Only)
Major Street	Minor Street	Urban	Rural	<u> Urban</u>	Rural
1	1	8,000	5,600	2,400	1,680
2 + <b>9,750</b>	1 <b>3,530</b>	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 - Interru	ption of Continuous Traffic			Vehicles	Per Day
<u>Satisfied</u>	Not Satisfied	Vehicles	s Per Day	on Highe	r-Volume
	XX	on Maj	or Street	Minor Stree	et Approach
Number of lanes for moving	ng traffic on each approach	(Total of Both	n Approaches)	(One Direct	ction Only)
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
1	1	12,000	8,400	1,200	850
2 + <b>9,750</b>	1 <b>3,530</b>	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				
<u>Satisfied</u>	Not Satisfied				
	XX	2 CONI	DITIONS	2 COND	DITIONS
No one condition satisfied	d, but following conditions	80	0%	80	)%
fulfilled 80% of more	_				
	100% 68%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



# Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = 2035 Without Project Conditions - Weekday AM Peak Hour

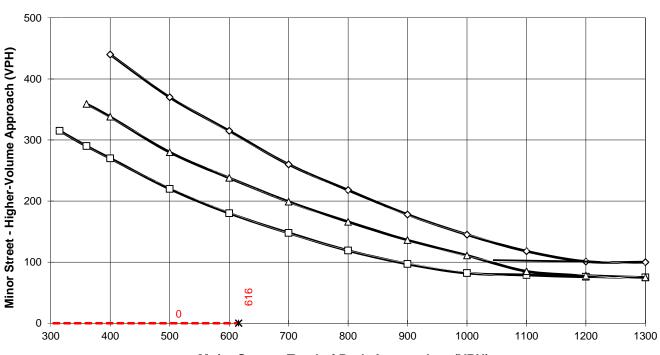
Major Street Name = Oleander Avenue Total of Both Approaches (VPH) = 616

Number of Approach Lanes Major Street = 1

Minor Street Name = Driveway 6 High Volume Approach (VPH) = 0

Number of Approach Lanes Minor Street = 1

# SIGNAL WARRANT NOT SATISFIED



Major Street - Total of Both Approaches (VPH)

→ 1 Lane (Major) & 1 Lane (Minor)

2+ Lanes (Major) & 1 Lane (Minor) OR 1 Lane (Major) & 2+ Lanes (Minor)

2+ Lanes (Major) & 2+ Lanes (Minor)

→ Major Street Approaches

- - - Minor Street Approaches

\*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane



8.3-2

# APPENDIX 8.4:

HORIZON YEAR (2035) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS



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					TRAFFIC COND	ITIONS	2035 WP	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15	5
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	<b>40</b> r	nph
Minor Street:	Driveway 1			_	Critical Approach	Speed (Minor)	<b>25</b> r	nph
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	1	ane
Major Street	Future ADT =		7,310	_vpd	Minor Street	Future ADT =	<b>251</b>	/pd
Speed limit o	or critical speed o	n major stre	eet traffic > 64	km/h (40 m	ph);		DUDAL (	<b>D</b> \
In built up are	ea of isolated cor	mmunity of	< 10,000 popu	lation		or	RURAL (I	₹)

# (Based on Estimated Average Daily Traffic - See Note)

LIDDAN	DUDAL		Minimum Da		
<u>URBAN</u>	<u>RURAL</u>		Minimum Re		
XX			EA		
CONDITION A - Mir	nimum Vehicular Volume			Vehicles	s Per Day
<u>Satisfied</u>	Not Satisfied	Vehicles I	Per Day on	on Highe	er-Volume
	XX	Majoı	r Street	Minor Stree	et Approach
Number of lanes for movi	ng traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)
Major Street	Minor Street	<u>Urban</u>	Rural	<u>Urban</u>	Rural
1 <b>7,310</b>	1 <b>251</b>	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 - Interru	ption of Continuous Traffic			Vehicles	Per Day
<u>Satisfied</u>	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume
	XX	on Maj	or Street	Minor Stree	et Approach
Number of lanes for movi	ng traffic on each approach	(Total of Botl	h Approaches)	(One Dire	ction Only)
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
1 <b>7,310</b>	1 <b>251</b>	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	f CONDITIONS A + B				
<u>Satisfied</u>	Not Satisfied				
	XX	2 CONI	DITIONS	2 CONI	DITIONS
No one condition satisfie	8	0%	80	)%	
fulfilled 80% of more					
	10% 21%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



N /I					
IVI	CALC	CHS	DATE	05/19	/15
	CHK		DATE		
	•	Critical Approach	Speed (Major)	4	0 mpł
		Critical Approach	Speed (Minor)	2	5 mpł
lane	e	Minor Street	Approach Lanes	1	lane
<b>23</b> vpd	ł	Minor Street	Future ADT =	262	vpd
	`	•	or	RURAI	_ (R)
	23 vpc	CHK    lane   23 vpd   c > 64 km/h (40 m	CHK  Critical Approach Critical Approach Minor Street	CHK DATE Critical Approach Speed (Major) Critical Approach Speed (Minor)  I lane Minor Street Approach Lanes  23 vpd Minor Street Future ADT =  C > 64 km/h (40 mph);	CHK         DATE           Critical Approach Speed (Major)         4           Critical Approach Speed (Minor)         2           I lane         Minor Street Approach Lanes         1           23 vpd         Minor Street Future ADT =         262           C > 64 km/h (40 mph);         or         RURAL

# (Based on Estimated Average Daily Traffic - See Note)

LIDDAN	DLIDAL		Minimum Da	au irom onto	
<u>URBAN</u>	<u>RURAL</u>		Minimum Re	•	
XX			EA		
CONDITION A - Min	imum Vehicular Volume			Vehicles	s Per Day
<u>Satisfied</u>	Not Satisfied	Vehicles F	Per Day on	on Highe	er-Volume
	XX	Major	r Street	Minor Stree	et Approach
Number of lanes for movi	ng traffic on each approach	(Total of Both	h Approaches)	(One Dire	ction Only)
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
1 <b>7,823</b>	1 <b>262</b>	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 - Interru	ption of Continuous Traffic			Vehicles	Per Day
<u>Satisfied</u>	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume
	XX	on Maj	or Street	Minor Stree	et Approach
Number of lanes for movi	ng traffic on each approach	(Total of Both	h Approaches)	(One Dire	ction Only)
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
1 <b>7,823</b>	1 <b>262</b>	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				
<u>Satisfied</u>	Not Satisfied				
	XX	2 CONI	DITIONS	2 CONI	DITIONS
No one condition satisfie	d, but following conditions	80	0%	80	0%
fulfilled 80% of more	_				
	11% 22%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS	2035 W	Р
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19	/15
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		<u></u>	Critical Approach	Speed (Major)	4	10 mpt
Minor Street:	Driveway 3				Critical Approach	Speed (Minor)	2	25 mpł
Major Street	Approach Lanes	=	1	_lane	Minor Street	Approach Lanes	1	lane
Major Street	Future ADT =		8,398	vpd	Minor Street	Future ADT =	313	vpd
·	or critical speed o	·		`	• *	or	RURAI	·

# (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	auiromonte	
<u></u>	KUKAL			•	
XX			EA		
CONDITION A - Min	imum Vehicular Volume				s Per Day
<u>Satisfied</u>	Not Satisfied		Per Day on	-	er-Volume
	XX	Major	Street	Minor Stree	et Approach
Number of lanes for movi	ng traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	Rural
<i>1</i> <b>8,398</b>	1 <b>313</b>	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 - Interru	ption of Continuous Traffic			Vehicles	s Per Day
Satisfied	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume
	XX	on Maj	or Street	Minor Stree	et Approach
Number of lanes for movi	ng traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
1 <b>8,398</b>	1 <b>313</b>	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 CONI	DITIONS	2 CONI	DITIONS
No one condition satisfie	d, but following conditions	80	0%	80	0%
fulfilled 80% of more	_				
	<b>13% 26%</b>				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS	2035 WP	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/15	,
Jurisdiction:	<b>County of Rive</b>	rside		CHK		DATE		
Major Street:	Oleander Aven	ue		_	Critical Approach	Speed (Major)	40 n	npl
Minor Street: I	Driveway 4				Critical Approach	Speed (Minor)	25 n	npl
Major Street A	Approach Lanes	= _	1	_lane	Minor Street	Approach Lanes	1la	ane
Major Street F	uture ADT =		8,463	vpd	Minor Street	Future ADT =	<b>253</b> v	pd
•	critical speed o	n major stre	et traffic > 64	_ · km/h (40 m	ıph);			
In built up area	a of isolated cor	mmunity of <	10,000 popu	lation		or	RURAL (F	₹)

# (Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL		Minimum Re	equirements	
XX	<u></u>		EA	•	
	imum Vehicular Volume				Per Day
Satisfied	Not Satisfied	Vehicles F	Per Day on		er-Volume
<u> </u>	XX		Street		et Approach
Number of lanes for movi	ng traffic on each approach	-	n Approaches)		ction Only)
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 8,463	1 253	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 - Interru	ption of Continuous Traffic	,	,		s Per Day
Satisfied	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume
	XX	on Maj	or Street		et Approach
Number of lanes for movi	ng traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
1 <b>8,463</b>	1 <b>253</b>	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				
<u>Satisfied</u>	Not Satisfied				
	XX	2 CONI	DITIONS	2 CONI	DITIONS
No one condition satisfie	d, but following conditions	80	0%	80	0%
fulfilled 80% of more	<u>A</u> <u>B</u>				
	11% 21%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



					TRAFFIC COND	ITIONS	2035 WP	
DIST	CO	RTE	PM	CALC	CHS	DATE	05/19/1	5
Jurisdiction:	<b>County of River</b>	side		CHK		DATE		
Major Street:	Oleander Avenu	ıe			Critical Approach	Speed (Major)	40	mph
Minor Street:	Driveway 5				Critical Approach	Speed (Minor)	25	mpł
•	Approach Lanes	=	1	_lane		Approach Lanes		lane
Major Street	Future ADT =		8,914	vpd	Minor Street	Future ADT =	197	vpd
·	or critical speed on	·		`	• /	or	RURAL	(R)
•		•						

# (Based on Estimated Average Daily Traffic - See Note)

LIDDAN	DUDAL		Minimo um Da		
<u>URBAN</u>	<u>RURAL</u>		Minimum Re	•	
XX			EA		
CONDITION A - Min	nimum Vehicular Volume			Vehicles	s Per Day
<u>Satisfied</u>	Not Satisfied	Vehicles F	Per Day on	on Highe	er-Volume
	XX	Major	Street	Minor Stree	et Approach
Number of lanes for mov	ring traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 8,914	1 <b>197</b>	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 - Interru	uption of Continuous Traffic			Vehicles	Per Day
<u>Satisfied</u>	Not Satisfied	Vehicles	s Per Day	on Highe	er-Volume
	XX	on Maj	or Street	Minor Stree	et Approach
Number of lanes for mov	ring traffic on each approach	(Total of Both	n Approaches)	(One Dire	ction Only)
Major Street	Minor Street	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
<i>1</i> <b>8,914</b>	1 <b>197</b>	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	f CONDITIONS A + B				
<u>Satisfied</u>	Not Satisfied				
	XX	2 CONI	DITIONS	2 CONI	DITIONS
No one condition satisfie	ed, but following conditions	80	0%	80	)%
fulfilled 80% of more	. <u>A</u> <u>B</u>				
	8% 16%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.



# Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = 2035 With Project Conditions - Weekday PM Peak Hour

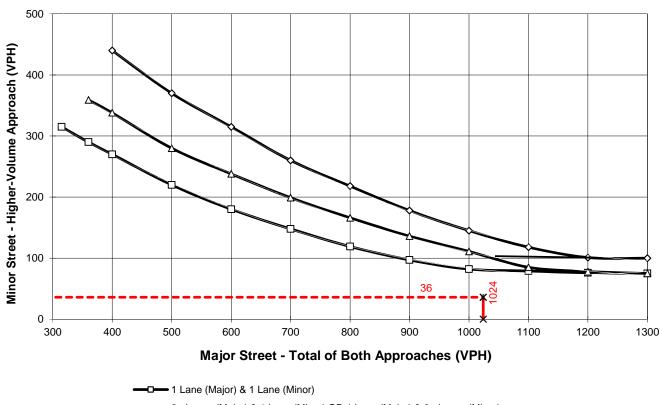
Major Street Name = Oleander Avenue Total of Both Approaches (VPH) = 1024

Number of Approach Lanes Major Street = 1

Minor Street Name = Driveway 6 High Volume Approach (VPH) = 36

Number of Approach Lanes Minor Street = 1

# SIGNAL WARRANT NOT SATISFIED



- 2+ Lanes (Major) & 1 Lane (Minor) OR 1 Lane (Major) & 2+ Lanes (Minor)

- 2+ Lanes (Major) & 2+ Lanes (Minor)

Major Street Approaches

- -x- • Minor Street Approaches

\*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane



8.4-6

# **APPENDIX 8.5:**

HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS OFF-RAMP QUEUING
ANALYSIS WORKSHEETS



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Lane Group         EBT         EBR         WBL         WBT         SBT         SBR           Lane Group Flow (vph)         900         138         254         506         1543         670           v/c Ratio         1.07         0.29         1.40         0.38         1.47         0.59           Control Delay         96.9         20.7         249.1         50.6         240.7         15.4
v/c Ratio 1.07 0.29 1.40 0.38 1.47 0.59
Control Dolay 06.0 20.7 240.1 50.6 240.7 15.4
Control Delay 70.7 20.7 247.1 30.0 240.7 13.4
Queue Delay 0.0 0.0 0.0 4.4 1.3 0.0
Total Delay 96.9 20.7 249.1 55.0 242.0 15.4
Queue Length 50th (ft) ~387 41 ~269 212 ~1638 246
Queue Length 95th (ft) #510 98 #436 268 #1903 361
Internal Link Dist (ft) 844 267 1109
Turn Bay Length (ft) 100 80 270
Base Capacity (vph) 839 476 182 1345 1052 1127
Starvation Cap Reductn 0 0 0 747 0 0
Spillback Cap Reductn 0 0 0 0 229 0
Storage Cap Reductn 0 0 0 0 0
Reduced v/c Ratio 1.07 0.29 1.40 0.85 1.87 0.59

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

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

	•	-	•	•	<b>†</b>	
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	601	1893	630	683	147	463
v/c Ratio	0.87	0.76	0.62	0.83	0.30	0.86
Control Delay	24.5	9.9	41.9	23.8	37.8	53.5
Queue Delay	2.7	48.4	0.5	0.0	0.0	0.0
Total Delay	27.3	58.3	42.3	23.8	37.8	53.5
Queue Length 50th (ft)	100	512	215	185	92	301
Queue Length 95th (ft)	m44	m215	275	#358	151	#481
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	688	2501	1013	825	490	538
Starvation Cap Reductn	34	1158	0	0	0	0
Spillback Cap Reductn	0	0	107	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.92	1.41	0.70	0.83	0.30	0.86

Intersection Summary

<sup># 95</sup>th 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.

	<b>→</b>	•	•	←	. ↓	4
					-	
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	834	173	709	991	849	752
v/c Ratio	1.23	0.43	1.23	0.50	1.15	0.95
Control Delay	156.4	27.9	140.1	20.7	118.8	54.6
Queue Delay	2.3	0.0	0.0	1.5	0.8	0.0
Total Delay	158.7	27.9	140.1	22.3	119.5	54.6
Queue Length 50th (ft)	~398	66	~677	234	~775	510
Queue Length 95th (ft)	#519	136	#882	m200	#1020	#771
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	680	402	577	1979	736	789
Starvation Cap Reductn	0	0	0	752	0	0
Spillback Cap Reductn	182	0	0	0	82	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.67	0.43	1.23	0.81	1.30	0.95

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

<sup># 95</sup>th 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.

5/19/2015

	•	-	•	•	<b>†</b>	1
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	660	1115	1399	1747	400	255
v/c Ratio	1.77	0.37	0.65	1.41	1.69	0.66
Control Delay	379.2	6.8	19.6	208.4	360.0	25.9
Queue Delay	2.3	50.4	0.3	0.0	0.0	0.0
Total Delay	381.4	57.2	19.9	208.4	360.0	25.9
Queue Length 50th (ft)	~677	204	353	~1676	~453	60
Queue Length 95th (ft)	m#451	m144	416	#1911	#640	146
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	372	3008	2153	1243	237	388
Starvation Cap Reductn	69	2038	0	0	0	0
Spillback Cap Reductn	0	0	216	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.18	1.15	0.72	1.41	1.69	0.66

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

<sup># 95</sup>th 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.

# APPENDIX 8.6:

HORIZON YEAR (2035) WITH PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS
WORKSHEETS



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Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	943	151	254	549	1543	752
v/c Ratio	1.12	0.32	1.40	0.41	1.47	0.67
Control Delay	114.0	24.4	247.9	30.4	240.7	18.7
Queue Delay	0.0	0.0	0.0	2.1	0.0	0.0
Total Delay	114.0	24.4	247.9	32.5	240.7	18.7
Queue Length 50th (ft)	~422	55	~263	159	~1638	324
Queue Length 95th (ft)	#547	116	#430	207	#1903	464
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	839	469	182	1345	1052	1115
Starvation Cap Reductn	0	0	0	629	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.12	0.32	1.40	0.77	1.47	0.67

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

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

	•	-	<b>←</b>	•	<b>†</b>	/
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	638	1900	646	683	176	463
v/c Ratio	0.96	0.76	0.64	0.79	0.40	0.94
Control Delay	55.1	13.3	33.1	16.5	32.4	58.2
Queue Delay	46.4	47.6	0.0	0.0	0.0	0.0
Total Delay	101.4	60.9	33.1	16.5	32.4	58.2
Queue Length 50th (ft)	344	331	165	95	85	226
Queue Length 95th (ft)	#559	416	221	#257	146	#414
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	686	2491	1006	864	443	494
Starvation Cap Reductn	180	794	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.26	1.12	0.64	0.79	0.40	0.94
Intersection Summary						

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

	-	•	•	•	¥	*
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	948	206	709	1014	849	796
v/c Ratio	1.39	0.51	1.23	0.51	1.15	1.01
Control Delay	223.8	31.9	140.0	21.2	118.8	68.6
Queue Delay	2.7	0.0	0.0	1.7	8.0	0.0
Total Delay	226.5	31.9	140.0	22.9	119.6	68.6
Queue Length 50th (ft)	~489	88	~678	246	~775	~584
Queue Length 95th (ft)	#614	167	#882	m205	#1020	#852
Internal Link Dist (ft)	844			267	1109	
Turn Bay Length (ft)		100	80			270
Base Capacity (vph)	680	405	577	1979	736	786
Starvation Cap Reductn	0	0	0	747	0	0
Spillback Cap Reductn	207	0	0	0	85	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.00	0.51	1.23	0.82	1.30	1.01

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

<sup># 95</sup>th 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.

5/15/2015

	•	$\rightarrow$	•	•	<b>†</b>	~
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	763	1131	1407	1747	415	255
v/c Ratio	2.05	0.38	0.65	1.41	1.75	0.67
Control Delay	498.6	7.0	19.7	209.4	386.6	27.1
Queue Delay	2.3	50.4	0.3	0.0	0.0	0.0
Total Delay	500.8	57.3	20.0	209.4	386.6	27.1
Queue Length 50th (ft)	~839	208	357	~1679	~478	64
Queue Length 95th (ft)	m#487	m139	420	#1914	#668	150
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	372	3008	2153	1241	237	383
Starvation Cap Reductn	69	2046	0	0	0	0
Spillback Cap Reductn	0	0	244	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.52	1.18	0.74	1.41	1.75	0.67

#### **Intersection Summary**

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

<sup>95</sup>th 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

# APPENDIX 8.7:

HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS BASIC FREEWAY SEGMENT ANALYSIS WORKSHEETS



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General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossi 5/18/2015 AM Peak Hou		Highway/Direction of Trave From/To Jurisdiction Analysis Year	North of Caltrans	of Harley Knox Bl.	
	Logistics Cent	er Phase II TIA	4 <i>(JN 09347)</i>			
✓ Oper.(LOS)			Des.(N)	Plar	nning Data	
Flow Inputs						
Volume, V AADT	6931	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.5 1)] 0.976		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width		ft	•			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph	
Number of Lanes, N	3		f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	mph	
Base free-flow Speed, BFFS		mph		70.0	тіріі	
LOS and Performanc	e Measures	1	Design (N)		_	
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x i x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 2574 48.1 53.5 F	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossi 5/18/2015 AM Peak Hol	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	f Harley Knox Bl.
	Logistics Cent	er Phase II TIA	A (JN 09347)		
✓ Oper.(LOS)			es.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	5141	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 5 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.976	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	3		f <sub>LW</sub>		mph
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub> TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	•
Base free-flow Speed, BFFS		mph	FFS	70.0	mph
LOS and Performanc	e Measures	}	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1909 64.2 29.7 D	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Jurisdiction Calt		5 Northbound th of Harley Knox Bl. trans 5 Without Project	
	Logistics Cent	er Phase II TIA	4 <i>(JN 09347)</i>			
✓ Oper.(LOS)			Des.(N)	Plar	nning Data	
Flow Inputs						
Volume, V AADT	6859	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 4		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980		
Speed Inputs			Calc Speed Adj and			
Lane Width		ft		-		
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph	
Number of Lanes, N	3		f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	mph	
Base free-flow Speed, BFFS		mph		70.0	тіріі	
LOS and Performanc	e Measures		Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 2535 49.3 51.4 F	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Jurisdiction Calt		5 Northbound of Harley Knox Bl. trans 35 Without Project	
	Logistics Cent	er Phase II TIA	A (JN 09347)			
✓ Oper.(LOS)			Des.(N)	Plar	nning Data	
Flow Inputs						
Volume, V AADT Peak-Hr Prop. of AADT, K	6284	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 3 0		
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.985		
Speed Inputs			Calc Speed Adj and			
Lane Width		ft				
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph	
Number of Lanes, N	3	-	f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	mph	
Base free-flow Speed, BFFS		mph	113	70.0	тіріі	
LOS and Performanc	e Measures		Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 2311 55.7 41.5 E	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Highway/Direction of Travel <i>I-215 Southbol</i> From/To <i>North of Harle</i> Jurisdiction <i>Caltrans</i> Analysis Year <i>2035 Without</i>		f Harley Knox Bl. S
	Logistics Cent	er Phase II TIA	A (JN 09347)		
✓ Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	6864	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 4 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft		-	
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	3	-	f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph		70.0	πρπ
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 2537 49.3 51.5 F	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Cross 5/18/2015 PM Peak Ho		Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	of Harley Knox Bl.
	Logistics Cert		· ,	□ Die	nning Data
✓ Oper.(LOS)  Flow Inputs		L	Des.(N)	⊔Ріа	nning Data
Volume, V AADT	6235	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 4 0	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments		·		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured)	3 70.0	ft ft ramps/mi mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment	70.0	mph mph mph mph
Base free-flow Speed, BFFS		mph			
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 2304 55.9 41.2 E	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Jurisdiction Caltra		n of Harley Knox Bl.	
	Logistics Cent	ter Phase II TIA	,			
✓ Oper.(LOS)			Des.(N)	Pla	nning Data	
Flow Inputs						
Volume, V AADT	6942	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.976		
Speed Inputs			Calc Speed Adj and			
Lane Width		ft		<del>-</del>		
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph	
Number of Lanes, N	3		f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	mph	
Base free-flow Speed, BFFS		mph		70.0	Шрп	
LOS and Performanc	e Measures		Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 2578 48.0 53.7 F	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Jurisdiction Caltr		th of Harley Knox Bl.	
	Logistics Cent	er Phase II TIA	A (JN 09347)			
✓ Oper.(LOS)			es.(N)	Plar	nning Data	
Flow Inputs						
Volume, V AADT Beak Hr Brop, of AADT, K	5291	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 4 0		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width		ft				
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph	
Number of Lanes, N	3	-	f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	mph	
Base free-flow Speed, BFFS		mph		70.0	тіріі	
LOS and Performanc	e Measures		Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 1955 63.4 30.8 D	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

## **APPENDIX 8.8:**

HORIZON YEAR (2035) WITH PROJECT CONDITIONS BASIC FREEWAY SEGMENT
ANALYSIS WORKSHEETS



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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 AM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	North o Caltran	f Harley Knox Bl.
	Logistics Cert	ter Phase II TI/	· ,	□ Dia	ania a Data
✓ Oper.(LOS)		<u> </u>	Des.(N)	⊔Pia	nning Data
<b>Flow Inputs</b> Volume, V AADT	6980	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.5 1)] 0.976	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS		pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \times x \times f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 AM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	of Harley Knox Bl.
	Logistics Cert	ter Phase II TI/	· ,		nning Data
✓ Oper.(LOS)			Des.(N)	∟Ріа	nning Data
<b>Flow Inputs</b> Volume, V AADT	5150	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.976	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance		ft ft	f <sub>LW</sub>	-	mph
Number of Lanes, N Total Ramp Density, TRD	3	ramps/mi	f <sub>LC</sub> TRD Adjustment		mph mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performanc	e Measures	;	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )		pc/h/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
S D = v <sub>p</sub> / S LOS	64.1 29.8 D	mph pc/mi/ln	S D = v <sub>p</sub> / S Required Number of Lanes	s, N	mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossi 5/18/2015 AM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	North of Caltrans	Harley Knox Bl.
	Logistics Cent	er Phase II TIA	A (JN 09347)		
✓ Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	6882	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.92 4 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft		-	
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	
Base free-flow Speed, BFFS		mph	FFS	70.0	mph
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 2543 49.1 51.8 F	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 AM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	of Harley Knox Bl.
	Logistics Certi	ter Phase II TI	· ,	□ Dia	ania a Data
✓ Oper.(LOS)		L L	Des.(N)	⊔Ріа	nning Data
Flow Inputs Volume, V AADT	6304	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments		<u> </u>		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.985	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD	3	ft ft ramps/mi	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment		mph mph mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performanc	e Measures	<b>3</b>	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF \times V)$ $x f_p)$ $S$ $D = v_p / S$ $LOS$	N x f <sub>HV</sub> 2318 55.5 41.8 E	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 PM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	North o Caltran	f Harley Knox Bl.
	Logistics Certi	ter Phase II TI	· ,		anian Data
✓ Oper.(LOS)			Des.(N)	∟Pla	nning Data
Flow Inputs	2000	1.0	D 111 E 1 DIE		
Volume, V AADT	6889	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft	Guio Opeca Auj ana i		
Rt-Side Lat. Clearance		ft	r .		mnh
Number of Lanes, N	3	10	f <sub>LW</sub>		mph
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub>		mph
FFS (measured)	70.0	mph	TRD Adjustment		mph
Base free-flow Speed, BFFS	70.0	mph	FFS	70.0	mph
LOS and Performanc	e Measures	<b>3</b>	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l	N x f <sub>uv</sub>		Design (N) Design LOS		
x t <sub>p</sub> )	11 <sup>v</sup> 2546 49.0	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
S D = v / S	52.0	mph	s		mph
D = v <sub>p</sub> / S		pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	F		Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Jurisdiction Caltra		of Harley Knox Bl.	
	Logistics Cent	er Phase II TIA	A (JN 09347)			
✓ Oper.(LOS)			es.(N)	Plar	nning Data	
Flow Inputs						
Volume, V AADT	6257	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 4		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980		
Speed Inputs			Calc Speed Adj and			
Lane Width		ft		-		
Rt-Side Lat. Clearance		ft	f		mph	
Number of Lanes, N	3		f <sub>LW</sub>		mph	
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub> TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	·	
Base free-flow Speed, BFFS		mph	FFS	70.0	mph	
LOS and Performanc	e Measures	}	Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x t x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 2312 55.7 41.5 E	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T			
General Information			Site Information				
Analyst Agency or Company Date Performed Analysis Time Period Project Description Knox	CHS Urban Cross 5/18/2015 PM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	North o Caltran	rth of Harley Knox Bl.		
	Logistics Cert	ter Phase II TI	· · · · · · · · · · · · · · · · · · ·	□ Dia	nnin n Data		
✓ Oper.(LOS)		L	Des.(N)	⊔Pia	nning Data		
Flow Inputs	6000	la /la	Deals Have Faster DUE	0.00			
Volume, V AADT	6998	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5			
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi			
Calculate Flow Adjus	tments						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2			
Speed Inputs	1.0		Calc Speed Adj and				
		ft	Caic Speed Auj and	113			
Lane Width Rt-Side Lat. Clearance		ιι ft			and b		
Number of Lanes, N	3	π	f <sub>LW</sub>		mph		
Total Ramp Density, TRD	3	romno/mi	f <sub>LC</sub>		mph		
	70.0	ramps/mi	TRD Adjustment		mph		
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph		
LOS and Performanc	e Measures	<b>3</b>	Design (N)				
Operational (LOS)			Design (N) Design LOS				
$v_p = (V \text{ or DDHV}) / (PHF x I x f_p)$		pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln		
S	47.3	mph	s		mph		
$D = v_p / S$	55.0	pc/mi/ln	$D = v_p / S$		pc/mi/ln		
LOS	F		Required Number of Lanes	s, N			
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 PM Peak Ho	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o	of Harley Knox Bl.
Project Description Knox	Logistics Cen		, ,		. 5.
✓ Oper.(LOS)			Des.(N)	∐Pla	nning Data
Flow Inputs	5000		D 111 E ( DIE		
Volume, V AADT	5300	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments		<u> </u>		
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.976	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph		70.0	
LOS and Performanc	e Measures	<b>S</b>	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l	N x f <sub>uv</sub>		Design (N) Design LOS		
x f <sub>p</sub> )	11 <sup>1</sup> 1968 63.2	pc/h/ln mph	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x t <sub>HV</sub>	pc/h/ln
	31.2	pc/mi/ln	S		mph
D = v <sub>p</sub> / S LOS	51.2 D	рс/пп/п	$D = v_p / S$		pc/mi/ln
LO3	D		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
Copyright © 2014 University of Florid			HCS 2010 <sup>TM</sup> Version 6.65	0	erated: 5/18/2015 2:30

## APPENDIX 8.9:

HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS FREEWAY MERGE/DIVERGE
ANALYSIS WORKSHEETS



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Concret Info	rmation	KAWI	PS AND RAM			יתתט				
General Info				Site Infor		1015 5				
Analyst	CHS			reeway/Dir of Tr			outhbound			
Agency or Company		n Crossroads,	-	unction		-	Knox Off-I	≺amp		
Date Performed		/2015		urisdiction		Caltran				
Analysis Time Perio		Peak Hour		nalysis Year		2035 W	ithout Pro	ject		
Project Description	Knox Logistics	S Center Phase	e II TIA (JN 09347)							
Inputs										
Upstream Adj F	Ramp	1 '	mber of Lanes, N	3					Downstrea	am Adj
☐ Yes [	On	1 '	er of Lanes, N	1					Ramp	
			Lane Length, L <sub>A</sub> Lane Length L <sub>D</sub>	195					✓ Yes	✓ On
✓ No	Off	Freeway Vol	- 0	6931					□No	Off
L <sub>up</sub> =	ft	Ramp Volum	•	2177					L <sub>down</sub> =	1420 ft
			e-Flow Speed, S <sub>FF</sub>							
$V_u = V$	/eh/h		Flow Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	387 veh
Conversion t	to nc/h Un		110	40.0						
	V PC/II OII				1 .			_		
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f
Freeway	6931	Level	5	0	0.9	976	1.00	77	'22	
Ramp	2177	0.92	Level	7	0	0.9	966	1.00	24	149
UpStream	<b></b>			<u> </u>						
DownStream	387	0.92	Level	26	0	0.8	885	1.00	4	75
<b>-</b>		Merge Areas					•	Diverge Areas		
Estimation o	t v <sub>12</sub>				Estimat	ion o	t v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )					V <sub>12</sub> =	= V <sub>R</sub> + (V <sub>F</sub> - V	<sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Eau	ation 13-6 o	r 13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-13	3)
		Equation			P <sub>FD</sub> =			.454 using Eq		
P <sub>FM</sub> =	_	Lqualion	(EXHIDIC 13-0)						uation (Exil	ibit 15-1)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			845 pc/h		
$V_3$ or $V_{av34}$	pc/h (	(Equation 13	3-14 or 13-17)		$V_3$ or $V_{av34}$			877 pc/h (Equ	iation 13-1	4 or 13-1
Is $V_3$ or $V_{av34} > 2,70$	ეე pc/h? <u></u> Υe	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 2,7	00 pc/h? [	✓ Yes 🗌 No		
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>2V</sub>	,34 > 1.5	* V <sub>12</sub> /2 [	☐Yes ☑No		
0 4.0.			3-16, 13-18, or			•		022 pc/h (Equ	ation 13-1	6. 13-18.
f Yes,V <sub>12a</sub> =	13-19		-, -, -		If Yes,V <sub>12a</sub> =	=		r 13-19)		,
Capacity Che	ecks				Capacit	y Che	ecks			
	Actual		Capacity	LOS F?			Actual	Ca	apacity	LOS
					V <sub>F</sub>		7722	Exhibit 13-	8 7200	Yes
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	- V <sub>D</sub>	5273	Exhibit 13-	8 7200	No
- FO		LAINDIC 10 0				- 'R		_	_	_
	<del></del>	<u></u>			V <sub>R</sub>		2449	Exhibit 13-1		Yes
Flow Enterin	<del></del>	1		\f;-1-£ 0	riow En			rge Influen		1 18-1 0
\/	Actual	Ť T	Desirable	Violation?			Actual	Max Desira	1	Violation
V <sub>R12</sub>	ioo Deter	Exhibit 13-8			V <sub>12</sub>		845	Exhibit 13-8	4400:All	Yes
Level of Serv					1			eterminatio	•	<u>r)                                    </u>
$D_R = 5.475 + 0$		U.UU/8 V <sub>12</sub>	- 0.00627 L <sub>A</sub>					0.0086 V <sub>12</sub> - 0	.uu9 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/lr	*				1 .,	5.7 (pc/	,			
00 /= 5:5:1	13-2)					<u> </u>	it 13-2)			
LOS = (EXNIBIT	mination				Speed L	Deter	minati	on		
·				· · ·	$D_s = 0.$	.518 (E	xhibit 13	-12)		
Speed Deteri	3-11)									
Speed Deteri M <sub>S</sub> = (Exibit 1						5.5 mph	(Exhibit	13-12)		
Speed Determ M <sub>S</sub> = (Exibit 1 S <sub>R</sub> = mph (Exi	hibit 13-11)				S <sub>R</sub> = 55					
Speed Determine $M_S = (Exibit 1 S_R = mph (Exibit 2 S_0 = mph (E$					$S_{R} = 55$ $S_{0} = 70$	0.2 mph	(Exhibit (Exhibit (Exhibit	13-12)		

8.9-1

Canaralla		RAMPS AND	INAIVIE 301			<u> '</u>			
	nformation			Site Infor					
Analyst		CHS		Freeway/Dir of Tra		-215 Southbou			
Agency or Com		Urban Crossroads, I		Junction		Harley Knox On	-катр		
Date Performed		5/19/2015		Jurisdiction		Caltrans	!4		
Analysis Time F		AM Peak Hour		Analysis Year		2035 Without P	roject		
nputs	tion knox Log	istics Center Phase I	1 TIA (JIN 09347)	)					
_		Francisco Numb	or of Longo N	3				1	
Jpstream Adj R	Ramp	Freeway Numb						Downstre	am Adj
✓ Yes	705	Ramp Number		1				Ramp	
Y res	On	Acceleration La	ane Length, L <sub>A</sub>	260				☐Yes	On
□ No	✓ Off	Deceleration L	ane Length L <sub>D</sub>					☑ No	□ O#
		Freeway Volun	ne, V <sub>F</sub>	4754				INO INO	Off
<sub>rup</sub> = 14	420 ft	Ramp Volume,		387				L <sub>down</sub> =	ft
~p			Flow Speed, S <sub>FF</sub>						
/ <sub>u</sub> = 21	177 veh/h							V <sub>D</sub> =	veh/h
		Ramp Free-Flo	111	45.0					
Conversion		Under Base (	Conditions				i		
(pc/h)	V (Veh/h	r) PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>n</sub>
reeway	4754	0.92	Level	4	0	0.980	1.00		5271
Ramp	387	0.92	Level	26	0	0.885	1.00		475
UpStream	2177			7	0		1.00		475 2449
	2177	0.92	Level		U	0.966	1.00	4	449
DownStream		Merge Areas					Diverge Areas	<u> </u>	
stimatio	n of v	Weige Aleas			Fetimati	on of v <sub>12</sub>	Diverge Areas		
-50111101101					Lounda	011 01 112			
	V <sub>12</sub>	= V <sub>F</sub> ( P <sub>FM</sub> )				V <sub>12</sub> :	= V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>ED</sub>	
- <sub>EQ</sub> =	129	96.48 (Equation	13-6 or 13-7)		L <sub>EQ</sub> =	12	(Equation 13-		3)
P <sub>FM</sub> =	0.5	85 using Equati	on (Exhibit 13-6	6)			using Equation		,
/ <sub>12</sub> =	308	82 pc/h			P <sub>FD</sub> =			MT (EXHIBIT I	J-1 )
		89 pc/h (Equatio	n 13-14 or 13	3-	V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$	17				V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation 1	13-14 or 13-1	7)
s V <sub>3</sub> or V <sub>av34</sub> >	> 2,700 pc/h? [	Yes ☑ No				-	☐ Yes ☐ No		
Is V <sub>3</sub> or V <sub>av34</sub> >	> 1.5 * V <sub>12</sub> /2 🔽	Yes □ No			Is V <sub>3</sub> or V <sub>av3</sub> ,	$_4 > 1.5 * V_{12}/2$	☐ Yes ☐ No		
		82 pc/h (Equatio	n 13-16. 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
Yes,V <sub>12a</sub> =	18	, or 13-19)			12a		13-19)		
Capacity (	Checks				Capacity	/ Checks			
	Actua	al Ca	apacity	LOS F?		Actua	al Cap	pacity	LOS F?
					V <sub>F</sub>		Exhibit 13-	8	
17	5740	E 1 11 11 40 0			V <sub>FO</sub> = V <sub>F</sub>	- V-	Exhibit 13-		<del>                                     </del>
$V_{FO}$	5746	Exhibit 13-8		No		*R	Exhibit 13		+
					$V_R$		10	-	
-low Ente	rina Mera	e Influence A	rea		Flow En	terina Div	erge Influen	ce Area	
	Actua		esirable	Violation?		Actual	Max Desi		Violation
V <sub>R12</sub>	3557	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
		termination (i		1		Sonios D	eterminatio	n (if not	<b>E</b> )
									<u>'')</u>
		R + 0.0078 V <sub>12</sub> - 0.0	0021 L <sub>A</sub>			••	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
	(pc/mi/ln)					c/mi/ln)			
OS = D (Ex	xhibit 13-2)				LOS = (E	xhibit 13-2)			
Speed De	terminatio	n			Speed D	eterminat	ion		
•	4 (Exibit 13-11)				<b></b>	khibit 13-12)			
•		44)				oh (Exhibit 13-1	2)		
• •	mph (Exhibit 13	· ·				•	•		
•	mph (Exhibit 13	,			l * '	oh (Exhibit 13-1	•		
60.0	mph (Exhibit 13	-13)			S = mp	h (Exhibit 13-1	3)		
- 00.0						•	·		

General Infor		III O AND	RAMP JUNG	Site Infor		1				
						1.045	NI			
Analyst Agency or Company	CHS			eeway/Dir of Tr	avei		Northbound	omn		
Agency of Company Date Performed		n Crossroads, Ir /2015		nction risdiction		Caltra	y Knox On-R	anıp		
Analysis Time Period		Peak Hour		alysis Year			ms Without Proj	art		
Project Description				lary 313 T Car		2000	vviiiiout i ioj	501		
Inputs	Talox Logicado	Contor i naco i	11111 (011 000 11)							
		Freeway Numb	er of Lanes N	3						
Upstream Adj Ramp		Ramp Number		1						eam Adj
✓ Yes ☐ Or	1	· '	•	•					Ramp	
E 103 E 01	•	Acceleration La	/ /	300					☐Yes	☐ On
☐ No ☑ Of	f	Deceleration La	ane Length L <sub>D</sub>						✓ No	Off
		Freeway Volum	ne, V <sub>F</sub>	5654						
<sub>-up</sub> = 1395	ft	Ramp Volume,	$V_R$	1205					L <sub>down</sub> =	ft
			Flow Speed, S <sub>FF</sub>	70.0						
$V_u = 630 \text{ V}$	eh/h	Ramp Free-Flo		45.0					V <sub>D</sub> =	veh/h
0	//-		111	40.0						
Conversion t		der Base C	onaitions		1	1			Ì	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	$f_p$	v = V/PH	$HF \times f_{HV} \times f_{p}$
Freeway	5654	0.92	Level	2	0	<del>                                     </del>	0.990	1.00		6207
Ramp	1205	0.92	Level	16	0	-	0.926	1.00		1415
UpStream	630	0.92	Level	17	0	_	0.920	1.00		743
DownStream	030	0.92	Level	17	, ·	+	0.922	1.00		743
Downoticani		Merge Areas						iverge Areas		
Estimation of					Estimat	ion				
		/ D \					- 12			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> = \	/ <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>FD</sub>	
L <sub>EQ</sub> =	1715.7	1 (Equation	13-6 or 13-7)		L <sub>EQ</sub> =			Equation 13-	. –	-13)
P <sub>FM</sub> =	0.566	using Equation	on (Exhibit 13-6)		P <sub>FD</sub> =			ising Equatio		
V <sub>12</sub> =	3510	pc/h						oc/h	II (EXIIIDIC	10 1 )
			n 13-14 or 13-		V <sub>12</sub> =		•		0.4440	
$V_3$ or $V_{av34}$	17)				V <sub>3</sub> or V <sub>av34</sub>			oc/h (Equation 1	3-14 or 13	i-17)
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h? 🗌 Ye	s 🗹 No						☐Yes ☐ No		
Is $V_3$ or $V_{av34} > 1.5$	* V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.	5 * V <sub>12</sub> /2 [	☐Yes ☐ No		
		pc/h (Equatio	n 13-16. 13-		If Yes,V <sub>12a</sub> =	=		c/h (Equatio	n 13-16,	13-18, or
f Yes,V <sub>12a</sub> =		13-19)	•		, 12a		13	3-19)		
Capacity Che	cks				Capacit	y Ch	necks			
	Actual	Ca	pacity	LOS F?			Actual	Car	oacity	LOS F?
					V <sub>F</sub>			Exhibit 13-8	3	
M	7000	F 1 11 11 40 0		.,	$V_{FO} = V_{F}$	- V-		Exhibit 13-8	3	
$V_{FO}$	7622	Exhibit 13-8		Yes		* K		Exhibit 13		
					$V_R$			10		
Flow Entering	n Merae In	fluence A	rea		Flow Fr	nteri	na Diver	ge Influen	ce Are	<del></del>
TOW EMEGINI	Actual		esirable	Violation?	7007 27	1	Actual	Max Desi		Violation?
V <sub>R12</sub>	4961	Exhibit 13-8	4600:All	Yes	V <sub>12</sub>	$\top$		Exhibit 13-8		
Level of Serv				1	-	f Sa	avica Da	terminatio	n (if no	)
										<i>,,</i> ,
		0.0078 V <sub>12</sub> - 0.0	UUZI LA					0086 V <sub>12</sub> - 0.	.uua r <sup>D</sup>	
$D_{R} = 41.6 (\text{pc/m})$						oc/mi/				
OS = F (Exhibit	13-2)				LOS = (E	Exhib	it 13-2)			
LOO - I (EXIIIDIL	nination				Speed L	Dete	rminatio	n		
•					†- <b>'</b>		13-12)			
Speed Deterr	hit 13_11\						· · - /			
Speed Deterr	· ·					nh /⊏\	hihit 12 12\			
Speed Deterr           M <sub>S</sub> = 0.851 (Exi           S <sub>R</sub> = 46.2 mph	(Exhibit 13-11)				S <sub>R</sub> = m		chibit 13-12)			
Speed Determ $M_S = 0.851$ (Exist) $S_R = 46.2$ mph $S_0 = 61.3$ mph	· ·				S <sub>R</sub> = m S <sub>0</sub> = m	ph (Ex	chibit 13-12) chibit 13-12) chibit 13-13)			

General Int	formation			Site Infor	ONS WC							
Analyst	CH	ς	F	reeway/Dir of Tr		L-215 N	lorthbound	I				
Agency or Comp		an Crossroads		unction	uvoi		Knox Off-I					
Date Performed		9/2015	, -	urisdiction		Caltrar		Vallip				
Analysis Time Pe		Peak Hour		nalysis Year			is Vithout Pro	inct				
<u>·</u>			e II TIA (JN 09347)	ararysis rear		2000 V	VILLIOUL I TO	jeci.				
Inputs	on Rilox Logistic	5 Center i nas	e ii 11A (014 03047)									
		Freeway Nu	mber of Lanes, N	3								
Upstream A	dj Ramp	1 '								Downstrea	am A	ıdj
Yes	On	I '	er of Lanes, N	1					ľ	Ramp		
□ 162		1	Lane Length, L <sub>A</sub>							Yes	<b>✓</b>	On
✓ No	Off	Deceleration	Lane Length L <sub>D</sub>	280						□N <sub>2</sub>		O#
<u> </u>		Freeway Vol	ume, V <sub>F</sub>	6284						□No		Оп
L <sub>up</sub> =	ft	Ramp Volum		630					Į.	L <sub>down</sub> =	1395	5 ft
ир		1	11									
V,, =	veh/h	1	e-Flow Speed, S <sub>FF</sub>						ľ	V <sub>D</sub> =	1205	5 veh
u		Ramp Free-I	Flow Speed, S <sub>FR</sub>	45.0								
Conversion	n to pc/h Ur	nder Base	Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>		/ = V/PHF	x f <sub>H</sub>	v x f <sub>p</sub>
Freeway	6284	0.92	Level	3	0	n	.985	1.00	_	60	33	
Ramp	630	0.92	Level	17	0	$\overline{}$	.922	1.00	+		43	
UpStream		0.02	20101	1 ''	Ť	Ť	.022	1.00	_		10	
DownStream	1205	0.92	Level	16	0	0	.926	1.00		1/	15	
Downoucum	1200	Merge Areas		10	<del>                                     </del>			Diverge Ar	L		10	
Estimation	of v.a	morgo / mode			Estimat	tion c		51101g071	-			
							<u>'-</u>		.,	\_		
	$V_{12} = V$	(P <sub>FM</sub> )						= V <sub>R</sub> + (V <sub>I</sub>				
L <sub>EQ</sub> =	(Equ	ıation 13-6 o	r 13-7)		L <sub>EQ</sub> =		(	Equation	13-12	2 or 13-13	)	
P <sub>FM</sub> =	usin	g Equation	(Exhibit 13-6)		P <sub>FD</sub> =		0	.552 usin	g Equ	ation (Exhi	bit 13	-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		4	163 pc/h				
V <sub>3</sub> or V <sub>av34</sub>	•		3-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			•	(Equa	ation 13-14	1 or '	13_17
	-		5-1 <del>4</del> 01 15-17)			> 2.7		-		10011 10-1-	+ OI	10-17
0 4,01	2,700 pc/h?  Y				Is V <sub>3</sub> or V <sub>av</sub>							
Is $V_3$ or $V_{av34} > 0$	1.5 * V <sub>12</sub> /2				Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.5						
If Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub>	=			(Equa	ation 13-16	3, 13	-18,
	13-19	9)						r 13-19)				
Capacity C	_			1 100 50	Capacit	y Cn	-			••		00.5
	Actual		Capacity	LOS F?	<del> </del>		Actual	_		acity	+	LOS F
					V <sub>F</sub>		6933	Exhib	it 13-8	7200		No
$V_{FO}$		Exhibit 13-8	В		$V_{FO} = V_{F}$	- V <sub>R</sub>	6190	Exhib	it 13-8	7200		No
					$V_R$		743	Fxhibi	t 13-10	2100		No
Elow Entor	ing Merge I	nfluonco	Aroa		Flow E							
I IOW LINE	Actual		Desirable	Violation?	I IOW LI	_	Actual	Max D			Vic	olation
\/	Actual	_	1	Violations	\/	_					1	
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		4163	Exhibit 1		4400:All		No
	rvice Deter		·		Level o					•	F)	
$D_R = 5.475 + 10^{-1}$	- 0.00734 v <sub>R</sub> +	+ 0.0078 V <sub>12</sub>	- 0.00627 L <sub>A</sub>			$D_R = 4$	1.252 + 0	0.0086 V <sub>1</sub>	<sub>2</sub> - 0.0	009 L <sub>D</sub>		
D <sub>R</sub> = (pc/m	i/ln)				$D_R = 3$	8.1 (pc	/mi/ln)					
LOS = (Exhil	oit 13-2)				LOS = E	(Exhi	bit 13-2)					
Speed Dete					Speed I			on .				
					<del>- '</del>							
•	t 13-11)				ľ	•	xhibit 13	,				
$S_R = mph (E$	Exhibit 13-11)						(Exhibit					
					$S_0 = 7$	0.2 mnh	(Exhibit	13-12)				
$S_0 = mph(E$	Exhibit 13-11)				$\sim_0$	U.Z IIIPI	· (=x:::::::::	.0,				
•	Exhibit 13-11) Exhibit 13-13)				ľ		(Exhibit					

General Info	ormation		PS AND RAN	Site Infor							
Analyst	CHS	2	F	reeway/Dir of Tr		L-215 S	Southbound	١			
Agency or Compa		an Crossroads		unction	4701		Knox Off-I				
Date Performed		//2015	, -	urisdiction		Caltrar		απρ			
Analysis Time Per		Peak Hour		nalysis Year			Vithout Pro	iect			
			e II TIA (JN 09347)	inalysis real		2000 V	VILIOUL I TO	Jeor			
Inputs	TATION LOGISTIC	3 Center i nas	e ii 11A (014 03047)								
		Freeway Nu	mber of Lanes, N	3					1_		
Upstream Ad	j Ramp	1 '							Downs	strear	n Adj
□V <sub>2</sub> ,	□ o	1 '	er of Lanes, N	1					Ramp		
☐Yes	On	Acceleration	Lane Length, L <sub>A</sub>						✓Ye	s	✓ On
✓ No	Off	Deceleration	Lane Length L <sub>D</sub>	195							
INO		Freeway Vol	_	6864					□No		Off
L <sub>up</sub> =	ft	Ramp Volum		1534					L <sub>down</sub> =		1420 ft
-up		1	11						down		
V <sub></sub> =	veh/h	Freeway Fre	e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	9	905 veh/
u	VC11/11	Ramp Free-I	Flow Speed, S <sub>FR</sub>	45.0							
Conversion	to pc/h Un	der Base	Conditions						•		
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/F	PHF :	k f <sub>HV</sub> x f <sub>r</sub>
Freeway	(Veh/hr) 6864	0.92	Level	4	0	_	.980	1.00	-	761	
Ramp	1534	0.92		16	0	$\overline{}$	.926	1.00		180	
UpStream	1554	0.92	Level	10	-	- 0	.920	1.00	+	100	1
DownStream	905	0.92	Level	21	0		.905	1.00		108	7
Downsteam	905	Merge Areas		21	-	U		Diverge Areas		100	1
Estimation	of v	Weige Aleas			Estimat	tion c		Diverge Areas	<u> </u>		
LStimation	01 V <sub>12</sub>				LSuma	1011	<u>'-</u>				
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	= V <sub>R</sub> + (V <sub>F</sub> -	$V_R)P_{FD}$		
L <sub>EQ</sub> =	(Equ	ation 13-6 o	r 13-7)		L <sub>EQ</sub> =		(	Equation 13	-12 or 13	3-13)	
P <sub>FM</sub> =		Equation			P <sub>FD</sub> =		0	.487 using E	guation	(Exhib	it 13-7)
	pc/h	, Equation	(Extribit 10 0)		V <sub>12</sub> =			629 pc/h	. 9	(=/2	,
V <sub>12</sub> =	•							•			40.4=
V <sub>3</sub> or V <sub>av34</sub>	-		3-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			981 pc/h (Ed	-	3-14	or 13-17
Is $V_3$ or $V_{av34} > 2$	,700 pc/h? 🗌 \Upsilon 🤄	es 🗌 No						✓Yes 🗌 N			
Is $V_3$ or $V_{av34} > 1$	.5 * V <sub>12</sub> /2 Ye	es 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.5	5 * V <sub>12</sub> /2 [	☐Yes ☑N	0		
If Yes,V <sub>12a</sub> =	pc/h	(Equation 1	3-16, 13-18, or		If Yes,V <sub>12a</sub>	=	4	910 pc/h (Ed	quation 1	3-16,	13-18,
	13-19	)						r 13-19)			
Capacity Cl	necks				Capacit	ty Ch	ecks				
	Actual		Capacity	LOS F?			Actual		Capacity		LOS F
					V <sub>F</sub>		7610	Exhibit 1	3-8 72	200	Yes
$V_{FO}$		Exhibit 13-8	3		V <sub>FO</sub> = V <sub>F</sub>		5809	Exhibit 1	_	200	No
- 10			1					_			+
<u></u>		<u></u>	<u> </u>		V <sub>R</sub>		1801	Exhibit 13		100	No
Flow Enteri	<u> </u>			T	Flow Er	_		rge Influe		ea	
	Actual	Ti Ti	Desirable	Violation?			Actual	Max Desi			Violation
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>		4629	Exhibit 13-8	4400:	All	Yes
Level of Se	rvice Deter	mination	(if not F)		Level o	f Ser	vice De	terminati	on (if n	ot F	)
D <sub>R</sub> = 5.475 +			·		1			0.0086 V <sub>12</sub> -	•		
D <sub>R</sub> = (pc/mi		12	A				/mi/ln)	12	L	,	
	it 13-2)						bit 13-2)				
,					Ļ			<u> </u>			
Speed Dete					Speed I						
$M_S = (Exibit)$	13-11)				ľ	•	xhibit 13	•			
S <sub>R</sub> = mph (E	xhibit 13-11)				S <sub>R</sub> = 5	7.1 mpł	ı (Exhibit	13-12)			
r (=						0.2 mpł	ı (Exhibit	13-12)			
S₀= mnh /⊏	xhihit 13-11\										
	xhibit 13-11) xhibit 13-13)				ľ		(Exhibit				

	RAI	MPS AND	RAMP JUNG	CTIONS W	ORKSHI	EET				
General Info				Site Infor						
Analyst Agency or Compan	CHS	n Crossroads,	Inc. Ju	eeway/Dir of Tr nction	avel		outhbound Knox On-Ra	amp		
Date Performed	5/19/			risdiction		Caltrans				
Analysis Time Perio		Peak Hour		nalysis Year		2035 W	ithout Proje	ect		
Project Description Inputs	Knox Logistics	Center Phase	II TIA (JIN 09347)							
		Freeway Num	ber of Lanes, N	3						
Jpstream Adj Ramp	)	Ramp Numbe		1					Downstre Ramp	am Adj
✓ Yes 🔲 O	n	l '	•	•						
			ane Length, L <sub>A</sub>	260					Yes	On
□ No   ☑ O	ff		ane Length L <sub>D</sub>						✓ No	Off
		Freeway Volu		5330						ft
<sub>rup</sub> = 1420	Ħ	Ramp Volume		905					L <sub>down</sub> =	IL
/ <sub>u</sub> = 1534	veh/h		-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	veh/h
u 1554	VCIIIII	Ramp Free-Fl	ow Speed, S <sub>FR</sub>	45.0					D	
Conversion	to pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	1	HV	f <sub>p</sub>	v = V/PHI	F x f <sub>HV</sub> x f <sub>p</sub>
reeway	5330	0.92	Level	1	0	0.9		1.00		5822
Ramp	905	0.92	Level	21	0	0.9	<del> </del>	1.00		1087
UpStream	1534	0.92	Level	16	0	0.9	926	1.00		1801
DownStream										
		Merge Areas			<u> </u>			verge Areas		
Estimation o	f v <sub>12</sub>				Estimati	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )					V = V	' <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub> )	\P	
- <sub>EQ</sub> =	1545.37	' (Equation	13-6 or 13-7)		. =			Equation 13-		13)
P <sub>FM</sub> =	0.577	using Equat	ion (Exhibit 13-6)		L <sub>EQ</sub> = P =			sing Equatio		
/ <sub>12</sub> =	3358		, ,		P <sub>FD</sub> =				II (LXIIIDIL I	J-1)
/ <sub>3</sub> or V <sub>av34</sub>			on 13-14 or 13-		V <sub>12</sub> =			c/h -//- /=	0.44 40 4	<b>17</b> \
	17)				V <sub>3</sub> or V <sub>av34</sub>	. 0.70		c/h (Equation 1	3-14 OF 13-	17)
Is $V_3$ or $V_{av34} > 2.7$								Yes No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5								Yes No	. 12 16 1	2 10 or
f Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =	:		c/h (Equatior -19)	1 13-10, 1	3-10, 01
Capacity Ch		13-19)			Capacity	v Cha	ocke	·		
sapacity Cit	Actual	1 0	apacity	LOS F?	Capacity	y Che	Actual	Can	acity	LOS F?
	Actual		apacity	LOGITE	V <sub>F</sub>		Actual	Exhibit 13-8		10011
						\/		Exhibit 13-8	_	
$V_{FO}$	6909	Exhibit 13-8		No	$V_{FO} = V_{F}$	- v <sub>R</sub>		Exhibit 13-		
					$V_R$			10		
low Enterin	a Merae In	fluence A	rea	<u> </u>	Flow En	terin	a Diver	ge Influen	ce Area	)
	Actual		Desirable	Violation?			ctual	Max Desi		Violation?
V <sub>R12</sub>	4445	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
evel of Serv	ice Detern	nination (	if not F)			Serv	ice Det	erminatio	n (if not	<i>F</i> )
	+ 0.00734 v <sub>R</sub> + (							0086 V <sub>12</sub> - 0.		•
) <sub>R</sub> = 38.0 (pc/r		12	7		1	c/mi/ln		12	D	
OS = E (Exhibit	•				1	Exhibit	•			
Speed Deter					Speed D			n		
•					<del>  '                                   </del>	xhibit 13		11		
•	ribit 13-11)				l °					
	(Exhibit 13-11)				I ''		bit 13-12)			
	(Exhibit 13-11)				l *		bit 13-12)			
S = 55.6 mph	(Exhibit 13-13)				S = m <sub>l</sub>	ph (Exhi	bit 13-13)			
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Conoral Info		INIT S AND	RAMP JUN			<u> </u>			
General Info				Site Infor					
Analyst	CHS			reeway/Dir of Tr		-215 Northbou			
Agency or Compar	-	an Crossroads, I		unction		Harley Knox Or	1-катр		
Date Performed		9/2015		urisdiction		Caltrans			
Analysis Time Peri		Peak Hour		nalysis Year		2035 Without P	roject		
Project Description Inputs	i Knox Logistic	s Center Phase i	II TIA (JIN 09347)						
		Frankov Numl	per of Lanes, N					l	
Jpstream Adj Ram	np			3				Downstrea	am Adj
	_	Ramp Number	of Lanes, N	1				Ramp	
✓ Yes 🔲 (	חכ	Acceleration La	ane Length, L <sub>A</sub>	300				□Yes	On
□ No ☑ (	)ff	Deceleration L	ane Length L <sub>D</sub>						
	<b>5</b> 11	Freeway Volun	ne, V <sub>E</sub>	4690				✓ No	Off
- <sub>up</sub> = 1395	ft	Ramp Volume,		2252				L <sub>down</sub> =	ft
ир									
/ <sub>u</sub> = 601	veh/h		Flow Speed, S <sub>FF</sub>	70.0				$V_D =$	veh/h
		Ramp Free-Flo	. 110	45.0					
Conversion		der Base (	Conditions						
(pc/h)	(\/ob/br\	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>H\/</sub> x f <sub>x</sub>
. ,	(Veh/hr)	+			<u> </u>	_	-		
Freeway	4690	0.92	Level	4 7	0	0.980	1.00		200
Ramp	2252	0.92	Level	7	0	0.966	1.00		533
UpStream	601	0.92	Level	11	0	0.948	1.00	(	689
DownStream		<del></del>		<u> </u>	<u> </u>				
	- <b>f</b>	Merge Areas			Fatimati		Diverge Areas		
Estimation (	or v <sub>12</sub>				Estimati	on of v <sub>12</sub>			
	$V_{12} = V_{F}$	- ( P <sub>FM</sub> )				٧	= V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	\P	
- <sub>EQ</sub> =	1739.4	6 (Equation	13-6 or 13-7)		L _	<b>*</b> 12			2)
P <sub>FM</sub> =			on (Exhibit 13-6	)	L <sub>EQ</sub> =		(Equation 13-		•
/ <sub>12</sub> =	2933		OTT (EXTINUIT TO 0	,	P <sub>FD</sub> =		using Equation	on (Exhibit 13	3-7)
		•	on 13-14 or 13-		V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$	17)	pc/ii (Equalic	JII 13-14 OI 13-	-	$V_3$ or $V_{av34}$		pc/h (Equation 1	13-14 or 13-1	7)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,	,	es VNo			Is V <sub>3</sub> or V <sub>av3</sub>	4 > 2,700 pc/h?	Yes No		
ls V <sub>3</sub> or V <sub>av34</sub> > 1.						-	☐Yes ☐No		
			m 10 10 10				pc/h (Equatio	n 13-16. 1	3-18. or
Yes,V <sub>12a</sub> =		pc/h (Equation r 13-19)	on 13-16, 13-		If Yes,V <sub>12a</sub> =		13-19)	,	, -
Capacity Ch		10 10)			Canacity	/ Checks			
supuoity on	Actual		apacity	LOS F?		Actu	al Car	pacity	LOS F?
	Actual	Ť	араску	1 2001:	V <sub>F</sub>	Actu	Exhibit 13-		1 2001:
					·				+
$V_{FO}$	7733	Exhibit 13-8		Yes	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13-		
					V <sub>R</sub>		Exhibit 13	-	
	<del></del>						10	<del></del>	
_, _ , ,				1	Flow En		erge Influen		
Flow Enterio		1	Desirable	Violation?	1	Actual	Max Desi	irable	Violation
	Actual		4600:All	Yes	V <sub>12</sub>		Exhibit 13-8		
V <sub>R12</sub>	5504	Exhibit 13-8				Service F	eterminatio	n (if not	<b>F</b> )
V <sub>R12</sub> Level of Ser	5504 vice Deteri	mination (i	f not F)						<u>·/</u>
V <sub>R12</sub> Level of Ser	5504	mination (i	f not F)	•			0.0086 V <sub>12</sub> - 0		<u>· / </u>
V <sub>R12</sub> Level of Ser	5504 <b>rvice Deteri</b> + 0.00734 v <sub>R</sub> +	mination (i	f not F)	•	Г	O <sub>R</sub> = 4.252 +			<u>. ,                                     </u>
$V_{R12}$ <b>Level of Ser</b> $D_{R} = 5.475$ $D_{R} = 45.4 \text{ (pc)}$	5504 <b>vice Deteri</b> + 0.00734 v <sub>R</sub> + /mi/ln)	mination (i	f not F)		D <sub>R</sub> = (po	O <sub>R</sub> = 4.252 + c/mi/ln)			<u>.,                                      </u>
$V_{R12}$ Level of Ser $D_R = 5.475$ $O_R = 45.4 \text{ (pc)}$ $OS = F \text{ (Exhibit)}$	5504 *Vice Deterion* + 0.00734 v <sub>R</sub> + /mi/ln) it 13-2)	mination (i	f not F)		D <sub>R</sub> = (po LOS = (E	O <sub>R</sub> = 4.252 + c/mi/ln) xhibit 13-2)	0.0086 V <sub>12</sub> - 0		- /
$V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 45.4 \text{ (pc)}$ $OS = F \text{ (Exhib)}$ Speed Determines	5504  vice Determent + 0.00734 v <sub>R</sub> + /mi/ln) it 13-2)  rmination	mination (i	f not F)		D <sub>R</sub> = (po LOS = (E <b>Speed D</b>	D <sub>R</sub> = 4.252 + c/mi/ln) xhibit 13-2) e <b>terminat</b>	0.0086 V <sub>12</sub> - 0		
$V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 45.4 \text{ (pc)}$ $OS = F \text{ (Exhib)}$ Speed Determines	5504 *Vice Deterion* + 0.00734 v <sub>R</sub> + /mi/ln) it 13-2)	mination (i	f not F)		D <sub>R</sub> = (po LOS = (E <b>Speed D</b> D <sub>s</sub> = (E)	D <sub>R</sub> = 4.252 + c/mi/ln) xhibit 13-2) <b>eterminat</b> khibit 13-12)	0.0086 V <sub>12</sub> - 0		,
$V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 45.4 \text{ (pc)}$ $D_R = 6.45 \text{ (pc)}$ $D_R $	5504  vice Determent + 0.00734 v <sub>R</sub> + /mi/ln) it 13-2)  rmination	<b>mination (i</b> 0.0078 V <sub>12</sub> - 0.0	f not F)		D <sub>R</sub> = (po LOS = (E <b>Speed D</b> D <sub>s</sub> = (E)	D <sub>R</sub> = 4.252 + c/mi/ln) xhibit 13-2) e <b>terminat</b>	0.0086 V <sub>12</sub> - 0		·,
$V_{R12}$ Level of Ser $D_R = 5.475$ $O_R = 45.4 \text{ (pc)}$ $O_R = 6.45 \text{ (pc)}$ $O_R $	5504  **Vice Determ** + 0.00734 v <sub>R</sub> +  **/mi/ln) it 13-2)  **rmination**  **xibit 13-11) h (Exhibit 13-11)	<b>mination (i</b> 0.0078 V <sub>12</sub> - 0.0	f not F)		$\begin{array}{c} D_{R} = & (p_{0}) \\ D_{S} = & (E) \\ \hline \textbf{Speed D} \\ D_{S} = & (E) \\ S_{R} = & mp \end{array}$	D <sub>R</sub> = 4.252 + c/mi/ln) xhibit 13-2) <b>eterminat</b> khibit 13-12)	0.0086 V <sub>12</sub> - 0		
$V_{R12}$ Level of Ser $D_R = 5.475$ $O_R = 45.4 \text{ (pc)}$ $O_S = F \text{ (Exhib)}$ Speed Deter $M_S = 1.252 \text{ (EX)}$ $S_R = 34.9 \text{ mp}$ $S_0 = 63.8 \text{ mp}$	5504  **Vice Determent** **Provice Determent	<b>mination (i</b> 0.0078 V <sub>12</sub> - 0.0	f not F)		$\begin{array}{cccc} & & & & & & \\ D_R = & & & & \\ D_R = & & & \\ LOS = & & & \\ \hline \textbf{Speed D} \\ D_S = & & & \\ D_S = & & \\ S_R = & & \\ S_0 = & & \\ \end{array}$	D <sub>R</sub> = 4.252 + c/mi/ln) xhibit 13-2) eterminat khibit 13-12) sh (Exhibit 13-1	0.0086 V <sub>12</sub> - 0		

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		RAMP	S AND RAM	IP JUNCT	ONS WO	ORKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company	CHS	n Crossroads,	Inc. J	reeway/Dir of Tourction			lorthbound Knox Off-F	Ramp		
Date Performed	5/19/			urisdiction		Caltran				
Analysis Time Period		Peak Hour		nalysis Year		2035 V	/ithout Pro	ect		
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		Francisco Nicora	har of Lanca N							
Upstream Adj R	_	Ramp Numbe	ber of Lanes, N r of Lanes, N	3 1					Downstrea Ramp	ım Adj
□Yes	On		ane Length, L <sub>A</sub>						✓Yes	✓ On
✓ No	Off	Freeway Volu	∟ane Length L <sub>D</sub> me, V <sub>⊏</sub>	280 5291					□No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	601					L <sub>down</sub> =	1395 ft
V <sub>u</sub> = v	eh/h			70.0 45.0					V <sub>D</sub> =	2252 veh/h
Conversion t	Vu =         veh/h         Freeway Free-Flow Speed, S <sub>FR</sub> Conversion to pc/h Under Base Conditions           (pc/h)         V (Veh/hr)         PHF         Terrain         %1           reeway         5291         0.92         Level         4           lamp         601         0.92         Level         1           lpStream         1         0.92         Level         1           lownStream         2252         0.92         Level         1           Merge Areas           Stimation of V <sub>12</sub>									
	V	1		%Truck	%Rv		f <sub>HV</sub>	fp	v = V/PHF	x f x f
	<del></del>	7011dck	0	_	¹HV 980	1.00	58	р		
Ramp		<del></del>		11	0		948	1.00	68	
UpStream				<u> </u>	<del>                                     </del>	<del>                                     </del>		1100		
DownStream	2252	0.92	Level	7	0	0.	966	1.00	25	33
		Merge Areas					Ī	Diverge Areas		
Estimation of	f v <sub>12</sub>				Estimat	tion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )					V <sub>12</sub> =	· V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	R)P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-1	2 or 13-13	)
P <sub>FM</sub> =	using	Equation (E	Exhibit 13-6)		P <sub>FD</sub> =		0.	582 using Eq	uation (Exhi	bit 13-7)
V <sub>12</sub> =	pc/h		,		V <sub>12</sub> =			700 pc/h	,	,
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			66 pc/h (Equ	ation 13-14	or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70		-	,			.24 > 2,7		☐Yes ☑No		,
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5						•••		Yes ☑ No		
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub>			c/h (Equation	13-16, 13-	18, or 13-
Capacity Che	cks				Capacit	ty Ch	ecks			
	Actual	С	apacity	LOS F?			Actual	Ca	pacity	LOS F?
					V <sub>F</sub>		5866	Exhibit 13-8	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{FO}$	- V <sub>R</sub>	5177	Exhibit 13-8	7200	No
					$V_R$		689	Exhibit 13-1	0 2100	No
Flow Entering	g Merge In	fluence A	rea	_	Flow E	nterin	g Dive	rge Influen	ce Area	
	Actual	· ·	Desirable	Violation?	ļ	$\overline{}$	Actual	Max Desirat		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		3700	Exhibit 13-8	4400:All	No
Level of Serv		•						terminatio	-	F)
$D_R = 5.475 + 0.$	• • • • • • • • • • • • • • • • • • • •	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			$D_R = 4$	1.252 + 0	.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 3$	3.6 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = D	(Exhil	oit 13-2)			
Speed Detern	nination				Speed					
M <sub>S</sub> = (Exibit 1							xhibit 13-			
	nibit 13-11)						(Exhibit			
	nibit 13-11)				1		(Exhibit			
l	nibit 13-13)				1		(Exhibit	13-13)		
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## **APPENDIX 8.10:**

HORIZON YEAR (2035) WITH PROJECT CONDITIONS FREEWAY MERGE/DIVERGE
ANALYSIS WORKSHEETS



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		RAMP	S AND RAM	IP JUNCTI	ONS WC	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company Date Performed Analysis Time Perioc	5/19/	n Crossroads, 2015 Peak Hour	Inc. Ju	reeway/Dir of Tr unction urisdiction nalysis Year	avel	Harley Caltrar	outhbound Knox Off-F is Vith Project	Ramp		
Project Description						2000 1		<u> </u>		
Inputs			,							
Upstream Adj R	amp	Freeway Num Ramp Numbe	nber of Lanes, N	3 1					Downstrea Ramp	am Adj
□Yes □	On	l '	Lane Length, L <sub>A</sub>	ı					✓ Yes	<b>☑</b> On
✓ No	Off	Deceleration   Freeway Volu	Lane Length L <sub>D</sub>	195 6980					□No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	2226					L <sub>down</sub> =	1420 ft
V <sub>u</sub> = ve	eh/h		e-Flow Speed, $S_{FF}$ low Speed, $S_{FR}$	70.0 45.0					V <sub>D</sub> =	396 veh/h
Conversion to	o pc/h Und	der Base	Conditions							
(pc/h)	reeway 6980 0.92 Level amp 2226 0.92 Level pStream						f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	6980	0.92	Level	5	0	0.	976	1.00		'77
Ramp UpStream	2226	0.92	Level	8	0	0.	962	1.00	25	516
DownStream			Level	25	0	0.	889	1.00 Diverge Areas	4	84
Estimation of		morgo / nouc			Estimat	tion o	$fv_{42}$	7110190711040		
$L_{EQ} = P_{FM} = V_{12} = V_3 \text{ or } V_{av34} > 2,70$ Is $V_3 \text{ or } V_{av34} > 1.5$ If Yes, $V_{12a} = V_{12a} = V_{12a}$	using pc/h pc/h (i 0 pc/h? Yes V <sub>12</sub> /2 Yes pc/h (i	Equation 13-6 or Equation (I)  Equation 13  S  No S  No Equation 13				<sub>/34</sub> > 1.5	0. 48 28 00 pc/h? [* V <sub>12</sub> /2	EV <sub>R</sub> + (V <sub>F</sub> - V <sub>I</sub> Equation 13-1 450 using Equalists pc/h 394 pc/h (Equalist) Yes □ No □ Yes ☑ No □ Yer (Equalist)	2 or 13-13 uation (Exhi	bit 13-7) 4 or 13-17)
	13-19)				Capacit			r 13-19)		
Capacity Che	Actual	1 (	Capacity	LOS F?	Capacit	y CII	Actual	Ca	pacity	LOS F?
V <sub>FO</sub>	riotaar	Exhibit 13-8	σομουτή	20011	$V_F$ $V_{FO} = V_F$		7777 5261	Exhibit 13-8	7200	Yes
	<u> </u>	<u></u>			V <sub>R</sub>		2516	Exhibit 13-1		Yes
Flow Entering		i-		Violation?	Flow El			rge Influen		Violation?
V <sub>R12</sub>	Actual	Exhibit 13-8	Desirable	violation?	V <sub>12</sub>	4	Actual 1883	Max Desirat Exhibit 13-8	4400:All	Yes
Level of Serv		•			<del>                                     </del>			terminatio		<i>F</i> )
$D_R = 5.475 + 0.$ $D_R = (pc/mi/ln + 0.00)$ $D_R = (Exhibit + 0.00)$	) 13-2)	0.0078 V <sub>12</sub> ·	- 0.00627 L <sub>A</sub>		D <sub>R</sub> = 4 LOS = F	6.2 (pc	/mi/ln) oit 13-2)	.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
Speed Detern	nination				Speed I					
$S_0$ = mph (Exh S = mph (Exh	nibit 13-11) nibit 13-11) nibit 13-13)				$S_{R} = 5$ $S_{0} = 7$ S = 5	5.3 mph 0.2 mph 9.7 mph	xhibit 13- (Exhibit (Exhibit (Exhibit	13-12) 13-12) 13-13)		
pyright © 2014 Univers	sity of Florida, All	Rights Reserve	ed		HCS2010 <sup>™</sup>	Versio	า 6.65	Ge	enerated: 5/19	9/2015 10:23

Canaralles		MIND SIND	RAMP JUN			<u>. C I</u>			
General Info				Site Infor		0/= 0			
Analyst	CH:			reeway/Dir of Tr		-215 Southbour			
Agency or Compa Date Performed	=	an Crossroads, I		unction urisdiction		Harley Knox On	-катр		
Sale Periornied Analysis Time Per		9/2015 Peak Hour		nalysis Year		Caltrans	ot		
Project Description				ilalysis i eal		2035 With Proje	Cl		
nputs	II KIIOX LOGISIIC	S Center Friase	1 11A (JIN 09347)						
		Frooway Numb	er of Lanes, N	3					
Jpstream Adj Rar	mp	1						Downstre	am Adj
✓ Yes 🔲	On	Ramp Number		1				Ramp	
v res	OII		ane Length, L <sub>A</sub>	260				☐Yes	On
□ No 🔽	Off	Deceleration L	ane Length L <sub>D</sub>					<b>☑</b> No	Off
		Freeway Volur	ne, V <sub>F</sub>	4754				INO	
<sub>rup</sub> = 1420	) ft	Ramp Volume	$V_{D}$	396				L <sub>down</sub> =	ft
			Flow Speed, S <sub>FF</sub>	70.0				l .	
$v_{\rm u} = 2226$	6 veh/h	Ramp Free-Flo		45.0				V <sub>D</sub> =	veh/h
<u> </u>			111	45.0					
onversion	to pc/h Ur	der Base C	onaitions	1	1	1	_		
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	$x f_{HV} x f_{p}$
Freeway	4754	0.92	Level	4	0	0.980	1.00	5	i271
Ramp	396	0.92	Level	25	0	0.889	1.00		484
UpStream	2226	0.92	Level	8	0	0.869	1.00		±04 !516
DownStream	2220	0.32	Level	<del>                                     </del>	-	0.302	1.00		.510
20Wilotteam		Merge Areas		1	<u> </u>		Diverge Areas		
stimation	of V <sub>40</sub>	o.go / u cuc			Estimati	on of v <sub>12</sub>			
		(D.)				12			
	$V_{12} = V$					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>FD</sub>	
<sub>-EQ</sub> =	1298.4	11 (Equation	13-6 or 13-7)		L <sub>EQ</sub> =		(Equation 13-	12 or 13-1	3)
P <sub>FM</sub> =	0.585	using Equati	on (Exhibit 13-6	5)	P <sub>FD</sub> =		using Equatio		•
′ <sub>12</sub> =	3082	pc/h			V <sub>12</sub> =		pc/h	,	,
/ <sub>3</sub> or V <sub>av34</sub>	2189	pc/h (Equation	n 13-14 or 13	-			•	2 11 0 12 1	7)
	17)				V <sub>3</sub> or V <sub>av34</sub>	> 0.700/-0	pc/h (Equation 1	3-14 01 13-1	1)
	,700 pc/h? Y					•	☐ Yes ☐ No		
Is $V_3$ or $V_{av34} > 1$	.5 * V <sub>12</sub> /2	es 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>		☐ Yes ☐ No	10.10.1	
Yes,V <sub>12a</sub> =		pc/h (Equation	n 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equation 13-19)	n 13-16, 1	3-18, or
120		r 13-19)					13-19)		
Capacity Cl	hecks				Capacity	Checks			
	Actual	Ci	apacity	LOS F?		Actua		pacity	LOS F?
					$V_{F}$		Exhibit 13-8	3	
$V_{FO}$	5755	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13-8	3	
- FO	0.00	Extribit 10 0		""			Exhibit 13-		
					V <sub>R</sub>		10		
Flow Enteri	ing Merge I	nfluence A	rea		Flow En	tering Dive	erge Influen	ce Area	
	Actual		)esirable	Violation?		Actual	Max Desi		Violation
V <sub>R12</sub>	3566	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
	rvice Deter	mination (i	f not F)	_		Service D	eterminatio	n (if not	F)
	5 + 0.00734 v <sub>R</sub> +						0.0086 V <sub>12</sub> - 0.		
**	c/mi/ln)	12	A		1	c/mi/ln)	12 0.	U	
	•				1				
	•				<del></del>	xhibit 13-2)	•		
OS = D (Exhi	rminotion				<del>  '                                   </del>	eterminati	on		
	riiiiiauoii				$D_s = (E)$	(hibit 13-12)			
OS = D (Exhi	Exibit 13-11)				l's (L'				
$OS = D$ (Exhipped Determine) $I_S = 0.436$ (Exhipped Determine)	Exibit 13-11)	)			1	h (Exhibit 13-12	2)		
OS = D (Exhi <b>Speed Dete</b> $M_S = 0.436$ (E $S_R = 57.8$ mp	Exibit 13-11) oh (Exhibit 13-11)				S <sub>R</sub> = mp	h (Exhibit 13-12			
OS = D  (Exhi <b>Speed Dete</b> $M_S = 0.436 \text{ (I}$ $M_R = 57.8 \text{ mp}$ $M_S = 63.9 \text{ mp}$	Exibit 13-11)	)			$S_R = mp$ $S_0 = mp$	•	2)		

General Infor			RAMP JUNG	Site Infor						
Analyst	CHS	<u> </u>		eeway/Dir of Tr		215 Northbound	1			
Agency or Company		an Crossroads,		nction		arley Knox On-				
Date Performed		/2015		risdiction		altrans				
Analysis Time Period		Peak Hour		alysis Year		aitians )35 With Projec	+			
Project Description				iaiysis i cai	20	JJJ WILLI FTOJEC				
Inputs	KIIOX LOGISTICS	S Center Fridse	TITIA (JIN 09347)							
-		Freeway Nun	nber of Lanes, N	3				L .		
Jpstream Adj Ramp		1 1						Downstre	am Adj	
✓ Yes ☐ On		Ramp Numbe		1				Ramp		
w res □ On	l	Acceleration	Lane Length, L <sub>A</sub>	300				☐Yes	On	
☐ No ☑ Off	•	Deceleration	Lane Length L <sub>D</sub>					NI-	□ o#	
		Freeway Volu	ıme, V <sub>r</sub>	5655				✓ No	Off	
- <sub>up</sub> = 1395	ft	Ramp Volume		1227				L <sub>down</sub> =	ft	
ир	••		11					Comi		
/, = 649 ve	Freeway Free-Flow Speed, S <sub>FF</sub> 70.0						V <sub>D</sub> =	veh/h		
	Ramp Free-Flow Speed, S <sub>FR</sub> 45.0									
Conversion to		der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f,	
Freeway	5655	0.92	Level	2	0	0.990	1.00		5208	
		<del>                                     </del>			<del>                                     </del>					
Ramp	1227	0.92	Level	16	0	0.926	1.00		1440	
UpStream	649	0.92	Level	17	0	0.922	1.00		765	
DownStream		<u> </u>					<u></u>			
F-4: 4: 4		Merge Areas			Fatima atia		Diverge Areas			
Estimation of	V <sub>12</sub>				Estimatio	n of V <sub>12</sub>				
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	/P		
- <sub>EQ</sub> =	1721.2	7 (Equation	13-6 or 13-7)		<u> </u>	.=			۵)	
_		L <sub>EQ</sub> =		(Equation 13-						
2 <sub>FM</sub> =			tion (Exhibit 13-6)		P <sub>FD</sub> =		using Equation	n (Exhibit 1	3-7)	
v <sub>12</sub> –	3509		10.1110		V <sub>12</sub> =		pc/h			
V <sub>3</sub> or V <sub>av34</sub>	2699 17)	pc/n (Equati	on 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub> pc/h (Equation 13-14 or 13-17)					
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,					> 2.700 pc/h? [	☐Yes ☐ No			
							Yes No			
Is $V_3$ or $V_{av34} > 1.5$ *							resno pc/h (Equatio	n 13 <sub>-</sub> 16 1	3_18 or	
f Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =		3-19)	11 13-10, 1	J-10, UI	
Capacity Che		13-19)			Capacity	Chocks	·			
capacity che	Actual	1 (	Capacity	LOS F?	Capacity	Actual	Car	pacity	LOSF	
	Actual	+ `	Зарасну	L001:	\ <u>'</u>	Actual			1001	
					V <sub>F</sub>		Exhibit 13-			
$V_{FO}$	7648	Exhibit 13-8		Yes	$V_{FO} = V_{F} - Y_{FO}$	V <sub>R</sub>	Exhibit 13-			
. •					V <sub>R</sub>		Exhibit 13	-		
	<u> </u>	<u> </u>				<u> </u>	10	<u> </u>		
Flow Entering		_		17.1.11.6	Flow Ente		rge Influen			
	Actual	1	Desirable	Violation?		Actual	Max Desi	ırabie	Violation	
V <sub>R12</sub>	4987	Exhibit 13-8	4600:All	Yes	V <sub>12</sub>		Exhibit 13-8			
Level of Serv					Level of S	Service De	eterminatio	n (if not	<i>F</i> )	
D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> - 0.	00627 L <sub>A</sub>		D <sub>F</sub>	<sub>R</sub> = 4.252 + 0	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>		
O <sub>R</sub> = 41.8 (pc/m	i/ln)	· <del>-</del>			L	· /mi/ln)	.=	_		
OS = F (Exhibit					1	hibit 13-2)				
					<u> </u>		<u> </u>			
Speed Detern	nination				<del>† '</del>	termination	ori			
•	oit 13-11)				1 "	nibit 13-12)				
•										
M <sub>S</sub> = 0.865 (Exil	Exhibit 13-11)				S <sub>R</sub> = mph (Exhibit 13-12)					
$M_S = 0.865 \text{ (Exilo}$ $S_R = 45.8 \text{ mph (}$	Exhibit 13-11)									
$M_{\rm S} = 0.865 \text{ (Exil}$ $S_{\rm R} = 45.8 \text{ mph (}$ $S_{\rm O} = 61.3 \text{ mph (}$	Exhibit 13-11) Exhibit 13-11) Exhibit 13-13)				S <sub>0</sub> = mph	(Exhibit 13-12)	)			

General Info	ormation		PS AND RAM	Site Infor							
Analyst	CHS	3	Fr	reeway/Dir of Tr		I-215 No	rthbound	<u> </u>			
Agency or Compa		an Crossroads		unction							
Date Performed		/2015	, -	urisdiction	Harley Knox Off-Ramp Caltrans						
Analysis Time Per		Peak Hour		nalysis Year			th Projec	•			
			e II TIA (JN 09347)	narysis rear		2000 VVI	шттојес				
Inputs	II Kliox Logistic	5 Ceriter i rias	e ii 11A (314 03341)								
		Freeway Nu	mber of Lanes, N	3					<u>L</u> .		
Upstream Ad	j Ramp	1							Downstre	am A	Adj
□Yes	On	1 '	er of Lanes, N	1					Ramp		
□ res	□On	Acceleration	Lane Length, L <sub>A</sub>						✓ Yes	<b>✓</b>	On
✓ No	Off	Deceleration	Lane Length L <sub>D</sub>	280							
INO		Freeway Vol	_	6304					☐ No		Off
L <sub>up</sub> =	ft		·	649					L <sub>down</sub> =	139	5 ft
−up		Ramp Volum	13						down		
V <sub></sub> =	veh/h	Freeway Fre	e-Flow Speed, $S_{FF}$	70.0					V <sub>D</sub> =	122	7 veh
v <sub>u</sub> –	Veriiii	Ramp Free-I	Flow Speed, S <sub>FR</sub>	45.0					1 5		
Conversion	to pc/h Un	der Base	Conditions						•		
(pc/h)	V	PHF	Terrain	%Truck	%Rv	f	HV	f <sub>p</sub>	v = V/PHF	- x f	x f
	(Veh/hr)	ļ				_					1V ^ 'p
Freeway	6304	0.92	Level	3	0	0.9		1.00	+	955	
Ramp	649	0.92	Level	17	0	0.9	22	1.00	7	'65	
UpStream											
DownStream	1227	0.92	Level	16	0	0.9	26	1.00	1	440	
		Merge Areas						Diverge Areas			
Estimation	of v <sub>12</sub>				Estimati	ion of	v <sub>12</sub>				
	V <sub>12</sub> = V <sub>F</sub>	(P)					V :	= V <sub>R</sub> + (V <sub>F</sub> - V	/_)P		
			- 40 7)							٥١	
L <sub>EQ</sub> =		ation 13-6 o			L <sub>EQ</sub> =			Equation 13-			
P <sub>FM</sub> =	using	g Equation	(Exhibit 13-6)		P <sub>FD</sub> =		0	.551 using Ed	quation (Ext	ibit 1	3-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		4	175 pc/h			
V <sub>3</sub> or V <sub>av34</sub>	pc/h	(Equation 1	3-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub> 2780 pc/h (Equation 13-14 or 13-17						
Is $V_3$ or $V_{av34} > 2$	-		,			., > 2.70		✓ Yes □ No			
0 4101					0 410	01		⊒Yes ☑ No			
Is $V_3$ or $V_{av34} > 1$			2 16 12 10 or							· 4	
If Yes,V <sub>12a</sub> =	13-19		3-16, 13-18, or		If Yes,V <sub>12a</sub> =	=		255 pc/h (Eq r 13-19)	uation 13-1	b, 13	3-18,
Capacity Cl		,			Capacity	v Che		1 10-10)			
oupacity of	Actual	1	Capacity	LOS F?	T T	<i>y 011</i> 0	Actual		apacity	Т	LOS F
	Actual	+	σαρασιτή	LOG1 !	1/	<del></del>		_	<del>'                                    </del>	$\dashv$	
	1				V <sub>F</sub>		6955	Exhibit 13	_	$\dashv$	No
$V_{FO}$		Exhibit 13-8	3		$V_{FO} = V_{F}$	- V <sub>R</sub>	6190	Exhibit 13	-8 7200		No
		1			$V_R$	7	765	Exhibit 13-	10 2100	T	No
Flow Enteri	na Merae II	nfluence	Area			terino	n Dive	rge Influei	ice Area		
	Actual		x Desirable	Violation?	13 ="	_	ctual	Max Desira		V	iolation
V <sub>R12</sub>	10,000	Exhibit 13-8	1		V <sub>12</sub>		75	Exhibit 13-8	4400:All	Ť	No
	rvios Data									<u></u>	INU
Level of Ser			<u> </u>		<b>†</b>			eterminatio	•	<u>r)</u>	
••	0.00734 v <sub>R</sub> +	u.uu78 V <sub>12</sub>	- 0.00627 L <sub>A</sub>					).0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>		
	/ln)				$D_R = 38$	3.3 (pc/r	ni/ln)				
D <sub>R</sub> = (pc/mi	it 13-2)				LOS = E	(Exhibi	t 13-2)				
**					Speed D			on			
LOS = (Exhib											
LOS = (Exhib	rmination				$D_{\alpha} = 0.0$	367 (⊏∨	hihit 13	-12)			
LOS = (Exhib) <b>Speed Dete</b> $M_S = (Exibit)$	<b>rmination</b> 13-11)				ľ	367 (Ex		•			
$LOS = (Exhib)$ $Speed Dete$ $M_S = (Exibit)$ $S_R = mph (E)$	13-11) xhibit 13-11)				S <sub>R</sub> = 59	9.7 mph	(Exhibit	13-12)			
$LOS = (Exhib)$ $Speed Dete$ $M_S = (Exibit)$ $S_R = mph (Exib)$	<b>rmination</b> 13-11)				S <sub>R</sub> = 59	9.7 mph	(Exhibit	•			

		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET				
General Infor	mation			Site Infor							
Analyst	CHS		Fr	eeway/Dir of Tr		I-215 S	Southbound				
Agency or Company	Urba	n Crossroads, I		unction		Harley	Knox Off-F	Ramp			
Date Performed	5/19/	2015	Jι	ırisdiction		Caltrar	IS				
Analysis Time Period		eak Hour		nalysis Year		2035 V	Vith Project				
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)								
Inputs		<u> </u>									
Upstream Adj R	Ramp	Freeway Num Ramp Numbe	ber of Lanes, N	3 1					Downstrea Ramp	m Adj	
□Yes	On	· '	ane Length, L <sub>A</sub>	'					✓Yes	<b>☑</b> On	
✓ No	Off	Deceleration L	ane Length L <sub>D</sub>	195					No	Off	
		Freeway Volu	me, V <sub>F</sub>	6889							
L <sub>up</sub> = f	t	Ramp Volume	, V <sub>R</sub>	1559					L <sub>down</sub> =	1420 ft	
.,		Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					\/ -	006 vah/h	
V <sub>u</sub> = v	eh/h		ow Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	926 veh/h	
Conversion t	o pc/h Und		111								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	fp	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>	
Freeway	6889	0.92	Level	4	0	0	980	1.00	76	 38	
Ramp	1559	0.92	Level	16	0		926	1.00	18:		
UpStream		1 1				<del>                                     </del>					
DownStream	926	0.92	Level	21	0	0.	905	1.00	11	12	
		Merge Areas		•				Diverge Areas			
Estimation or	f v <sub>12</sub>				Estimat	tion o	f v <sub>12</sub>				
	V <sub>12</sub> = V <sub>F</sub>	(P)						· V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>			
I =		tion 13-6 or	13_7)		l =			Equation 13-1		1	
L <sub>EQ</sub> =					L <sub>EQ</sub> = P =			-			
P <sub>FM</sub> =	_	Equation (E	EXHIBIT 13-0)		P <sub>FD</sub> =			485 using Equ	Jation (Exili	JIL 13-7)	
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			646 pc/h			
V <sub>3</sub> or V <sub>av34</sub>			-14 or 13-17)		$V_3$ or $V_{av34}$			992 pc/h (Equ	ation 13-14	or 13-17)	
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70					Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\checkmark$ Yes $\checkmark$ No Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ $\checkmark$ Yes $\checkmark$ No						
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5					Is V <sub>3</sub> or V <sub>av</sub>	<sub>v34</sub> > 1.5	5 * V <sub>12</sub> /2	☐Yes ☑No			
If Yes,V <sub>12a</sub> =	pc/h ( 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub>	=		938 pc/h (Equ	ation 13-16	, 13-18,	
Capacity Che					Canacit	ty Ch		r 13-19)			
Capacity Cite	Actual	<u> </u>	apacity	LOS F?	Capacit	Capacity Checks Actual Capacity				LOS F?	
	Actual	<del>l ĭ</del>	араску	LOGTE	V <sub>F</sub>		7638	Exhibit 13-8		Yes	
V		F.,I.;I.;I. 40, 0								<del>-</del>	
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{I}$		5808	Exhibit 13-8	+	No	
					V <sub>R</sub>		1830	Exhibit 13-1		No	
Flow Entering		T-			Flow E			rge Influen			
	Actual	1 1	Desirable	Violation?		_	Actual	Max Desirab		Violation?	
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		4646	Exhibit 13-8	4400:All	Yes	
Level of Serv		<u> </u>			Level of Service Determination (if not F)						
$D_R = 5.475 + 0.$	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			$D_R = 4$	1.252 + 0	.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>		
D <sub>R</sub> = (pc/mi/ln	1)				$D_R = 4$	5.0 (pc	/mi/ln)				
LOS = (Exhibit	13-2)				LOS = F	(Exhil	oit 13-2)				
Speed Deterr					Speed	<u> </u>		on			
$M_S = (Exibit 1)$							xhibit 13				
							(Exhibit				
	nibit 13-11)										
	nibit 13-11)				1 "		(Exhibit				
	nibit 13-13)						(Exhibit				
pyright © 2014 Univer	sity of Florida, All	Rights Reserve	d		HCS2010 <sup>™</sup>	Version	n 6.65	Ge	enerated: 5/19	/2015 10:24	

General Infor			RAMP JUNG	Site Infor							
Analyst	CHS	`		eeway/Dir of Tr		215 Southboun					
नावापुडा Agency or Company		an Crossroads,		nction		arley Knox On-					
Date Performed		1/2015		risdiction		altrans					
Analysis Time Period		Peak Hour		alysis Year		)35 With Projec	+				
Project Description				laryolo i cai		700 William Tojec	,,				
Inputs	Triox Logistics	3 Ochtor i masc	: II TIP (014 00041)								
		Freeway Nun	nber of Lanes, N	3					A 11		
Jpstream Adj Ramp		1 '						Downstre:	am Adj		
☑ Yes ☐ Or	n		er of Lanes, N	1				Ramp			
i les 🗀 Oi	1	Acceleration	Lane Length, L <sub>A</sub>	260				☐Yes	On		
□ No ☑ Of	f	Deceleration	Lane Length L <sub>D</sub>					☑ No	Off		
	•	Freeway Volu	ıme, V⊏	5331				INO			
- <sub>up</sub> = 1420	ft	Ramp Volume	•	926				L <sub>down</sub> =	ft		
ир			e-Flow Speed, S <sub>FF</sub>								
/ <sub></sub> = 1559 \	veh/h			70.0				$V_D =$	veh/h		
			low Speed, S <sub>FR</sub>	45.0							
Conversion t		der Base	Conditions	1	1 1						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>r</sub>		
Freeway	5331	0.92	Level	1	0	0.995	1.00	-			
Ramp	926	0.92	Level	21	0	0.995	1.00		112		
UpStream		_			0		<u> </u>	<b>-</b>			
DownStream	1559	0.92	Level	16	U	0.926	1.00	<del>                                     </del>	830		
Downstream		Merge Areas			1		I Diverge Areas				
Estimation of		Weige Aleas			Estimatio		Diverge Areas				
					LStillatio	11 01 1 12					
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>ED</sub>			
- <sub>EQ</sub> =	1551.1	4 (Equation	13-6 or 13-7)		l =		(Equation 13-		3)		
P <sub>FM</sub> =		L <sub>EQ</sub> =									
/.a =	3357		tion (Exhibit 13-6)		P <sub>FD</sub> =		using Equation	on (Exhibit is	o- <i>(</i> )		
12		•	on 13-14 or 13-		V <sub>12</sub> =		pc/h				
$V_3$ or $V_{ m av34}$	17)	pc/ii (Lquati	011 13-14 01 13-		V <sub>3</sub> or V <sub>av34</sub> pc/h (Equation 13-14 or 13-17)						
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,	es VNo			Is V <sub>3</sub> or V <sub>av34</sub>	> 2,700 pc/h?	Yes No				
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>2</sub> or V <sub>2V24</sub>	> 1.5 * V <sub>12</sub> /2	☐Yes ☐No				
			ion 12 16 12				pc/h (Equatio	n 13-16, 1	3-18, or		
f Yes,V <sub>12a</sub> =	ააა <i>i</i> 18 or	pc/n (Equati · 13-19)	ion 13-16, 13-		If Yes,V <sub>12a</sub> =		3-19)	,	-, -		
Capacity Che		.0 .0)			Capacity	Checks					
, ,	Actual		Capacity	LOS F?		Actual	Car	pacity	LOS F		
					V <sub>F</sub>		Exhibit 13-				
						v	Exhibit 13-	+	+		
$V_{FO}$	6936	Exhibit 13-8		No	$V_{FO} = V_F - V_F$	*R			-		
					$V_R$		Exhibit 13- 10	-			
Flow Entering	a Merae II	nfluence A	lrea	1	Flow Enter	erina Dive	erge Influen	ce Area			
.on Entering	Actual	ii'	Desirable Desirable	Violation?		Actual	Max Desi		Violation		
V <sub>R12</sub>	4469	Exhibit 13-8	4600:All	No	V <sub>12</sub>	, iotaai	Exhibit 13-8		FISICIOI		
				110		Consider D		n /if raat	<i>E</i> )		
Level of Serv					<del></del>		eterminatio		<u>r)</u>		
• • •	0.00734 v <sub>R</sub> +	u.uu/8 V <sub>12</sub> - 0.	00627 L <sub>A</sub>		1	-	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>			
$O_{R} = 38.2  (pc/m)$	ni/ln)				$D_R = (pc/$	/mi/ln)					
- R 00.2 (po///	13-2)				LOS = (Ex	hibit 13-2)					
					<u> </u>	terminati	on				
OS = E (Exhibit					<del>  '</del>	nibit 13-12)					
OS = E (Exhibit	hii 10 11)				rs (LAII						
$OS = E $ (Exhibit <b>Speed Detern</b> $M_S = 0.638 $ (Exi	•										
Speed Determine $M_S = 0.638$ (Exist) $S_R = 0.638$ (Exist) $S_R = 52.1$ mph	(Exhibit 13-11)										
LOS = E  (Exhibit <b>Speed Detern</b> $M_S = 0.638 $ (Exi $M_S = 52.1 $ mph	•				1	(Exhibit 13-12 (Exhibit 13-12					
LOS = E (Exhibit <b>Speed Detern</b> $M_S = 0.638$ (Exi $M_S = 52.1$ mph $M_S = 62.5$ mph	(Exhibit 13-11)				S <sub>0</sub> = mph	·	)				

Conoral Infa		IVIFO AND	RAMP JUN			<u>-</u> ⊆ I					
General Info				Site Infor							
Analyst	CHS			reeway/Dir of Tr		I-215 Northbou					
Agency or Compan	-	an Crossroads, I		unction		Harley Knox O	п-катр				
Date Performed		)/2015 Danielland		urisdiction		Caltrans					
Analysis Time Perio		Peak Hour		nalysis Year		2035 With Proj	ect				
Project Description Inputs	Knox Logistics	s Center Phase i	1 11A (JN 09347)								
-		Freeway Numb	or of Lanca N	2							
Jpstream Adj Ram	p	1		3				Downstream Adj			
		Ramp Number	of Lanes, N	1				Ramp			
✓ Yes □ C	n	Acceleration La	ane Length, L <sub>A</sub>	300				☐Yes	On		
□ No ☑ C	)ff	Deceleration L	ane Length L <sub>D</sub>								
	<b>/</b> 11	Freeway Volun	ne, V <sub>r</sub>	4690				✓ No	Off		
- <sub>up</sub> = 1395	ft	Ramp Volume,		2308				L <sub>down</sub> =	ft		
ир			• •					1			
/ <sub>u</sub> = 610 ·	veh/h		Flow Speed, S <sub>FF</sub>					$V_D =$	veh/h		
		Ramp Free-Flo	. 117	45.0							
Conversion		der Base C	Conditions								
(pc/h)	() (a la (la ri)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	fp	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>		
, ,	(Veh/hr)			<del>                                     </del>		_		+	··· F		
Freeway	4690	0.92	Level	4	0	0.980	1.00		5200		
Ramp	2308	0.92	Level	8	0	0.962	1.00		2609		
UpStream	610	0.92	Level	11	0	0.948	1.00		700		
DownStream		<del></del>									
		Merge Areas			Fatimati		Diverge Areas				
Estimation o	or v <sub>12</sub>				Estimati	on of v <sub>12</sub>					
	$V_{12} = V_{F}$	<sub>:</sub> ( P <sub>FM</sub> )				٧	= V <sub>R</sub> + (V <sub>F</sub> - V <sub>I</sub>	_\P			
- <sub>EQ</sub> =	1755.7	3 (Equation	13-6 or 13-7)		L _	<b>*</b> 12			10)		
P <sub>FM</sub> =	using Equati	)	L <sub>EQ</sub> =		(Equation 13		•				
/ <sub>12</sub> =	2928		OII (EXIIIDIL 10 0	,	P <sub>FD</sub> =		using Equati	ion (Exhibit 1	13-7)		
		•	n 13-14 or 13		V <sub>12</sub> =		pc/h				
/ <sub>3</sub> or V <sub>av34</sub>	17)	pc/ii (Equalic	11 13-14 01 13	-	$V_3$ or $V_{av34}$		pc/h (Equation	13-14 or 13-	17)		
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7	,	es VNo			Is V <sub>3</sub> or V <sub>av3</sub>	2,700 pc/h	? ☐ Yes ☐ No	)			
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5							☐Yes ☐No				
			n 12 16 12				pc/h (Equation		13-18, or		
f Yes,V <sub>12a</sub> =		pc/h (Equatio 13-19)	iii 13-16, 13-		If Yes,V <sub>12a</sub> =		13-19)	,	, -		
Capacity Ch		10 10)			Canacity	/ Checks					
supuony on	Actual	C	apacity	LOS F?	l	Actu	al Ca	apacity	LOS F?		
	Actual	Ť	араску	2001:	V <sub>F</sub>	Actu	Exhibit 13		LOOTE		
								-	_		
$V_{FO}$	7809	Exhibit 13-8		Yes	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13				
					$V_R$		Exhibit 13	3-			
	<del></del>					<u> </u>	10				
LIAW Entarir		nfluence A		1 1515 0	Flow En		erge Influe				
TOW EIREIN	Actual	-i	Desirable 4000 AU	Violation?	.,	Actual	Max De	sirable	Violation?		
		Exhibit 13-8	4600:All	Yes	V <sub>12</sub>		Exhibit 13-8				
V <sub>R12</sub>	5580		f not E		Level of		Determination		t F)		
V <sub>R12</sub> Level of Ser	vice Deteri					) = 4 2E2 I	· 0.0086 V <sub>12</sub> - 0	0 009 1 -			
V <sub>R12</sub> Level of Ser	vice Deteri	<b>mination (i</b> 0.0078 V <sub>12</sub> - 0.0				J <sub>R</sub> - 4.252 +	0.0000 V <sub>12</sub> - 0	o.ooo <b>-</b> D			
V <sub>R12</sub> Level of Ser	vice Deteri + 0.00734 v <sub>R</sub> +					• •	0.0000 V <sub>12</sub> - 0	о.ооо 2 <sub>D</sub>			
$V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 45.9 (pc/$	vice Deteri + 0.00734 v <sub>R</sub> +				$D_R = (p$	c/mi/ln)	0.0000 V <sub>12</sub> - 0	o.ooo			
$V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 45.9 (pc/OS = F (Exhibit))$	vice Deteri + 0.00734 v <sub>R</sub> + mi/ln) tt 13-2)				D <sub>R</sub> = (p LOS = (E	c/mi/ln) xhibit 13-2)		o.ooo			
$V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 45.9 (pc/.0S = F (Exhibit)$ Speed Deter	vice Detern + 0.00734 v <sub>R</sub> + mi/ln) t 13-2)				D <sub>R</sub> = (p LOS = (E <b>Speed D</b>	c/mi/ln) ixhibit 13-2) <b>Determina</b>		о.ооо 2 <sub>0</sub>			
$V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 45.9 (pc/.0S = F (Exhibit)$ Speed Deter	vice Deteri + 0.00734 v <sub>R</sub> + mi/ln) tt 13-2)				$D_R = (p)$ $LOS = (E)$ $Speed D$ $D_S = (E)$	c/mi/ln) exhibit 13-2) <b>Determina</b> exhibit 13-12)	tion				
$V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 45.9 (pc/60)$ $D_R = 45.9 (pc/60)$ $D_R = 45.9 (pc/60)$ $D_R = 1.328 (E:60)$	vice Detern + 0.00734 v <sub>R</sub> + mi/ln) t 13-2)	0.0078 V <sub>12</sub> - 0.0			$D_R = (p)$ $LOS = (E)$ $Speed D$ $D_S = (E)$	c/mi/ln) ixhibit 13-2) <b>Determina</b>	tion				
$V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 45.9 \text{ (pc/}$ $D_R$	vice Detern + 0.00734 v <sub>R</sub> + mi/ln) tt 13-2) rmination xibit 13-11)	0.0078 V <sub>12</sub> - 0.0			$D_R$ = (p LOS = (E <b>Speed D</b> $D_S$ = (E: $S_R$ = mp	c/mi/ln) exhibit 13-2) <b>Determina</b> exhibit 13-12)	tion				
$V_{R12}$ Level of Ser $D_R = 5.475$ $O_R = 45.9 \text{ (pc/}$ $OS = F  (Exhibition of Expression of Expression$	vice Detern + 0.00734 v <sub>R</sub> + mi/ln) it 13-2) mination xibit 13-11)	0.0078 V <sub>12</sub> - 0.0			$D_R$ = (p LOS = (E Speed D $D_S$ = (E: $S_R$ = mp $S_0$ = mp	c/mi/ln) Exhibit 13-2) Determination Exhibit 13-12) On (Exhibit 13-1	tion (2) (12)				

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		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET					
General Infor	mation			Site Infor								
Analyst Agency or Company	CHS	n Crossroads,		reeway/Dir of Tournetion	Harley Knox Off-Ramp							
Date Performed	5/19/			urisdiction		Caltran						
Analysis Time Period		Peak Hour		nalysis Year		2035 V	/ith Project					
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)									
Inputs		le v							Ĭ			
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes, N	3 1					Downstream Adj Ramp			
Yes	On	1	ane Length, L <sub>A</sub>						✓ Yes	<b>☑</b> On		
✓ No	Off	Deceleration L Freeway Volu	ane Length L <sub>D</sub>	280 5300					□ No □ O			
L <sub>up</sub> = f	t	Ramp Volume	•	610					L <sub>down</sub> =	1395 ft		
	ah/h	Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	2308 veh/h		
V <sub>u</sub> = v	eh/h	Ramp Free-Fl	ow Speed, S <sub>FR</sub>	45.0					, D	2500 VE11/1		
Conversion t	o pc/h Und	der Base (	Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>		
Freeway	5300	0.92	Level	5	0	0.	976	1.00	59	05		
Ramp	610	0.92	Level	11	0	0.	948	1.00	7	00		
UpStream						_						
DownStream	2308	0.92	Level	8	0	0.	962	1.00	26	509		
Estimation of		Merge Areas			Estimat	tion o	.f.v	Diverge Areas				
Estimation of					ESuma	iioii o						
	$V_{12} = V_{F}$							$V_R + (V_F - V_I)$				
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-1	2 or 13-13	)		
P <sub>FM</sub> =	using	Equation (E	Exhibit 13-6)		P <sub>FD</sub> =		0.	580 using Eq	uation (Exhi	bit 13-7)		
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		37	'20 pc/h				
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub> 2185 pc/h (Equation 13-14 or 13-17)							
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h? 🗌 Ye:	s 🗌 No			Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\checkmark$ No							
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5	* V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>v34</sub> > 1.5	* V <sub>12</sub> /2	Yes <b>☑</b> No				
If Yes,V <sub>12a</sub> =	pc/h ( 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> = pc/h (Equation 13-16, 13-18, or 13-19)							
Capacity Che	cks				Capacit	ty Ch	ecks					
	Actual	C	apacity	LOS F?			Actual	Ca	pacity	LOS F?		
					$V_{F}$		5905	Exhibit 13-8	7200	No		
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{I}$	- V <sub>R</sub>	5205	Exhibit 13-8	7200	No		
					$V_R$		700	Exhibit 13-1	0 2100	No		
Flow Entering	a Merae In	fluence A	rea				a Dive	rge Influen	ce Area			
	Actual		Desirable	Violation?	1	_	Actual	Max Desiral		Violation?		
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3720	Exhibit 13-8	4400:All	No		
Level of Serv	ice Detern	nination (	if not F)		Level o	f Serv	/ice De	terminatio	n (if not	<del>.</del> F)		
D <sub>R</sub> = 5.475 + 0.								.0086 V <sub>12</sub> - 0.		•		
D <sub>R</sub> = (pc/mi/ln	• • • • • • • • • • • • • • • • • • • •	12	,,			3.7 (pc.		12	J			
LOS = (Exhibit	, 13-2)				1 '''		oit 13-2)					
Speed Deterr					Speed	•		on .				
M <sub>S</sub> = (Exibit 1					+		xhibit 13-					
	nibit 13-11)				1		(Exhibit					
''					1		(Exhibit					
	nibit 13-11) nibit 13-13)						(Exhibit					
		Diaht- Dece	.d		1				onoroted 5/11	0/0045 40.05		
pyright © 2014 Univer	sity of Florida, All	ı ragnıs reserve	u		HCS2010 <sup>™</sup>	Versior	า 6.65	G	enerated: 5/19	9/2015 10:25		

# **APPENDIX 8.11:**

HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS

ANALYSIS WORKSHEETS WITH IMPROVEMENTS



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	۶	<b>→</b>	•	•	<b>←</b>	•	4	<b>†</b>	~	<b>/</b>	<b>+</b>	-√
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	f.		7	<b>₽</b>			4			4	
Volume (veh/h)	25	207	50	50	284	25	25	830	25	25	91	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	27	225	54	54	309	27	27	902	27	27	99	27
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	52	314	75	81	394	34	63	965	28	129	452	112
Arrive On Green	0.03	0.21	0.21	0.04	0.23	0.23	0.54	0.54	0.54	0.54	0.54	0.54
Sat Flow, veh/h	1810	1482	356	1810	1723	151	26	1799	53	136	841	209
Grp Volume(v), veh/h	27	0	279	54	0	336	956	0	0	153	0	0
Grp Sat Flow(s), veh/h/ln	1810	0	1837	1810	0	1873	1878	0	0	1187	0	0
Q Serve(g_s), s	1.1	0.0	10.6	2.2	0.0	12.7	15.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.1	0.0	10.6	2.2	0.0	12.7	36.1	0.0	0.0	3.2	0.0	0.0
Prop In Lane	1.00		0.19	1.00		0.08	0.03		0.03	0.18		0.18
Lane Grp Cap(c), veh/h	52	0	390	81	0	428	1057	0	0	693	0	0
V/C Ratio(X)	0.52	0.00	0.72	0.66	0.00	0.78	0.90	0.00	0.00	0.22	0.00	0.00
Avail Cap(c_a), veh/h	123	0	662	123	0	675	1106	0	0	728	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	36.0	0.0	27.5	35.3	0.0	27.3	16.4	0.0	0.0	8.8	0.0	0.0
Incr Delay (d2), s/veh	3.0	0.0	2.5	3.4	0.0	1.2	9.8	0.0	0.0	0.1	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	0.6	0.0	5.6	1.2	0.0	6.7	21.2	0.0	0.0	1.6	0.0	0.0
LnGrp Delay(d),s/veh	39.0	0.0	30.0	38.8	0.0	28.5	26.2	0.0	0.0	8.9	0.0	0.0
LnGrp LOS	D		С	D		С	С			Α		
Approach Vol, veh/h		306			390			956			153	
Approach Delay, s/veh		30.8			29.9			26.2			8.9	
Approach LOS		С			С			С			Α	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		45.8	7.9	21.5		45.8	6.7	22.7				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5	4.5	5.5				
Max Green Setting (Gmax), s		42.3	5.1	27.1		42.3	5.1	27.1				
Max Q Clear Time (g_c+l1), s		38.1	4.2	12.6		5.2	3.1	14.7				
Green Ext Time (p_c), s		2.3	0.0	2.7		7.0	0.0	2.5				
Intersection Summary												
HCM 2010 Ctrl Delay			26.3									
HCM 2010 LOS			С									

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<b>/</b>	<b>/</b>	Ţ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1,1	<b>^</b>	7	ሻሻ	<b>^</b>	7	Ţ	<b>†</b>	77	7	<b>∱</b> ∱	
Volume (veh/h)	4	201	11	558	499	49	17	6	719	56	7	12
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	5	239	9	664	594	58	20	7	527	67	8	14
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	235	1045	496	883	1726	762	37	507	1650	86	559	474
Arrive On Green	0.06	0.28	0.28	0.41	0.76	0.76	0.02	0.27	0.27	0.05	0.29	0.29
Sat Flow, veh/h	3619	3800	1680	3619	3800	1678	1810	1900	3230	1810	1900	1613
Grp Volume(v), veh/h	5	239	9	664	594	58	20	7	527	67	8	14
Grp Sat Flow(s),veh/h/ln	1810	1900	1680	1810	1900	1678	1810	1900	1615	1810	1900	1613
Q Serve(g_s), s	0.2	5.8	0.2	18.8	6.1	8.0	1.3	0.3	2.0	4.4	0.4	0.7
Cycle Q Clear(g_c), s	0.2	5.8	0.2	18.8	6.1	0.8	1.3	0.3	2.0	4.4	0.4	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	235	1045	496	883	1726	762	37	507	1650	86	559	474
V/C Ratio(X)	0.02	0.23	0.02	0.75	0.34	0.08	0.55	0.01	0.32	0.78	0.01	0.03
Avail Cap(c_a), veh/h	235	1045	496	883	1726	762	80	507	1650	128	559	474
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.5	33.7	11.7	32.4	8.7	4.6	58.2	32.4	7.9	56.5	30.0	30.2
Incr Delay (d2), s/veh	0.0	0.5	0.1	3.1	0.5	0.2	4.6	0.0	0.5	8.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.1	0.1	9.7	3.3	0.4	0.7	0.2	3.4	2.4	0.2	0.3
LnGrp Delay(d),s/veh	52.6	34.2	11.8	35.5	9.2	4.8	62.8	32.4	8.4	64.7	30.1	30.3
LnGrp LOS	D	С	В	D	Α	Α	Е	С	А	Е	С	С
Approach Vol, veh/h		253			1316			554			89	
Approach Delay, s/veh		33.7			22.3			10.7			56.2	
Approach LOS		С			С			В			Е	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	33.8	38.5	6.9	40.8	12.3	60.0	10.2	37.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	26.5	33.0	5.3	35.2	5.0	54.5	8.5	32.0				
Max Q Clear Time (g_c+I1), s	20.8	7.8	3.3	2.7	2.2	8.1	6.4	4.0				
Green Ext Time (p_c), s	0.8	0.9	0.0	1.2	0.5	2.5	0.0	1.2				
Intersection Summary												
HCM 2010 Ctrl Delay			22.0									
HCM 2010 LOS			С									

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	ሻሻ	<b>^</b>					ሻሻ	₽	
Volume (veh/h)	0	846	130	239	476	0	0	0	0	1449	2	630
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	900	138	254	506	0				1541	2	593
Adj No. of Lanes	0	2	1	2	2	0				2	1	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, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	1128	479	315	1601	0				1763	3	784
Arrive On Green	0.00	0.59	0.59	0.03	0.14	0.00				0.49	0.49	0.49
Sat Flow, veh/h	0	3800	1615	3619	3800	0				3619	5	1610
Grp Volume(v), veh/h	0	900	138	254	506	0				1541	0	595
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1616
Q Serve(g_s), s	0.0	21.9	5.0	8.4	14.4	0.0				45.6	0.0	35.9
Cycle Q Clear(g_c), s	0.0	21.9	5.0	8.4	14.4	0.0				45.6	0.0	35.9
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1128	479	315	1601	0				1763	0	787
V/C Ratio(X)	0.00	0.80	0.29	0.81	0.32	0.00				0.87	0.00	0.76
Avail Cap(c_a), veh/h	0	1128	479	347	1601	0				2006	0	895
HCM Platoon Ratio	1.00	2.00	2.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.95	0.95	0.75	0.75	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	21.6	18.2	57.3	36.1	0.0				27.5	0.0	25.0
Incr Delay (d2), s/veh	0.0	5.6	1.4	8.3	0.4	0.0				4.2	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	12.1	2.4	4.6	7.7	0.0				23.7	0.0	16.6
LnGrp Delay(d),s/veh	0.0	27.2	19.6	65.6	36.5	0.0				31.7	0.0	28.2
LnGrp LOS		С	В	<u>E</u>	D					С		С
Approach Vol, veh/h		1038			760						2136	
Approach Delay, s/veh		26.2			46.2						30.7	
Approach LOS		С			D						С	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	14.9	41.1		64.0		56.0						
Change Period (Y+Rc), s	4.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	11.5	26.5		66.5		42.5						
Max Q Clear Time (g_c+I1), s	10.4	23.9		47.6		16.4						
Green Ext Time (p_c), s	0.1	1.6		10.8		6.7						
Intersection Summary												
HCM 2010 Ctrl Delay			32.5									
HCM 2010 LOS			С									

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1,4	<b>^</b>			<b>^</b>	7		ર્ન	7			
Volume (veh/h)	553	1742	0	0	580	628	135	0	426	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	601	1893	0	0	630	0	147	0	358			
Adj No. of Lanes	2	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	1267	2502	0	0	1013	431	467	0	417			
Arrive On Green	0.70	1.00	0.00	0.00	0.27	0.00	0.26	0.00	0.26			
Sat Flow, veh/h	3619	3800	0	0	3800	1615	1810	0	1615			
Grp Volume(v), veh/h	601	1893	0	0	630	0	147	0	358			
Grp Sat Flow(s), veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	9.0	0.0	0.0	0.0	17.5	0.0	7.9	0.0	25.3			
Cycle Q Clear(g_c), s	9.0	0.0	0.0	0.0	17.5	0.0	7.9	0.0	25.3			
Prop In Lane	1.00	2502	0.00	0.00	1010	1.00	1.00	0	1.00			
Lane Grp Cap(c), veh/h	1267	2502	0	0	1013	431	467	0	417			
V/C Ratio(X)	0.47	0.76	0.00	0.00	0.62	0.00	0.31	0.00	0.86			
Avail Cap(c_a), veh/h	1312	2502	1.00	1.00	1013	431	467	1.00	417			
HCM Platoon Ratio	2.00 0.44	2.00 0.44	1.00	1.00	1.00 1.00	1.00	1.00	1.00	1.00 1.00			
Upstream Filter(I)	13.0	0.44	0.00	0.00	38.7	0.00	35.9	0.00	42.4			
Uniform Delay (d), s/veh Incr Delay (d2), s/veh	0.0	1.0	0.0	0.0	2.9	0.0	1.8	0.0	19.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.0	0.0	9.6	0.0	4.1	0.0	13.6			
LnGrp Delay(d),s/veh	13.1	1.0	0.0	0.0	41.6	0.0	37.7	0.0	62.3			
LnGrp LOS	В	Α	0.0	0.0	41.0 D	0.0	37.7 D	0.0	02.3 E			
Approach Vol, veh/h	ט	2494			630		ט	505	<u> </u>			
Approach Delay, s/veh		3.9			41.6			55.1				
Approach LOS		3.9 A			41.0 D			55.1 E				
• •					D			L				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		84.0			47.0	37.0		36.0				
Change Period (Y+Rc), s		5.0			5.0	* 5		5.0				
Max Green Setting (Gmax), s		79.0			43.5	* 32		31.0				
Max Q Clear Time (g_c+l1), s		2.0			11.0	19.5		27.3				
Green Ext Time (p_c), s		17.9			14.6	2.1		0.8				
Intersection Summary												
HCM 2010 Ctrl Delay			17.6									
HCM 2010 LOS			В									
Notes												

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	¥	f)		7	f)			4			4	
Volume (veh/h)	25	397	50	50	311	25	25	251	25	25	790	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	27	432	54	54	338	27	27	273	27	27	859	27
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	50	478	60	76	526	42	76	680	64	57	876	27
Arrive On Green	0.03	0.29	0.29	0.04	0.30	0.30	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1810	1656	207	1810	1737	139	62	1386	130	29	1785	55
Grp Volume(v), veh/h	27	0	486	54	0	365	327	0	0	913	0	0
Grp Sat Flow(s), veh/h/ln	1810	0	1863	1810	0	1876	1578	0	0	1869	0	0
Q Serve(g_s), s	1.3	0.0	21.7	2.6	0.0	14.6	0.0	0.0	0.0	22.1	0.0	0.0
Cycle Q Clear(g_c), s	1.3	0.0	21.7	2.6	0.0	14.6	9.3	0.0	0.0	42.1	0.0	0.0
Prop In Lane	1.00		0.11	1.00		0.07	0.08		0.08	0.03		0.03
Lane Grp Cap(c), veh/h	50	0	538	76	0	568	819	0	0	960	0	0
V/C Ratio(X)	0.54	0.00	0.90	0.71	0.00	0.64	0.40	0.00	0.00	0.95	0.00	0.00
Avail Cap(c_a), veh/h	104	0	581	104	0	584	819	0	0	960	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	41.6	0.0	29.7	41.0	0.0	26.1	13.6	0.0	0.0	21.9	0.0	0.0
Incr Delay (d2), s/veh	3.4	0.0	16.0	6.2	0.0	1.7	0.1	0.0	0.0	18.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	13.6	1.4	0.0	7.8	4.8	0.0	0.0	26.4	0.0	0.0
LnGrp Delay(d),s/veh	44.9	0.0	45.7	47.2	0.0	27.9	13.7	0.0	0.0	40.1	0.0	0.0
LnGrp LOS	D		D	D		С	В			D		
Approach Vol, veh/h		513			419			327			913	
Approach Delay, s/veh		45.7			30.4			13.7			40.1	
Approach LOS		D			С			В			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		48.0	8.1	30.5		48.0	6.9	31.8				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5	4.5	5.5				
Max Green Setting (Gmax), s		42.5	5.0	27.0		42.5	5.0	27.0				
Max Q Clear Time (g_c+I1), s		11.3	4.6	23.7		44.1	3.3	16.6				
Green Ext Time (p_c), s		7.4	0.0	1.3		0.0	0.0	2.8				
Intersection Summary												
HCM 2010 Ctrl Delay			35.6									
HCM 2010 LOS			D									

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	<b>/</b>	<b>/</b>	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1,4	<b>^</b>	7	ሻሻ	<b>^</b>	7	ሻ	<b>↑</b>	77	ሻ	<b>ተ</b> ኈ	
Volume (veh/h)	497	143	740	661	572	406	248	149	793	10	331	128
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	512	147	760	681	590	419	256	154	533	10	341	132
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	566	2071	1132	606	2113	933	234	745	1808	21	700	266
Arrive On Green	0.16	0.55	0.55	0.28	0.93	0.93	0.13	0.39	0.39	0.01	0.27	0.27
Sat Flow, veh/h	3619	3800	1680	3619	3800	1679	1810	1900	3230	1810	2625	998
Grp Volume(v), veh/h	512	147	760	681	590	419	256	154	533	10	245	228
Grp Sat Flow(s),veh/h/ln	1810	1900	1680	1810	1900	1679	1810	1900	1615	1810	1900	1723
Q Serve(g_s), s	16.7	2.2	35.8	20.1	1.8	3.7	15.5	6.4	10.4	0.7	13.0	13.4
Cycle Q Clear(g_c), s	16.7	2.2	35.8	20.1	1.8	3.7	15.5	6.4	10.4	0.7	13.0	13.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	566	2071	1132	606	2113	933	234	745	1808	21	507	459
V/C Ratio(X)	0.90	0.07	0.67	1.12	0.28	0.45	1.10	0.21	0.29	0.47	0.48	0.50
Avail Cap(c_a), veh/h	582	2071	1132	606	2113	933	234	745	1808	75	507	459
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.7	12.9	22.3	43.2	2.0	2.0	52.3	24.1	13.9	58.9	37.0	37.2
Incr Delay (d2), s/veh	16.8	0.1	3.2	73.2	0.3	1.3	86.7	0.6	0.4	5.8	3.3	3.8
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	9.6	1.2	17.3	16.1	0.9	1.7	13.4	3.5	4.8	0.4	7.3	6.9
LnGrp Delay(d),s/veh	66.6	13.0	25.5	116.4	2.2	3.4	138.9	24.7	14.3	64.7	40.3	41.0
LnGrp LOS	Е	В	С	F	А	А	F	С	В	E	D	D
Approach Vol, veh/h		1419			1690			943			483	
Approach Delay, s/veh		39.0			48.5			49.9			41.1	
Approach LOS		D			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.6	71.9	21.0	37.5	23.3	73.2	5.9	52.6				
Change Period (Y+Rc), s	4.5	5.5	5.5	* 5.5	4.5	5.5	4.5	5.5				
Max Green Setting (Gmax), s	20.1	32.4	15.5	* 32	19.3	33.2	5.0	42.5				
Max Q Clear Time (g_c+I1), s	22.1	37.8	17.5	15.4	18.7	5.7	2.7	12.4				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.4	0.1	5.8	0.0	1.9				
Intersection Summary												
HCM 2010 Ctrl Delay			45.0									
HCM 2010 LOS			D									
Notes												

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

2035 Without Project Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>*</b>	7	ሻሻ	<b>^</b>					ሻሻ	₽	
Volume (veh/h)	0	784	163	666	932	0	0	0	0	796	2	707
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	834	173	709	991	0				847	2	675
Adj No. of Lanes	0	2	1	2	2	0				2	1	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, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	1029	437	1228	2492	0				1402	2	624
Arrive On Green	0.00	0.54	0.54	0.11	0.22	0.00				0.39	0.39	0.39
Sat Flow, veh/h	0	3800	1615	3619	3800	0				3619	5	1611
Grp Volume(v), veh/h	0	834	173	709	991	0				847	0	677
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1616
Q Serve(g_s), s	0.0	21.5	7.5	22.3	26.8	0.0				22.5	0.0	46.5
Cycle Q Clear(g_c), s	0.0	21.5	7.5	22.3	26.8	0.0				22.5	0.0	46.5
Prop In Lane	0.00	1000	1.00	1.00	2402	0.00				1.00	0	1.00
Lane Grp Cap(c), veh/h	0	1029	437	1228	2492	0				1402	0	626
V/C Ratio(X)	0.00	0.81	0.40	0.58	0.40	0.00				0.60	0.00	1.08
Avail Cap(c_a), veh/h	1.00	1029 2.00	437	1228 0.33	2492	0 1.00				1402	1.00	626
HCM Platoon Ratio	1.00	0.97	2.00 0.97	0.33	0.33 0.41	0.00				1.00 1.00	1.00	1.00 1.00
Upstream Filter(I)	0.00	25.0	21.8	45.1	26.7	0.00					0.00	36.8
Uniform Delay (d), s/veh Incr Delay (d2), s/veh	0.0	6.7	21.8	0.2	0.2	0.0				29.4 0.7	0.0	59.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.2	0.2	0.0				0.7	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	12.1	3.6	11.2	14.2	0.0				11.3	0.0	31.1
LnGrp Delay(d),s/veh	0.0	31.7	24.4	45.3	26.9	0.0				30.1	0.0	96.7
LnGrp LOS	0.0	31.7 C	24.4 C	45.5 D	20.7 C	0.0				30.1	0.0	70.7 F
Approach Vol, veh/h		1007	U	ט	1700					C	1524	1
Approach Delay, s/veh		30.4			34.6						59.7	
Approach LOS		30.4 C			34.0 C						59.7 E	
					C						L	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	46.5	38.0		52.0		84.5						
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5						
Max Green Setting (Gmax), s	25.5	* 33		46.5		62.5						
Max Q Clear Time (g_c+I1), s	24.3	23.5		48.5		28.8						
Green Ext Time (p_c), s	0.4	2.7		0.0		6.4						
Intersection Summary												
HCM 2010 Ctrl Delay			42.6									
HCM 2010 LOS			D									
Notes												

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

2035 Without Project Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	<b>^</b>			44	7		ર્ન	7			
Volume (veh/h)	587	992	0	0	1245	1555	353	3	227	0	0	0
Number	5	2	12	1	6	16	3	8	18			
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	1.00	1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	660	1115	0	0	1399	0	397	3	146			
Adj No. of Lanes	2	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, % Cap, veh/h	827	2673	0	0	1647	700	449	0	404			
Arrive On Green	0.46	1.00	0.00	0.00	0.43	0.00	0.25	0.25	0.25			
Sat Flow, veh/h	3619	3800	0.00	0.00	3800	1615	1797	14	1615			
Grp Volume(v), veh/h	660	1115	0	0	1399	0	400	0	146			
Grp Sat Flow(s), veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	18.7	0.0	0.0	0.0	39.6	0.0	25.5	0.0	8.9			
Cycle Q Clear(q_c), s	18.7	0.0	0.0	0.0	39.6	0.0	25.5	0.0	8.9			
Prop In Lane	1.00	0.0	0.00	0.00	37.0	1.00	0.99	0.0	1.00			
Lane Grp Cap(c), veh/h	827	2673	0.00	0.00	1647	700	453	0	404			
V/C Ratio(X)	0.80	0.42	0.00	0.00	0.85	0.00	0.88	0.00	0.36			
Avail Cap(c_a), veh/h	827	2673	0	0	1647	700	453	0	404			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.66	0.66	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.2	0.0	0.0	0.0	30.5	0.0	43.3	0.0	37.1			
Incr Delay (d2), s/veh	3.5	0.3	0.0	0.0	5.7	0.0	21.5	0.0	2.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	9.6	0.1	0.0	0.0	22.1	0.0	15.5	0.0	4.3			
LnGrp Delay(d),s/veh	33.7	0.3	0.0	0.0	36.2	0.0	64.8	0.0	39.6			
LnGrp LOS	С	Α			D		Е		D			
Approach Vol, veh/h		1775			1399			546				
Approach Delay, s/veh		12.7			36.2			58.1				
Approach LOS		В			D			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		89.4			32.4	57.0		35.0				
Change Period (Y+Rc), s		5.0			5.0	* 5		5.0				
Max Green Setting (Gmax), s		80.0			24.5	* 52		30.0				
Max Q Clear Time (g_c+I1), s		2.0			20.7	41.6		27.5				
Green Ext Time (p_c), s		7.4			2.3	4.8		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay			28.2									
HCM 2010 LOS			С									

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

2035 Without Project Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

# **APPENDIX 8.12:**

HORIZON YEAR (2035) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS
ANALYSIS WORKSHEETS WITH IMPROVEMENTS



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	î»		7	ĵ.			4			4	
Volume (veh/h)	25	237	50	50	351	25	25	830	25	25	91	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	27	258	54	54	382	27	27	902	27	27	99	27
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	51	368	77	79	451	32	60	940	28	118	412	102
Arrive On Green	0.03	0.24	0.24	0.04	0.26	0.26	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1810	1525	319	1810	1754	124	27	1798	53	125	788	196
Grp Volume(v), veh/h	27	0	312	54	0	409	956	0	0	153	0	0
Grp Sat Flow(s),veh/h/ln	1810	0	1844	1810	0	1878	1878	0	0	1109	0	0
Q Serve(g_s), s	1.2	0.0	12.5	2.4	0.0	16.7	19.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.2	0.0	12.5	2.4	0.0	16.7	39.9	0.0	0.0	3.5	0.0	0.0
Prop In Lane	1.00		0.17	1.00		0.07	0.03		0.03	0.18		0.18
Lane Grp Cap(c), veh/h	51	0	446	79	0	483	1027	0	0	632	0	0
V/C Ratio(X)	0.53	0.00	0.70	0.69	0.00	0.85	0.93	0.00	0.00	0.24	0.00	0.00
Avail Cap(c_a), veh/h	114	0	619	114	0	631	1031	0	0	635	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	38.7	0.0	27.9	38.0	0.0	28.5	18.6	0.0	0.0	10.0	0.0	0.0
Incr Delay (d2), s/veh	3.2	0.0	8.0	3.9	0.0	6.6	14.1	0.0	0.0	0.1	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	0.6	0.0	6.4	1.3	0.0	9.5	24.5	0.0	0.0	1.8	0.0	0.0
LnGrp Delay(d),s/veh	41.8	0.0	28.7	41.9	0.0	35.1	32.7	0.0	0.0	10.1	0.0	0.0
LnGrp LOS	D		С	D		D	С			В		
Approach Vol, veh/h		339			463			956			153	
Approach Delay, s/veh		29.8			35.9			32.7			10.1	
Approach LOS		С			D			С			В	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		47.7	8.0	25.0		47.7	6.8	26.2				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5	4.5	5.5				
Max Green Setting (Gmax), s		42.3	5.1	27.1		42.3	5.1	27.1				
Max Q Clear Time (g_c+I1), s		41.9	4.4	14.5		5.5	3.2	18.7				
Green Ext Time (p_c), s		0.2	0.0	2.5		7.0	0.0	2.1				
Intersection Summary												
HCM 2010 Ctrl Delay			31.1									
HCM 2010 LOS			С									

2035 WP Conditions - AM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	<b>^</b>	7	ሻሻ	<b>^</b>	7	7	<b>^</b>	77	ň	<b>∱</b> ∱	
Volume (veh/h)	4	201	11	675	499	49	17	6	771	56	7	12
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	5	239	11	804	594	58	20	7	545	67	8	14
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	23	1053	500	845	1917	847	37	507	1616	86	574	488
Arrive On Green	0.01	0.28	0.28	0.39	0.84	0.84	0.02	0.27	0.27	0.05	0.30	0.30
Sat Flow, veh/h	3619	3800	1680	3619	3800	1680	1810	1900	3230	1810	1900	1615
Grp Volume(v), veh/h	5	239	11	804	594	58	20	7	545	67	8	14
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1680	1810	1900	1615	1810	1900	1615
Q Serve(g_s), s	0.2	5.8	0.6	25.9	4.0	0.5	1.3	0.3	7.9	4.4	0.4	0.7
Cycle Q Clear(g_c), s	0.2	5.8	0.6	25.9	4.0	0.5	1.3	0.3	7.9	4.4	0.4	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	23	1053	500	845	1917	847	37	507	1616	86	574	488
V/C Ratio(X)	0.22	0.23	0.02	0.95	0.31	0.07	0.55	0.01	0.34	0.78	0.01	0.03
Avail Cap(c_a), veh/h	151	1053	500	860	1917	847	80	507	1616	98	574	488
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.3	33.4	29.8	35.9	5.0	2.5	58.2	32.4	8.2	56.5	29.3	29.5
Incr Delay (d2), s/veh	1.7	0.5	0.1	18.8	0.4	0.1	4.6	0.0	0.6	24.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.1	0.3	15.0	2.2	0.3	0.7	0.2	3.6	2.8	0.2	0.3
LnGrp Delay(d),s/veh	61.0	34.0	29.9	54.7	5.4	2.6	62.8	32.4	8.7	81.1	29.4	29.6
LnGrp LOS	E	С	С	D	Α	Α	E	С	А	F	С	С
Approach Vol, veh/h		255			1456			572			89	
Approach Delay, s/veh		34.3			32.5			10.9			68.4	
Approach LOS		С			С			В			Е	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	32.5	38.8	6.9	41.8	5.3	66.0	11.2	37.5				
Change Period (Y+Rc), s	4.5	5.5	4.5	5.5	4.5	5.5	5.5	* 5.5				
Max Green Setting (Gmax), s	28.5	33.0	5.3	33.2	5.0	56.5	6.5	* 32				
Max Q Clear Time (g_c+l1), s	27.9	7.8	3.3	2.7	2.2	6.0	6.4	9.9				
Green Ext Time (p_c), s	0.2	3.5	0.0	0.1	0.0	3.6	0.0	1.2				
Intersection Summary												
HCM 2010 Ctrl Delay			28.8									
HCM 2010 LOS			С									
Notos												

Notes

2035 WP Conditions - AM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	14.54	<b>^</b>					ሻሻ	₽	
Volume (veh/h)	0	886	142	239	516	0	0	0	0	1449	2	707
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	943	146	254	549	0				1541	2	688
Adj No. of Lanes	0	2	1	2	2	0				2	1	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, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	1218	518	311	1687	0				1680	2	748
Arrive On Green	0.00	0.64	0.64	0.09	0.44	0.00				0.46	0.46	0.46
Sat Flow, veh/h	0	3800	1615	3619	3800	0				3619	5	1611
Grp Volume(v), veh/h	0	943	146	254	549	0				1541	0	690
Grp Sat Flow(s),veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1616
Q Serve(g_s), s	0.0	21.2	4.8	8.3	11.3	0.0				47.7	0.0	47.9
Cycle Q Clear(g_c), s	0.0	21.2	4.8	8.3	11.3	0.0				47.7	0.0	47.9
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1218	518	311	1687	0				1680	0	750
V/C Ratio(X)	0.00	0.77	0.28	0.82	0.33	0.00				0.92	0.00	0.92
Avail Cap(c_a), veh/h	0	1218	518	329	1687	0				1734	0	774
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.93	0.93	0.84	0.84	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	18.4	15.5	53.9	21.7	0.0				30.0	0.0	30.0
Incr Delay (d2), s/veh	0.0	4.5	1.3	11.1	0.4	0.0				8.0	0.0	15.8
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	0.0	11.5	2.3	4.6	6.0	0.0				25.6	0.0	24.6
LnGrp Delay(d),s/veh	0.0	23.0	16.8	65.0	22.1	0.0				38.0	0.0	45.9
LnGrp LOS		С	В	<u>E</u>	С					D		D
Approach Vol, veh/h		1089			803						2231	
Approach Delay, s/veh		22.1			35.7						40.5	
Approach LOS		С			D						D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	14.8	44.0		61.2		58.8						
Change Period (Y+Rc), s	4.5	5.5		5.5		5.5						
Max Green Setting (Gmax), s	10.9	36.1		57.5		51.5						
Max Q Clear Time (g_c+I1), s	10.3	23.2		49.9		13.3						
Green Ext Time (p_c), s	0.0	5.6		5.8		7.8						
Intersection Summary												
HCM 2010 Ctrl Delay			34.7									
HCM 2010 LOS			С									

2035 WP Conditions - AM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1,1	<b>^</b>			<b>^</b>	7		ર્ન	7			
Volume (veh/h)	587	1748	0	0	594	628	162	0	426	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	638	1900	0	0	646	0	176	0	377			
Adj No. of Lanes	2	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	966	2450	0	0	1224	520	523	0	467			
Arrive On Green	0.27	0.64	0.00	0.00	0.32	0.00	0.29	0.00	0.29			
Sat Flow, veh/h	3619	3800	0	0	3800	1615	1810	0	1615			
Grp Volume(v), veh/h	638	1900	0	0	646	0	176	0	377			
Grp Sat Flow(s), veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	14.1	32.0	0.0	0.0	12.5	0.0	6.9	0.0	19.5			
Cycle Q Clear(g_c), s	14.1	32.0	0.0	0.0	12.5	0.0	6.9	0.0	19.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00	_	1.00			
Lane Grp Cap(c), veh/h	966	2450	0	0	1224	520	523	0	467			
V/C Ratio(X)	0.66	0.78	0.00	0.00	0.53	0.00	0.34	0.00	0.81			
Avail Cap(c_a), veh/h	966	2450	0	0	1224	520	523	0	467			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.44	0.44	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	29.4	11.4	0.0	0.0	24.9	0.0	25.2	0.0	29.7			
Incr Delay (d2), s/veh	0.6	1.1	0.0	0.0	1.6	0.0	1.7	0.0	14.0			
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	7.1	17.0	0.0	0.0	6.8	0.0	3.7	0.0	10.5			
LnGrp Delay(d),s/veh	30.0 C	12.5	0.0	0.0	26.5	0.0	26.9 C	0.0	43.7			
LnGrp LOS	C	В			C		C	FF2	D			
Approach Vol, veh/h		2538			646			553				
Approach Delay, s/veh		16.9			26.5			38.3				
Approach LOS		В			С			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		63.1			29.1	34.0		31.0				
Change Period (Y+Rc), s		5.0			5.0	* 5		5.0				
Max Green Setting (Gmax), s		54.0			21.5	* 29		26.0				
Max Q Clear Time (g_c+l1), s		34.0			16.1	14.5		21.5				
Green Ext Time (p_c), s		11.6			4.0	2.3		1.0				
Intersection Summary												
HCM 2010 Ctrl Delay			21.7									
HCM 2010 LOS			С									
Notos												

\* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

2035 WP Conditions - AM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	J.	ĵ»		7	f)			4			4	
Volume (veh/h)	25	475	50	50	346	25	25	251	25	25	790	25
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	27	516	54	54	376	27	27	273	27	27	859	27
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	162	505	53	71	417	30	73	680	64	53	902	28
Arrive On Green	0.09	0.30	0.30	0.04	0.24	0.24	0.51	0.51	0.51	0.51	0.51	0.51
Sat Flow, veh/h	1810	1692	177	1810	1752	126	66	1344	127	30	1783	55
Grp Volume(v), veh/h	27	0	570	54	0	403	327	0	0	913	0	0
Grp Sat Flow(s), veh/h/ln	1810	0	1869	1810	0	1878	1537	0	0	1868	0	0
Q Serve(g_s), s	1.4	0.0	29.5	2.9	0.0	20.6	0.0	0.0	0.0	24.1	0.0	0.0
Cycle Q Clear(g_c), s	1.4	0.0	29.5	2.9	0.0	20.6	10.3	0.0	0.0	46.6	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.07	0.08		0.08	0.03		0.03
Lane Grp Cap(c), veh/h	162	0	558	71	0	447	817	0	0	982	0	0
V/C Ratio(X)	0.17	0.00	1.02	0.76	0.00	0.90	0.40	0.00	0.00	0.93	0.00	0.00
Avail Cap(c_a), veh/h	162	0	558	92	0	560	817	0	0	982	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	41.6	0.0	34.7	47.0	0.0	36.5	14.6	0.0	0.0	23.5	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	43.9	17.4	0.0	13.6	1.5	0.0	0.0	16.0	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	0.7	0.0	21.8	1.8	0.0	12.3	5.7	0.0	0.0	28.2	0.0	0.0
LnGrp Delay(d),s/veh	41.8	0.0	78.5	64.4	0.0	50.2	16.1	0.0	0.0	39.5	0.0	0.0
LnGrp LOS	D		F	Е		D	В			D		
Approach Vol, veh/h		597			457			327			913	
Approach Delay, s/veh		76.9			51.8			16.1			39.5	
Approach LOS		Е			D			В			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		55.5	8.4	35.0		55.5	14.3	29.0				
Change Period (Y+Rc), s		5.5	4.5	5.5		5.5	5.5	* 5.5				
Max Green Setting (Gmax), s		50.0	5.0	29.5		50.0	5.0	* 30				
Max Q Clear Time (g_c+I1), s		12.3	4.9	31.5		48.6	3.4	22.6				
Green Ext Time (p_c), s		7.6	0.0	0.0		0.9	0.5	1.0				
Intersection Summary												
HCM 2010 Ctrl Delay			48.4									
HCM 2010 LOS			D									
Notos												

Notes

2035 WP Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	<b>^</b>	7	ሻሻ	<b>^</b>	7	ሻ	<b>↑</b>	77	7	<b>∱</b> ∱	
Volume (veh/h)	497	143	740	723	572	406	248	149	932	10	331	128
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1976	1900	1900	1976	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	512	147	760	745	590	419	256	154	676	10	341	132
Adj No. of Lanes	2	2	1	2	2	1	1	1	2	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	522	1077	679	1273	1897	838	219	657	2253	60	700	266
Arrive On Green	0.14	0.28	0.28	0.59	0.83	0.83	0.12	0.35	0.35	0.03	0.27	0.27
Sat Flow, veh/h	3619	3800	1680	3619	3800	1679	1810	1900	3230	1810	2625	998
Grp Volume(v), veh/h	512	147	760	745	590	419	256	154	676	10	245	228
Grp Sat Flow(s), veh/h/ln	1810	1900	1680	1810	1900	1679	1810	1900	1615	1810	1900	1723
Q Serve(g_s), s	16.9	3.5	34.0	15.5	4.2	9.8	14.5	6.9	0.0	0.6	13.0	13.4
Cycle Q Clear(g_c), s	16.9	3.5	34.0	15.5	4.2	9.8	14.5	6.9	0.0	0.6	13.0	13.4
Prop In Lane	1.00	1077	1.00	1.00	1007	1.00	1.00	/ [ 7	1.00	1.00	F07	0.58
Lane Grp Cap(c), veh/h	522	1077	679	1273	1897	838	219	657	2253	60	507	459
V/C Ratio(X)	0.98	0.14	1.12	0.59	0.31	0.50	1.17	0.23	0.30	0.17	0.48	0.50
Avail Cap(c_a), veh/h	522	1077	679	1273	1897	838	219	657	2253	75	507	459
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00 51.2	1.00	1.00	0.85	0.85 5.3	0.85	1.00 52.8	1.00	1.00	1.00	1.00	1.00 37.2
Uniform Delay (d), s/veh	34.4	32.1	57.0 72.3	19.2	0.4	7.5 1.8	114.7	27.9 0.8	6.9	56.4 0.5	37.0 3.3	37.2
Incr Delay (d2), s/veh Initial Q Delay(d3),s/veh	0.0	0.3	0.0	0.4	0.4	0.0	0.0	0.0	0.3	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	1.9	13.6	7.6	2.1	4.8	14.2	3.8	4.3	0.0	7.3	6.9
LnGrp Delay(d),s/veh	85.6	32.3	129.3	19.6	5.7	9.3	167.4	28.8	7.3	56.9	40.3	41.0
LnGrp LOS	65.6 F	32.3 C	129.3 F	19.0 B	3.7 A	9.3 A	F	20.0 C	7.3 A	50.9 E	40.3 D	41.0 D
Approach Vol, veh/h	ļ.	1419		D	1754	A		1086	A	<u> </u>	483	D
Approach Delay, s/veh		103.5			1754			48.1			41.0	
Approach LOS		103.5 F			12.5 B			40.1 D			41.0 D	
											U	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	47.8	39.5	19.0	37.5	21.8	65.5	9.5	47.0				
Change Period (Y+Rc), s	5.5	* 5.5	4.5	5.5	4.5	5.5	5.5	* 5.5				
Max Green Setting (Gmax), s	19.5	* 34	14.5	32.0	17.3	36.2	5.0	* 42				
Max Q Clear Time (g_c+l1), s	17.5	36.0	16.5	15.4	18.9	11.8	2.6	8.9				
Green Ext Time (p_c), s	1.0	0.0	0.0	1.4	0.0	4.9	0.4	2.0				
Intersection Summary												
HCM 2010 Ctrl Delay			50.8									
HCM 2010 LOS			D									
Notos												

\* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

2035 WP Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

	۶	<b>→</b>	•	<	<b>←</b>	•	1	†	/	<b>/</b>	<b>↓</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>^</b>	7	1	<b>^</b>					ሻሻ	f)	
Volume (veh/h)	0	891	194	666	953	0	0	0	0	796	2	748
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1900	1900
Adj Flow Rate, veh/h	0	948	206	709	1014	0				847	2	719
Adj No. of Lanes	0	2	1	2	2	0				2	1	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, %	0	0	0	0	0	0				0	0	0
Cap, veh/h	0	1086	462	1681	3025	0				1402	2	624
Arrive On Green	0.00	0.57	0.57	0.15	0.26	0.00				0.39	0.39	0.39
Sat Flow, veh/h	0	3800	1615	3619	3800	0				3619	4	1611
Grp Volume(v), veh/h	0	948	206	709	1014	0				847	0	721
Grp Sat Flow(s), veh/h/ln	0	1900	1615	1810	1900	0				1810	0	1616
Q Serve(g_s), s	0.0	25.6	8.8	21.3	25.9	0.0				22.5	0.0	46.5
Cycle Q Clear(g_c), s	0.0	25.6	8.8	21.3	25.9	0.0				22.5	0.0	46.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1086	462	1681	3025	0				1402	0	626
V/C Ratio(X)	0.00	0.87	0.45	0.42	0.34	0.00				0.60	0.00	1.15
Avail Cap(c_a), veh/h	0	1086	462	1681	3025	0				1402	0	626
HCM Platoon Ratio	1.00	2.00	2.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.96	0.96	0.36	0.36	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	23.8	20.2	36.2	18.6	0.0				29.4	0.0	36.8
Incr Delay (d2), s/veh	0.0	9.3	3.0	0.0	0.1	0.0				0.7	0.0	85.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	14.6	4.3	10.7	13.7	0.0				11.3	0.0	35.6
LnGrp Delay(d),s/veh	0.0	33.2	23.2	36.2	18.7	0.0				30.1	0.0	122.4
LnGrp LOS		С	С	D	В					С		F
Approach Vol, veh/h		1154			1723						1568	
Approach Delay, s/veh		31.4			25.9						72.5	
Approach LOS		С			С						Е	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	61.9	39.8		52.0		101.7						
Change Period (Y+Rc), s	5.5	* 5.5		5.5		5.5						
Max Green Setting (Gmax), s	23.7	* 34		46.5		62.5						
Max Q Clear Time (g_c+l1), s	23.3	27.6		48.5		27.9						
Green Ext Time (p_c), s	0.1	2.6		0.0		6.6						
Intersection Summary												
HCM 2010 Ctrl Delay			43.8									
HCM 2010 LOS			D									
Notes												

<sup>\*</sup> HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

2035 WP Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

Synchro 8 - Report Page 9

	۶	<b>→</b>	•	•	<b>←</b>	•	1	<b>†</b>	~	<b>/</b>	<b>↓</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	<b>^</b>			<b>^</b>	7		र्स	7			
Volume (veh/h)	679	1007	0	0	1252	1555	367	3	227	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	763	1131	0	0	1407	0	412	3	146			
Adj No. of Lanes	2	2	0	0	2	1	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	799	2533	0	0	1583	673	449	3	404			
Arrive On Green	0.22	0.67	0.00	0.00	0.42	0.00	0.25	0.25	0.25			
Sat Flow, veh/h	3619	3800	0	0	3800	1615	1797	13	1615			
Grp Volume(v), veh/h	763	1131	0	0	1407	0	415	0	146			
Grp Sat Flow(s),veh/h/ln	1810	1900	0	0	1900	1615	1810	0	1615			
Q Serve(g_s), s	25.0	17.0	0.0	0.0	41.2	0.0	26.8	0.0	8.9			
Cycle Q Clear(g_c), s	25.0	17.0	0.0	0.0	41.2	0.0	26.8	0.0	8.9			
Prop In Lane	1.00		0.00	0.00		1.00	0.99		1.00			
Lane Grp Cap(c), veh/h	799	2533	0	0	1583	673	453	0	404			
V/C Ratio(X)	0.95	0.45	0.00	0.00	0.89	0.00	0.92	0.00	0.36			
Avail Cap(c_a), veh/h	799	2533	0	0	1583	673	453	0	404			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.60	0.60	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	46.2	9.5	0.0	0.0	32.4	0.0	43.8	0.0	37.1			
Incr Delay (d2), s/veh	15.1	0.3	0.0	0.0	7.8	0.0	25.9	0.0	2.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	14.2	8.9	0.0	0.0	23.2	0.0	16.6	0.0	4.3			
LnGrp Delay(d),s/veh	61.3	9.8	0.0	0.0	40.3	0.0	69.7	0.0	39.6			
LnGrp LOS	Е	А			D		Е		D			
Approach Vol, veh/h		1894			1407			561				
Approach Delay, s/veh		30.6			40.3			61.9				
Approach LOS		С			D			E				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		85.0			30.0	55.0		35.0				
Change Period (Y+Rc), s		5.0			3.5	5.0		5.0				
Max Green Setting (Gmax), s		0.08			26.5	50.0		30.0				
Max Q Clear Time (g_c+I1), s		19.0			27.0	43.2		28.8				
Green Ext Time (p_c), s		20.0			0.0	5.4		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			38.6									
HCM 2010 LOS			D									

2035 WP Conditions - PM Peak Hour WITH IMPROVEMENTS Urban Crossroads, Inc.

# **APPENDIX 8.13:**

HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS OFF-RAMP QUEUING
ANALYSIS WORKSHEETS WITH IMPROVEMENTS



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	-	•	•	•	-	<b>↓</b>
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	900	138	254	506	1541	672
v/c Ratio	0.94	0.26	0.74	0.35	0.77	0.62
Control Delay	57.8	18.5	42.9	48.1	25.2	16.8
Queue Delay	0.0	0.0	0.0	1.9	48.6	0.0
Total Delay	57.8	18.5	42.9	50.1	73.8	16.8
Queue Length 50th (ft)	~392	36	105	212	430	249
Queue Length 95th (ft)	#520	88	147	268	511	363
Internal Link Dist (ft)	844			267		1109
Turn Bay Length (ft)		100	80			
Base Capacity (vph)	956	525	366	1443	2105	1127
Starvation Cap Reductn	0	0	0	753	0	0
Spillback Cap Reductn	0	0	0	0	841	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.26	0.69	0.73	1.22	0.60

### Intersection Summary

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

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

5/21/2015

Lane Group

v/c Ratio Control Delay Queue Delay Total Delay

Lane Group Flow (vph)

Oueue Length 50th (ft)
Queue Length 95th (ft)
Internal Link Dist (ft)
Turn Bay Length (ft)
Base Capacity (vph)
Starvation Cap Reductn

•	<b>→</b>	<b>←</b>	•	<b>†</b>	/
EBL	EBT	WBT	WBR	NBT	NBR
601	1893	630	683	147	463
0.44	0.76	0.62	0.36	0.30	0.86
33.7	24.3	41.9	0.5	37.8	53.5
1.3	47.8	0.5	0.0	0.0	0.0
35.0	72.1	42.3	0.5	37.8	53.5
124	723	215	0	92	301
m124	m778	275	0	151	#481
	267	594		929	
60			100		265
1377	2501	1013	1877	490	538

0

0

0

0.86

#### **Intersection Summary**

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

532

0.71

0

0

915

0

0

1.19

0

0

107

0.70

0

0

0

0.36

0

0

0

0.30

<sup># 95</sup>th 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.

	-	•	•	←	-	↓
Lana Craun	EDT	EDD.	- WDI	\M/DT	CDI	CDT
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	834	173	709	991	847	754
v/c Ratio	0.81	0.30	0.88	0.50	0.58	0.96
Control Delay	43.8	16.0	77.4	25.2	31.0	56.0
Queue Delay	0.2	0.0	48.9	47.5	0.0	0.0
Total Delay	44.0	16.0	126.3	72.7	31.0	56.0
Queue Length 50th (ft)	302	38	295	284	255	512
Queue Length 95th (ft)	383	98	m#355	353	317	#775
Internal Link Dist (ft)	844			267		1109
Turn Bay Length (ft)		100	80			
Base Capacity (vph)	1036	579	807	1986	1472	789
Starvation Cap Reductn	0	0	209	1079	0	0
Spillback Cap Reductn	16	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.30	1.19	1.09	0.58	0.96

Intersection Summary

<sup># 95</sup>th 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.

5/21/2015

	۶	<b>→</b>	•	•	<b>†</b>	/
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	660	1115	1399	1747	400	255
v/c Ratio	0.85	0.44	0.85	0.93	0.84	0.45
Control Delay	22.4	1.6	36.7	10.9	59.9	22.5
Queue Delay	3.8	0.3	47.9	0.0	0.0	0.0
Total Delay	26.2	1.9	84.5	10.9	59.9	22.5
Queue Length 50th (ft)	31	9	477	0	296	85
Queue Length 95th (ft)	86	29	561	#21	#449	162
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	775	2533	1646	1877	475	565
Starvation Cap Reductn	61	758	0	0	0	0
Spillback Cap Reductn	0	0	493	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.63	1.21	0.93	0.84	0.45
Intersection Summary						

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# **APPENDIX 8.14:**

HORIZON YEAR (2035) WITH PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS
WORKSHEETS WITH IMPROVEMENTS



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Lane Group         EBT         EBR         WBL         WBT         SBL         SBT           Lane Group Flow (vph)         943         151         254         549         1541         754           v/c Ratio         0.80         0.24         0.76         0.33         0.86         0.75           Control Delay         39.1         15.0         68.9         23.3         33.8         23.6           Queue Delay         0.0         0.0         0.0         1.4         0.0         0.0
v/c Ratio         0.80         0.24         0.76         0.33         0.86         0.75           Control Delay         39.1         15.0         68.9         23.3         33.8         23.6
Control Delay 39.1 15.0 68.9 23.3 33.8 23.6
<b>,</b>
Queue Delay 0.0 0.0 1.4 0.0 0.0
Total Delay 39.1 15.0 68.9 24.7 33.8 23.6
Queue Length 50th (ft) 291 39 97 139 508 344
Queue Length 95th (ft) 375 m95 #149 181 608 504
Internal Link Dist (ft) 844 267 1109
Turn Bay Length (ft) 100 80
Base Capacity (vph) 1176 635 345 1651 1820 1016
Starvation Cap Reductn 0 0 0 868 0 0
Spillback Cap Reductn 0 0 0 0 0
Storage Cap Reductn 0 0 0 0 0
Reduced v/c Ratio 0.80 0.24 0.74 0.70 0.85 0.74

### Intersection Summary

<sup># 95</sup>th 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.

	•	<b>→</b>	<b>←</b>	•	<b>†</b>	/
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	638	1900	646	683	176	463
v/c Ratio	0.70	0.83	0.53	0.36	0.32	0.76
Control Delay	36.2	18.6	26.8	0.5	27.1	33.1
Queue Delay	0.9	47.3	0.0	0.0	0.0	0.0
Total Delay	37.1	65.9	26.8	0.5	27.1	33.1
Queue Length 50th (ft)	166	397	148	0	78	197
Queue Length 95th (ft)	223	499	199	0	134	#321
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	907	2280	1224	1900	548	609
Starvation Cap Reductn	89	695	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.78	1.20	0.53	0.36	0.32	0.76
Intersection Summary						

intersection Summary

<sup># 95</sup>th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

	-	•	1	•	-	↓
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	948	206	709	1014	847	798
v/c Ratio	0.87	0.34	0.95	0.51	0.58	1.02
Control Delay	47.8	17.3	79.2	17.6	30.9	69.2
Queue Delay	48.1	0.0	44.3	25.0	0.0	0.0
Total Delay	95.9	17.3	123.5	42.5	30.9	69.2
Queue Length 50th (ft)	357	71	294	266	255	~590
Queue Length 95th (ft)	#455	127	m#356	m312	317	#857
Internal Link Dist (ft)	844			267		1109
Turn Bay Length (ft)		100	80			
Base Capacity (vph)	1086	608	750	1979	1472	786
Starvation Cap Reductn	0	0	152	998	0	0
Spillback Cap Reductn	268	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.16	0.34	1.19	1.03	0.58	1.02

### Intersection Summary

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

<sup># 95</sup>th 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.

	•	<b>→</b>	←	•	<b>†</b>	/
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	763	1131	1407	1747	415	255
v/c Ratio	0.93	0.45	0.88	0.93	0.87	0.45
Control Delay	51.8	7.4	39.6	10.9	63.4	23.1
Queue Delay	47.6	0.2	47.3	0.0	7.6	0.0
Total Delay	99.5	7.5	86.9	10.9	71.0	23.1
Queue Length 50th (ft)	284	109	496	0	310	88
Queue Length 95th (ft)	m296	122	583	#21	#476	166
Internal Link Dist (ft)		267	594		929	
Turn Bay Length (ft)	60			100		265
Base Capacity (vph)	839	2533	1602	1877	475	562
Starvation Cap Reductn	235	488	0	0	0	0
Spillback Cap Reductn	0	0	433	0	39	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.26	0.55	1.20	0.93	0.95	0.45

Intersection Summary

<sup># 95</sup>th 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.

# **APPENDIX 8.15:**

HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS BASIC FREEWAY SEGMENT
ANALYSIS WORKSHEETS WITH IMPROVEMENTS



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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ĒΤ		
General Information			Site Information			
Analyst Agency or Company Date Performed	CHS Urban Crossroads, Inc. 5/18/2015		Highway/Direction of Trav From/To Jurisdiction	North of Caltrans	North of Harley Knox Bl. Caltrans	
Analysis Time Period	nalysis Time Period AM Peak Hour		Analysis Year	2035 Without Project w/ IMPROV		
Project Description Knox	Logistics Cent	er Phase II TIA	A (JN 09347)			
✓ Oper.(LOS)			es.(N)	☐ Plar	nning Data	
Flow Inputs						
Volume, V AADT	5961	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
f <sub>p</sub>	1.00		E <sub>R</sub>	1.5		
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.976</i>		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width		ft				
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph	
Number of Lanes, N	3		f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	70.0	mph	FFS	70.0	mph	
Base free-flow Speed, BFFS		mph		, 6.0		
LOS and Performanc	e Measures		Design (N)			
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> )	N x f <sub>HV</sub> 2214	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln	
S	58.1	mph	x f <sub>p</sub> )		ролили	
D = v <sub>p</sub> / S	38.1	pc/mi/ln	S		mph	
LOS	E	<b>P</b> 2	D = v <sub>p</sub> / S Required Number of Lane	s, N	pc/mi/ln	
 Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11	

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HCS 2010<sup>TM</sup> Version 6.65

	BASIC FR	EEWAY SE	GMENTS WORKSHE	ET			
General Information			Site Information				
Analyst Agency or Company Date Performed	CHS Urban Crossroads, Inc. 5/18/2015		Highway/Direction of Trav From/To Jurisdiction	South o Caltrans	South of Harley Knox Bl. Caltrans		
Analysis Time Period	AM Peak Hour		Analysis Year		2035 Without Project w/ IMPROV		
Project Description Knox	Logistics Cen	ter Phase II Tl	A (JN 09347)				
✓ Oper.(LOS)			Des.(N)	Plar	nning Data		
Flow Inputs							
Volume, V AADT	4171	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 7			
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi			
Calculate Flow Adjus	tments						
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2			
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.966			
Speed Inputs			Calc Speed Adj and	FFS			
Lane Width		ft					
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph		
Number of Lanes, N	3		f <sub>LC</sub>		mph		
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph		
FFS (measured)	70.0	mph	FFS	70.0	mph		
Base free-flow Speed, BFFS		mph			<b>.</b>		
LOS and Performanc	e Measures	3	Design (N)				
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub> 1564	pc/h/ln	Design (N) Design LOS v <sub>n</sub> = (V or DDHV) / (PHF )	x N x f <sub>ыv</sub>			
x f <sub>p</sub> )		•	$x f_p$	110	pc/h/ln		
S D	68.5	mph	s		mph		
$D = v_p / S$	22.8	pc/mi/ln	$D = v_p / S$		pc/mi/ln		
LOS	С		Required Number of Lane	es, N			
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-12 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits	I, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	el I-215 Northbound North of Harley Knox Bl. Caltrans 2035 Without Project w/	
-			<u> </u>	IMPRO	V
Project Description Knox	Logistics Cen				anian Data
✓ Oper.(LOS)		L	Des.(N)	Piai	nning Data
Flow Inputs Volume, V AADT	5899	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments		·		
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 2191	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
S P	58.6	mph	x f <sub>p</sub> )		·
D = v <sub>p</sub> / S	37.4	pc/mi/ln	S		mph
LOS	E		$D = v_p / S$ Required Number of Lane	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 AM Peak Ho	ŕ	Highway/Direction of Trave From/To Jurisdiction Analysis Year	South of Caltrant 2035 W	of Harley Knox Bl. s /ithout Project w/
-			<u> </u>	IMPRO	V
Project Description Knox	Logistics Cert			□ Die	aning Data
✓ Oper.(LOS)		L	Pes.(N)	□Pia	nning Data
Flow Inputs Volume, V AADT	5324	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			·
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> )	N x f <sub>HV</sub> 1968	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
S	63.2	mph	x f <sub>p</sub> )		ролин
D = v <sub>p</sub> / S	31.2	pc/mi/ln	S		mph
LOS	D	ρο/	D = v <sub>p</sub> / S Required Number of Lane	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed	CHS Urban Cross 5/18/2015	roads, Inc.	Highway/Direction of Trave From/To Jurisdiction	el I-215 Southbound North of Harley Knox Bl. Caltrans	
Analysis Time Period	PM Peak Hour		Analysis Year	2035 W IMPRO	/ithout Project w/ V
Project Description Knox	Logistics Cent	ter Phase II Tl	4 <i>(JN 09347)</i>		
☑ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT	5903	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			•
LOS and Performanc	e Measures	 S	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub> 2192	pc/h/ln	Design (N) Design LOS v <sub>n</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	
x f <sub>p</sub> )	50.0		x f <sub>p</sub> )	110	pc/h/ln
S D = v / S	58.6 27.4	mph	s		mph
D = v <sub>p</sub> / S LOS	37.4 E	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LO3	L		Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHE	<b>E</b> T	
General Information			Site Information		
Analyst Agency or Company Date Performed	CHS Urban Crossroads, Inc. 5/18/2015		Highway/Direction of Trav From/To Jurisdiction	South of Caltrans	f Harley Knox Bl. S
Analysis Time Period	PM Peak Hour		Analysis Year	2035 WI IMPRO\	ithout Project w/ /
Project Description Knox	Logistics Cent	er Phase II TI	A (JN 09347)		
✓ Oper.(LOS)			es.(N)	☐ Plar	nning Data
Flow Inputs					
Volume, V AADT	5274	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.976</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			r
LOS and Performanc	e Measures	}	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x I	N x f <sub>HV</sub> 1959	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF >	αN x f <sub>HV</sub>	pc/h/ln
x f <sub>p</sub> ) S	63.3	mph	x f <sub>p</sub> )		релинг
D = v <sub>p</sub> / S	30.9	pc/mi/ln	S		mph
LOS	D	r -	D = v <sub>p</sub> / S Required Number of Lane	es, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	rel I-215 Northbound North of Harley Knox Bl. Caltrans 2035 Without Project w/	
-			<u>-</u>	IMPRO	V
Project Description Knox	Logistics Cent				anian Data
✓ Oper.(LOS)		L	es.(N)	□Pia	nning Data
Flow Inputs Volume, V AADT	5970	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 6	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performanc	e Measures	3	Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 2228	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	$N \times f_{HV}$	pc/h/ln
S	57.7	mph	x f <sub>p</sub> )		pormii
D = v <sub>p</sub> / S	38.6	pc/mi/ln	S		mph
LOS	E	pomini	D = v <sub>p</sub> / S Required Number of Lane	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	<u> </u>	
General Information			Site Information		
Analyst Agency or Company Date Performed	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Highway/Direction of Trave From/To Jurisdiction	el I-215 Northbound South of Harley Knox Bl. Caltrans 2035 Without Project w/	
Analysis Time Period			Analysis Year	IMPRO	
Project Description Knox	Logistics Cent	ter Phase II Tl	4 <i>(JN 09347)</i>		
✓ Oper.(LOS)			Des.(N)	☐ Pla	nning Data
Flow Inputs					
Volume, V AADT	4319	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
fp	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <i>0.976</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph		. •.•	
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV 1604</sub>	pc/h/ln	Design (N) Design LOS v <sub>n</sub> = (V or DDHV) / (PHF x	Νyf	
x f <sub>p</sub> ) S	68.1	mph	$x f_p$	''' A 'HV	pc/h/ln
D = v <sub>p</sub> / S	23.6	pc/mi/ln	S		mph
LOS	С	<b>P</b> • · · · · · · · · ·	D = v <sub>p</sub> / S Required Number of Lane	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

## APPENDIX 8.16:

HORIZON YEAR (2035) WITH PROJECT CONDITIONS BASIC FREEWAY SEGMENT
ANALYSIS WORKSHEETS WITH IMPROVEMENTS



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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	:T	
General Information			Site Information		
Analyst Agency or Company Date Performed	CHS Urban Crossroads, Inc. 5/18/2015		Highway/Direction of Trave From/To Jurisdiction	el I-215 Southbound North of Harley Knox Bl. Caltrans	
Analysis Time Period	AM Peak Hour		Analysis Year	2035 W IMPRO	∕ith Project w/ V
Project Description Knox	Logistics Cent	ter Phase II Tl	A (JN 09347)		
✓ Oper.(LOS)			Des.(N)	☐ Pla	nning Data
Flow Inputs					
Volume, V AADT	6003	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 6	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00 1.5		E <sub>R</sub>	1.5	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		_
Speed Inputs			Calc Speed Adj and	FFS	_
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed,	70.0	mph	FFS	70.0	mph
BFFS		mph			
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub> 2240	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	no/h/ln
x f <sub>p</sub> ) S	57.5	mph	x f <sub>p</sub> )		pc/h/ln
D = v <sub>p</sub> / S	39.0	pc/mi/ln	S		mph
LOS	E	·	$D = v_p / S$ Required Number of Lane	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	el I-215 Southbound South of Harley Knox Bl. Caltrans 2035 With Project w/	
-			•	IMPRO	V
Project Description Knox	Logistics Cent				anian Data
✓ Oper.(LOS)		L	Des.(N)	□Pia	nning Data
Flow Inputs Volume, V AADT	4173	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 7	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.966	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph		. 0.0	
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 1565	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
S	68.5	mph	x f <sub>p</sub> )		ролип
D = v <sub>p</sub> / S	22.9	pc/mi/ln	S		mph
LOS	C	ролили	$D = v_p / S$ Required Number of Lane	s. N	pc/mi/ln
Glossary			Factor Location	,	
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

General Information			Site Information		
Analyst Agency or Company Date Performed	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Jurisdiction Caltrans		f Harley Knox Bl. s
Analysis Time Period			Analysis Year	2035 W IMPRO	′ith Project w/ V
Project Description Knox	Logistics Cent	ter Phase II Tl	A (JN 09347)		
✓ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT	5918	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	<u>FFS</u>	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performanc	e Measures	<u> </u>	Design (N)		
	<u> </u>	,	<del>                                     </del>		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 2198	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
S D = v <sub>p</sub> / S	58.4 37.6	mph pc/mi/ln	x f <sub>p</sub> ) S		mph
LOS	Ε		$D = v_p / S$ Required Number of Lanes	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed			$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

General Information			Site Information		
Analyst Agency or Company Date Performed	CHS Urban Crossroads, Inc. 5/18/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction	el I-215 Northbound South of Harley Knox Bl. Caltrans 2035 With Project w/	
Analysis Time Period			Analysis Year	IMPRO	
Project Description Knox	Logistics Cen		,		
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT	5340	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
fp	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.980	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV 1973</sub>	pc/h/ln	Design (N) Design LOS v <sub>n</sub> = (V or DDHV) / (PHF x	N x f	
x f <sub>p</sub> ) S	63.1	mph	$x f_p$	· · · · · · · · · · · · · · · · · · ·	pc/h/ln
D = v <sub>p</sub> / S	31.3	pc/mi/ln	S		mph
LOS	D	ролили	D = v <sub>p</sub> / S Required Number of Lane	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

CHS				
CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Highway/Direction of Travel <i>I-215 Southb</i> From/To <i>North of Hart</i> Jurisdiction <i>Caltrans</i>		f Harley Knox Bl. s
		Analysis Year	2035 W IMPRO	/ith Project w/ V
Logistics Cent	ter Phase II Tl	A (JN 09347)		
		Des.(N)	☐ Plaı	nning Data
5925	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
	veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
tments				
1.00		E <sub>R</sub>	1.2	
1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.976	
		Calc Speed Adj and	FFS	
	ft			
	ft	$f_{LW}$		mph
3				mph
	ramps/mi	TRD Adjustment		mph
70.0	mph mph	FFS	70.0	mph
e Measures	<u> </u>	Design (N)		
o mododi oc	•	<del>                                     </del>		
N x f <sub>HV</sub> 2200	pc/h/ln	Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
58. <i>4</i>	mph			mnh
37.7	pc/mi/ln			mph pc/mi/ln
E		l '	s, N	ролили
		Factor Location		
S - Spec	ed			f F. J. 9 44 0
-		1 '`		f <sub>LW</sub> - Exhibit 11-8
FFS - Free	e-flow speed	f <sub>p</sub> - Page 11-18		f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
	5925  stments  1.00  1.5  3  70.0  e Measures  N x f <sub>HV</sub> 2200  58.4  37.7  E  S - Spee  D - Dens  FFS - Free	5925 veh/h veh/day  veh/h  timents  1.00 1.5  ft ft ft 3 ramps/mi 70.0 mph mph  e Measures  N x f HV 2200 pc/h/ln 58.4 mph 37.7 pc/mi/ln E  S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow	$ \begin{array}{c} \text{veh/day} & \% \text{Trucks and Buses, P}_T \\ \% \text{RVs, P}_R \\ \text{General Terrain:} \\ \text{Grade} & \& \text{Length} \\ \text{Up/Down } \% \\ \\ \hline                              $	

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ΞT	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Crossroads, Inc. 5/18/2015 PM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	el I-215 Southbound South of Harley Knox Bl. Caltrans 2035 With Project w/	
-			<u>-</u>	IMPRO	V
Project Description Knox	Logistics Cent				and an Data
✓ Oper.(LOS)		LL	es.(N)	□ Plai	nning Data
<b>Flow Inputs</b> Volume, V AADT	5292	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 5	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.976	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			r
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 1965	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
S	63.2	mph	x f <sub>p</sub> )		pormin
D = v <sub>p</sub> / S	31.1	pc/mi/ln	S		mph
LOS	D	po///////	D = v <sub>p</sub> / S Required Number of Lane	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ΞT	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 PM Peak Ho	ŕ	Highway/Direction of Trav From/To Jurisdiction Analysis Year	North of Caltrans 2035 W	f Harley Knox Bl. s ith Project w/
		-		IMPRO	<u>V</u>
Project Description Knox	Logistics Certi				
✓ Oper.(LOS)		L	Des.(N)	Piai	nning Data
Flow Inputs Volume, V AADT	6018	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 6	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			r
LOS and Performanc	e Measures	6	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> )	N x f <sub>HV</sub> 2246	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF >	(Nxf <sub>HV</sub>	pc/h/ln
S	57.3	mph	x f <sub>p</sub> )		ролин
D = v <sub>p</sub> / S	39.2	pc/mi/ln	S		mph
LOS	E	<b>P</b> 6/11	$D = v_p / S$ Required Number of Lane	es, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	CHS Urban Cross 5/18/2015 PM Peak Ho		Highway/Direction of Trave From/To Jurisdiction Analysis Year	South o Caltrans 2035 W	of Harley Knox Bl. s /ith Project w/
		-	<u>-</u>	IMPRO	V
Project Description Knox	Logistics Certi			□ Die	anina Data
✓ Oper.(LOS)		L	es.(N)	□Piai	nning Data
Flow Inputs Volume, V AADT	4320	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.92 6	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performanc	e Measures	3	Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 1612	pc/h/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
S	68.0	mph	x f <sub>p</sub> )		po/
D = v <sub>p</sub> / S	23.7	pc/mi/ln	S		mph
LOS	C	po///iii/iii	D = v <sub>p</sub> / S Required Number of Lane	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

## **APPENDIX 8.17:**

HORIZON YEAR (2035) WITHOUT PROJECT CONDITIONS FREEWAY MERGE/DIVERGE
ANALYSIS WORKSHEETS WITH IMPROVEMENTS



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		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET			
General Info	rmation			Site Infor						
Analyst	CHS		Fr	eeway/Dir of Tr		I-215 S	outhbound			
Agency or Company	/ Urbai	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/2			ırisdiction		Caltrar				
Analysis Time Perio		eak Hour		nalysis Year		2035 V	Vithout Pro	ect w/ IMPROV	'	
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		le v							1	
Upstream Adj F	Ramp	Ramp Numbe	ber of Lanes, N r of Lanes, N	3 1					Downstre Ramp	am Adj
□Yes	On	l '	ane Length, L <sub>A</sub>	·					✓ Yes	<b>☑</b> On
✓ No	Off		ane Length L <sub>D</sub>	195					□No	Off
L <sub>up</sub> =	ft	Freeway Volu	•	5961					L <sub>down</sub> =	1420 ft
_up _		Ramp Volume	11	2177					down	1120 10
V,, = v	/eh/h		-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	387 veh/h
			ow Speed, S <sub>FR</sub>	45.0						
Conversion t	to pc/h Und	der Base	Conditions						_	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	$f_p$	v = V/PHI	$= x f_{HV} x f_{p}$
Freeway	5961	0.92	Level	5	0	0.	976	1.00	6	641
Ramp	2177	0.92	Level	7	0	0.	966	1.00	2	449
UpStream										
DownStream	387	0.92	Level	26	0	0.	885	1.00	4	175
<b>-</b>	•	Merge Areas			- ··	4.	[	Diverge Areas		
Estimation o	f V <sub>12</sub>				Estimat	tion c	of V <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	: V <sub>R</sub> + (V <sub>F</sub> - V	<sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-1	3)
P <sub>FM</sub> =	using	Equation (E	Exhibit 13-6)		P <sub>FD</sub> =		0.	481 using Ed	uation (Ext	nibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		44	167 pc/h		•
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			174 pc/h (Equ	uation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,7$			,,					☐Yes ☑No		,
Is $V_3$ or $V_{av34} > 1.5$								⊒Yes ☑No		
			-16, 13-18, or					oc/h (Equation	n 13-16. 13	3-18. or 13-
If Yes,V <sub>12a</sub> =	13-19)				If Yes,V <sub>12a</sub>		19			
Capacity Che	ecks				Capacit	ty Ch	ecks			
	Actual	С	apacity	LOS F?			Actual	С	apacity	LOS F?
					$V_{F}$		6641	Exhibit 13-	8 7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{FO}$	F-V <sub>R</sub>	4192	Exhibit 13-	8 7200	No
					$V_R$		2449	Exhibit 13-	10 2100	Yes
Flow Enterin	g Merge In	fluence A	rea	•	Flow E	nterin	g Dive	rge Influer	ice Area	•
	Actual	T	Desirable	Violation?			Actual	Max Desira		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	,	1467	Exhibit 13-8	4400:AII	Yes
Level of Serv	ice Detern	nination (	if not F)	•	Level o	f Ser	vice De	terminatio	n (if not	<i>F</i> )
D <sub>R</sub> = 5.475 + 0	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			D <sub>R</sub> = 4	1.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/lr		12	,,			0.9 (pc		12		
LOS = (Exhibit	•						oit 13-2)			
Speed Deteri					Speed			<u> </u>		
_					1 -		xhibit 13-			
M <sub>S</sub> = (Exibit 1	•									
	hibit 13-11)						(Exhibit			
	hibit 13-11)						(Exhibit			
	hibit 13-13)				•		(Exhibit			
pyright © 2014 Unive	rsity of Florida, All	Rights Reserve	ed .		HCS2010 <sup>™</sup>	Versio	n 6.65	G	Senerated: 5/	19/2015 10:41

General In	K/	AMPS AND	KAMP JUN	ICTIONS W	ORKSHE	ET			
				Site Infor					
Analyst Naanay or Comp	CH			reeway/Dir of Tr unction		I-215 Southboo			
Agency or Comp Date Performed	-	ban Crossroads, l 19/2015		urisdiction		Harley Knox O Caltrans	п-катр		
nalysis Time Pe		19/2015 1 Peak Hour		nalysis Year			Project w/ IMPRO	W	
	ion Knox Logisti			inaryolo i cai		2000 Williout i	TOJOCE W/ IIVII TEO	•	
nputs	<u> </u>		(* *** )						
Jpstream Adj Ra	amp		ber of Lanes, N	3				Downstr	eam Adj
	1 -	Ramp Numbe	r of Lanes, N	1				Ramp	-
✓ Yes	On	Acceleration L	ane Length, L <sub>A</sub>	260				□Yes	On
_No ✓	Off		ane Length L <sub>D</sub>					✓ No	Off
		Freeway Volu	me, V <sub>F</sub>	3784				L	
<sub>-up</sub> = 142	20 ft	Ramp Volume	, V <sub>R</sub>	387				L <sub>down</sub> =	ft
/ <sub>u</sub> = 217	77 veh/h	Freeway Free	-Flow Speed, $S_{FF}$	70.0				V <sub>D</sub> =	veh/h
'u	// ven/n	Ramp Free-Fl	ow Speed, S <sub>FR</sub>	45.0				I.D	701111
Conversion	n to pc/h U	nder Base (	Conditions				_		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	fp	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>
Freeway	3784	0.92	Level	5	0	0.976	1.00		4216
Ramp	387	0.92	Level	26	0	0.885	1.00		475
UpStream	2177	0.92	Level	7	0	0.966	1.00		2449
DownStream									
-4:4:	f	Merge Areas			Fatimati		Diverge Areas	i	
Estimation					Estimati	on of v <sub>12</sub>			
	$V_{12} = V_{12}$	/ <sub>F</sub> ( P <sub>FM</sub> )				V <sub>12</sub>	= V <sub>R</sub> + (V <sub>F</sub> - V	/ <sub>B</sub> )P <sub>ED</sub>	
-EQ =	1070.	.71 (Equation	13-6 or 13-7)		L <sub>EQ</sub> =	12	(Equation 1		·13)
P <sub>FM</sub> =	0.585	using Equat	ion (Exhibit 13-6	i)	P <sub>FD</sub> =		using Equat		
/ <sub>12</sub> =	2465	pc/h			V <sub>12</sub> =		pc/h		- /
′ <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	on 13-14 or 13	-	V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	13-14 or 13	-17)
	17)	. EN				. > 2.700 pc/h	? Yes N		,
	2,700 pc/h? ☐ Y						Yes N		
rs v <sub>3</sub> or v <sub>av34</sub> > ° f Yes,V <sub>12a</sub> =	1.5 * V <sub>12</sub> /2	′es	on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equati		13-18, or
	18, c	or 13-19)			ļ		13-19)		
Capacity C				1	Capacity	/ Checks	. 1		1
	Actual		apacity	LOS F?		Actu		apacity	LOS F?
					V <sub>F</sub>		Exhibit 13		
$V_{FO}$	4691	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13		
					$V_R$		Exhibit 1	3-	
low Enter	ring Merge	Influence A	rea		Flow En	terina Div	erge Influe	nce Are	<del></del> a
	Actual	The state of the s	Desirable	Violation?	1011 =111	Actual	Max De		Violation?
	2940	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
$V_{R12}$	ervice Dete	rmination (	if not F)			Service L	Determinati	on (if no	t F)
V <sub>R12</sub> Level of Se							- 0.0086 V <sub>12</sub> -	•	
Level of Se	75 + 0.00734 v <sub>R</sub>	12			1			-	
<b>Level of Se</b> D <sub>R</sub> = 5.47	75 + 0.00734 v <sub>R</sub> · pc/mi/ln)	12			$\nu_R$ - (p	C/III/III)			
$D_{R} = 5.47$ $D_{R} = 26.6 (p$		12				c/mi/ln) xhibit 13-2)			
Level of Se $D_R = 5.47$ $D_R = 26.6 (p$ $D_R = C (Exhause)$	pc/mi/ln) hibit 13-2)	12			LOS = (E	xhibit 13-2)	tion		
Level of Se $D_R = 5.47$ $D_R = 26.6$ (p OS = C (Exh	pc/mi/ln) hibit 13-2) ermination	12			LOS = (E <b>Speed D</b>	xhibit 13-2) etermina	tion		
$\begin{array}{c} \textbf{Level of Se} \\ \textbf{D}_{R} = 5.47 \\ \textbf{O}_{R} = 26.6 \text{ (p OS)} \\ \textbf{OS} = \textbf{C (Ext} \\ \textbf{Speed Deta} \\ \textbf{M}_{S} = 0.371 \\ \end{array}$	pc/mi/ln) hibit 13-2) ermination (Exibit 13-11)				LOS = (E <b>Speed D</b> D <sub>s</sub> = (Ex	etermina xhibit 13-12)			
$\begin{array}{ccc} \textbf{Level of Se} \\ & D_{R} = 5.47 \\ D_{R} = & 26.6 \text{ (p. OS)} \\ \textbf{COS)} & \textbf{C (Exh. Speed Detection} \\ \textbf{M}_{S} = & 0.371 \\ \textbf{E}_{R} = & 59.6 \text{ m} \end{array}$	pc/mi/ln) hibit 13-2) rermination (Exibit 13-11) nph (Exhibit 13-11	1)			LOS = (E <b>Speed D</b> $D_s = (E)$ $S_R = mp$	etermina xhibit 13-12) oh (Exhibit 13-	12)		
$\begin{array}{ccc} \textbf{Level of Se} \\ & D_{R} = 5.47 \\ D_{R} = & 26.6  (posensity of the posensity of$	pc/mi/ln) hibit 13-2) ermination (Exibit 13-11)	1)			$\begin{aligned} & \text{LOS} = & \text{(E)} \\ & \textbf{Speed D} \\ & \text{D}_{\text{S}} = & \text{(E)} \\ & \text{S}_{\text{R}} = & \text{mp} \\ & \text{S}_{0} = & \text{mp} \end{aligned}$	etermina xhibit 13-12)	12) 12)		

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General Infor			RAMP JUNG	Site Infor					
Analyst	CHS	<u> </u>	En	eeway/Dir of Tr		215 Northbound			
Agency or Company		an Crossroads,		nction		arley Knox On-			
Date Performed		/2015		risdiction		altrans			
Analysis Time Period		Peak Hour		alysis Year			ject w/ IMPROV		
Project Description				iaiysis i cai	20	JJJ WILLIOUL FIL	Ject W/ IIVIF NOV		
Inputs	KIIOX LOGISTICS	S Center Friase	TITIA (JIN 09347)						
-		Freeway Nun	nber of Lanes, N	3				L .	
Jpstream Adj Ramp		1						Downstre	am Adj
✓ Yes ☐ On		Ramp Numbe		1				Ramp	
w res □On		Acceleration	Lane Length, L <sub>A</sub>	300				☐Yes	On
☐ No ☑ Off	:	Deceleration	Lane Length L <sub>D</sub>					. ✓ Na	□ O#
		Freeway Volu	ıme, V <sub>r</sub>	4694				✓ No	Off
- <sub>up</sub> = 1395	ft	Ramp Volume		1205				L <sub>down</sub> =	ft
ир	•		11					domi	
/, = 630 ve	eh/h		e-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h
<u> </u>			low Speed, S <sub>FR</sub>	45.0					
Conversion to		der Base	Conditions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_HV$	fp	v = V/PHF	x f <sub>HV</sub> x f,
Freeway	4694	0.92	Level	2	0	0.990	1.00		5153
Freeway		<del>                                     </del>			<del>                                     </del>				
Ramp	1205	0.92	Level	16	0	0.926	1.00		1415
UpStream	630	0.92	Level	17	0	0.922	1.00	<u> </u>	743
DownStream		Mane: A					Discours: A		
F-4:4:4		Merge Areas			Fatima atia		Diverge Areas		
Estimation of	V <sub>12</sub>				Estimatio	n of V <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				\/ <b>=</b>	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	/P	
- <sub>EQ</sub> =	1490.1	5 (Equation	13-6 or 13-7)		L _				0)
_			tion (Exhibit 13-6)		L <sub>EQ</sub> =		(Equation 13-		
2 <sub>FM</sub> =			tion (Exhibit 15-0)		P <sub>FD</sub> =		using Equation	n (Exhibit 1	3-7)
v <sub>12</sub> –	2988		10.1110		V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$	2165 17)	pc/n (Equati	on 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation 1	3-14 or 13-1	17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,	a ZNa				> 2,700 pc/h?	Yes No		
							Yes No		
Is $V_3$ or $V_{av34} > 1.5 *$							pc/h (Equatio	n 13 <sub>-</sub> 16 1	3_18 or
f Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =		3-19)	11 15-10, 1	3-10, 01
Capacity Che		13-19)			Capacity	Chocks	•		
capacity cire	Actual	1 (	Capacity	LOS F?	Capacity	Actual	Car	pacity	LOSF
	Actual	+ `	Зарасну	L001:	\ <u>\</u>	Actual			1001
					V <sub>F</sub>		Exhibit 13-		
$V_{FO}$	6568	Exhibit 13-8		No	$V_{FO} = V_{F} - V_{F}$	V <sub>R</sub>	Exhibit 13-		
-					$V_R$		Exhibit 13	-	
		<u> </u>				<u> </u>	10	<u> </u>	
Flow Entering		_		1010 6	Flow Ente		rge Influen		
	Actual	1	Desirable	Violation?		Actual	Max Desi	rable	Violation
V <sub>R12</sub>	4403	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
Level of Servi	ice Deteri	mination (	if not F)		Level of S	Service De	eterminatio	n (if not	<i>F</i> )
D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> - 0.	00627 L <sub>A</sub>		D <sub>F</sub>	<sub>R</sub> = 4.252 + (	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
O <sub>R</sub> = 37.3 (pc/m			••		L	· /mi/ln)		-	
OS = E (Exhibit	-				1	hibit 13-2)			
					<u> </u>				
Speed Detern	nination				Speed De		on		
	oit 13-11)				$D_s = (Exh$	nibit 13-12)			
$M_{\rm S} = 0.613  (Exit)$	•				S <sub>R</sub> = mph	(Exhibit 13-12	)		
-	Exhibit 13-11)				K				
S <sub>R</sub> = 52.8 mph (	Exhibit 13-11) Exhibit 13-11)				1	·	)		
$S_R = 52.8 \text{ mph } (S_0 = 64.0 \text{ mph } ($	Exhibit 13-11) Exhibit 13-11) Exhibit 13-13)				S <sub>0</sub> = mph	(Exhibit 13-12 (Exhibit 13-13			

		RAMP	S AND RAM	IP JUNCTI	ONS WC	RKS	HEET			
General Infor	mation			Site Infor						
Analyst	CHS		Fr	reeway/Dir of Tr		I-215 N	lorthbound			
Agency or Company	Urbai	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/			urisdiction		Caltrar				
Analysis Time Period		eak Hour		nalysis Year		2035 V	Vithout Pro	ject w/ IMPRO\	/	
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		le								
Upstream Adj R	Ramp	Ramp Numbe	ber of Lanes, N	3 1					Downstre Ramp	eam Adj
□Yes	On	l '	ane Length, L <sub>Δ</sub>	1					✓ Yes	<b>☑</b> On
☑ No	Off		Lane Length L <sub>D</sub>	280						
	_011	Freeway Volu	me, V <sub>F</sub>	5324					□ No	Off
L <sub>up</sub> = f	t	Ramp Volume		630					L <sub>down</sub> =	1395 ft
V,, = v	eh/h	Freeway Free	-Flow Speed, $S_{\rm FF}$	70.0					V <sub>D</sub> =	1205 veh/h
_ v <sub>u</sub>	CII/II	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					1.0	1200 101111
Conversion t	o pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHI	F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	5324	0.92	Level	4	0	0.	980	1.00	5	903
Ramp	630	0.92	Level	17	0	0.	922	1.00		743
UpStream		ļ								
DownStream	1205	0.92	Level	16	0	0.	926	1.00	1	415
Estimation or	f v	Merge Areas			Estimat	tion o	of v	Diverge Areas		
LStillation of					LStillat	1011				
	$V_{12} = V_{F}$							= V <sub>R</sub> + (V <sub>F</sub> - \		
L <sub>EQ</sub> =		ition 13-6 or			L <sub>EQ</sub> =			Equation 13-		
P <sub>FM</sub> =	using	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =		0.	578 using Ed	quation (Ext	nibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		37	727 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		2	176 pc/h (Eq	uation 13-1	14 or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h? 🗌 Yes	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 2,7	'00 pc/h?	☐Yes ☑No	)	
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5	* V <sub>12</sub> /2  \( \text{Yes}	s 🗌 No			Is V <sub>3</sub> or V <sub>a</sub>	<sub>/34</sub> > 1.5	* V <sub>12</sub> /2	☐Yes ☑No	)	
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub>		p	oc/h (Equatio 9)		3-18, or 13-
Capacity Che					Capacit			9)		
, ,	Actual	C	Capacity	LOS F?	1		Actual	C	apacity	LOS F?
					V <sub>F</sub>		5903	Exhibit 13	-8 7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	5160	Exhibit 13	-8 7200	No
					$V_R$		743	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	fluence A	rea		Flow Er	nterin	g Dive	rge Influe	nce Area	
	Actual	Max	Desirable	Violation?			Actual	Max Desira	able	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	(	3727	Exhibit 13-8	4400:AII	No
Level of Serv					Level o	f Ser	vice De	terminatio	on (if not	F)
$D_R = 5.475 + 0.$	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>			$D_R = 4$	1.252 + 0	.0086 V <sub>12</sub> - 0	).009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	1)				$D_R = 3$	3.8 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = D	(Exhil	bit 13-2)			
Speed Deterr	mination				Speed I	Deter	minatio	on		
M <sub>S</sub> = (Exibit 1	3-11)		· · · · · ·		$D_s = 0$	.365 (E	xhibit 13	-12)		
-	nibit 13-11)					9.8 mph	(Exhibit	13-12)		
	nibit 13-11)					2.2 mph	(Exhibit	13-12)		
	nibit 13-13)				S = 6	3.8 mph	(Exhibit	13-13)		
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		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Info	rmation			Site Infor						
Analyst	CHS		F	reeway/Dir of Tr		I-215 S	Southbound			
Agency or Compan	y Urba	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/			urisdiction		Caltrar				
Analysis Time Perio		eak Hour		nalysis Year		2035 V	Vithout Pro	ject w/ IMPROV	1	
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		le v							1	
Upstream Adj	Ramp	1	ber of Lanes, N	3					Downstre	am Adj
	70-	Ramp Numbe	•	1					Ramp	
☐ Yes ☐	On	Acceleration L	ane Length, L <sub>A</sub>						✓ Yes	On
☑ No	Off	Deceleration I	Lane Length L <sub>D</sub>	195					□No	Off
		Freeway Volu	me, V <sub>F</sub>	5903					I III INO	
L <sub>up</sub> =	ft	Ramp Volume	e, V <sub>D</sub>	1534					L <sub>down</sub> =	1420 ft
•			Flow Speed, S <sub>FF</sub>	70.0						
V <sub>u</sub> =	veh/h		low Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	905 veh/h
Conversion	to no/h line		110	+0.0						
	lo peni one			1	1				.,,,,,,,	
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHI	$= x f_{HV} x f_{p}$
Freeway	5903	0.92	Level	5	0	0.	.976	1.00	6	577
Ramp	1534	0.92	Level	16	0	0.	.926	1.00	1	801
UpStream										
DownStream	905	0.92	Level	21	0	0.	.905	1.00	1	087
		Merge Areas			ļ			Diverge Areas		
Estimation o	of v <sub>12</sub>				Estimat	tion c	of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )					V <sub>12</sub> =	· V <sub>R</sub> + (V <sub>F</sub> - V	/ <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-1	3)
P <sub>FM</sub> =		Equation (			P <sub>FD</sub> =			513 using Ed		
V <sub>12</sub> =	pc/h	_4			V <sub>12</sub> =			250 pc/h	1000.01. (27.	
V <sub>3</sub> or V <sub>av34</sub>	•	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			327 pc/h (Eqi	uation 12 1	1 or 12 17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7			-14 01 13-17)							4 01 13-17)
								☐Yes ☑No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5			16 12 19 or					Yes ✓ No		0 10 or 12
If Yes,V <sub>12a</sub> =	13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub>	=		oc/h (Equatio 9)	11 13-10, 13	D-10, UI 13-
Capacity Ch	ecks				Capacit	ty Ch	ecks	•		
	Actual	C	Capacity	LOS F?		_	Actual	С	apacity	LOS F?
					V <sub>F</sub>		6577	Exhibit 13-	-8 7200	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>I</sub>	V <sub>D</sub>	4776	Exhibit 13-	-8 7200	No
FO					V <sub>R</sub>		1801	Exhibit 13-		No
<u> </u>		<i>f</i>								
Flow Enterin	Actual	T	<b>Tea</b> Desirable	Violation?	FIOW EI	_	Actual	rge Influer Max Desira		Violation?
\/	Actual	Exhibit 13-8	Desirable	Violations	\/	$\neg$		Exhibit 13-8	4400:All	1
V <sub>R12</sub>	<u> </u>		** 4 <b></b> \		V <sub>12</sub>		4250			No No
Level of Serv								terminatio		<i>F)</i>
D <sub>R</sub> = 5.475 + 0	• • • • • • • • • • • • • • • • • • • •	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>					.0086 V <sub>12</sub> - 0	0.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/l	n)				$D_R = 3$	9.0 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = E	(Exhil	bit 13-2)			
Speed Deter	mination				Speed I	Deter	minatio	on		
M <sub>S</sub> = (Exibit	13-11)				$D_s = 0$	.460 (E	xhibit 13	-12)		
	hibit 13-11)					7.1 mph	(Exhibit	13-12)		
	hibit 13-11)						` (Exhibit			
	hibit 13-11)				1		(Exhibit			
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		RA	MPS AND	RAMP JUN	ICTIONS W	ORKSHE	ET			
Genera	I Inform				Site Infor					
Analyst Agency or C	Company	CHS Urba	in Crossroads, I		reeway/Dir of Tr unction		-215 Southb			
ate Perfor			/2015		urisdiction		Caltrans	r		
nalysis Tir	me Period	PM F	Peak Hour	А	nalysis Year	,	2035 Withou	ıt Project w/ IMPR	VC	
	cription I	Knox Logistics	Center Phase	II TIA (JN 09347)						
nputs			1							
Jpstream A	dj Ramp		1	per of Lanes, N	3					ream Adj
/\/			Ramp Number	·	1				Ramp	
✓ Yes	On		Acceleration L	ane Length, L <sub>A</sub>	260				□Yes	On
No	✓ Off		Deceleration L	ane Length L <sub>D</sub>					✓ No	Off
			Freeway Volur	ne, V <sub>F</sub>	4369				L	
up =	1420 f	t	Ramp Volume	, V <sub>R</sub>	905				L <sub>down</sub> =	ft
/ =	1534 ve	ah/h	Freeway Free-	Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h
' <sub>u</sub> =	1554 V	311/11	Ramp Free-Flo	ow Speed, S <sub>FR</sub>	45.0				I.D	1011111
onver	sion to	pc/h Un	der Base (	Conditions						
(pc/	h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PI	HF x f <sub>HV</sub> x f <sub>p</sub>
reeway		4369	0.92	Level	1	0	0.995	1.00		4773
Ramp		905	0.92	Level	21	0	0.905	1.00		1087
UpStream		1534	0.92	Level	16	0	0.926	1.00		1801
DownStrea	ım									
	tion of		Merge Areas			Fatimati		Diverge Area	<u>s</u>	
Sumat	tion of					Estimati	on or v <sub>1</sub>	12		
		$V_{12} = V_{F}$	(P <sub>FM</sub> )				V	<sub>12</sub> = V <sub>R</sub> + (V <sub>F</sub> - '	$V_R)P_{FD}$	
EQ =		1320.8	8 (Equation	13-6 or 13-7)		L <sub>EQ</sub> =		(Equation 1	13-12 or 13	-13)
r <sub>FM</sub> =		0.585	using Equat	on (Exhibit 13-6	6)	P <sub>FD</sub> =		using Equa		
′ <sub>12</sub> =		2791	•			V <sub>12</sub> =		pc/h	,	•
or V <sub>av34</sub>			pc/h (Equation	on 13-14 or 13	-	V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equatio	n 13-14 or 13	3-17)
	> 2 700	17) pc/h?	s VNo				, > 2,700 pc	:/h? ☐ Yes ☐ N		,
		V <sub>12</sub> /2						½ □Yes □N		
Yes,V <sub>12a</sub>		2791		on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equa 13-19)		13-18, or
Capacit	ty Chec		10-10)			Capacity	/ Check	s		
ирион	1	Actual	С	apacity	LOS F?		1		Capacity	LOS F?
	i					V <sub>F</sub>		Exhibit 1		
V		E000	F.,k;k;t 12.0		Na	V <sub>FO</sub> = V <sub>F</sub>	- V <sub>D</sub>	Exhibit 1		
V <sub>F</sub>	o	5860	Exhibit 13-8		No		K	Exhibit		
						V <sub>R</sub>		10		
low Er	ntering	Merge In	ifluence A	rea		Flow En	tering D	iverge Influ	ence Are	a
		Actual	1	Desirable	Violation?		Actua		esirable	Violation?
V <sub>R1</sub>		3878	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-		
			nination (i					Determinat	•	ot F)
D <sub>R</sub> =	= 5.475 + (	0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> - 0.0	0627 L <sub>A</sub>		[	$O_{R} = 4.252$	2 + 0.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
<sub>R</sub> = 3	3.6 (pc/mi/	ln)				$D_R = (p_0)$	c/mi/ln)			
OS = D	(Exhibit 1	3-2)				LOS = (E	xhibit 13-2	2)		
Speed I	Determ	ination				Speed D	etermin	ation		
•	.486 (Exib					<b>-</b>	khibit 13-12)			
-	•	Exhibit 13-11)					h (Exhibit 1			
							•	•		
	4.7 mnh /F	-xhihit 13-11\				$\rho_0$ mb	JII (⊏XIIIDIL I	3-12)		
i <sub>0</sub> = 6		Exhibit 13-11) Exhibit 13-13)				I * '	oh (Exhibit 1 oh (Exhibit 1	•		

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Agency or Company   Lithan Crossrosis, Inc.   Junction   Harley Knox On-Ramp		RA	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET			
Agency or Company   Lithan Crossrosis, Inc.   Junction   Harley Knox On-Ramp	General Info									
Description	Analyst Agency or Company				•					
Processor   Pro			-				-			
	Analysis Time Perio	d PM F	Peak Hour	A	nalysis Year	2	2035 Without F	Project w/ IMPRC	V	
Downstream Adj   Ramp		Knox Logistics	Center Phase	II TIA (JN 09347)						
Ramp Number of Lanes, N   Acceleration Lane Length, L <sub>A</sub>   300	nputs		T-							
Yes	Jpstream Adj Ramp	)								eam Adj
No	✓ Yes □ O	n	1 '	•	•				1 '	
Freeway Volume, V <sub>F</sub>   3718	No ZO	ff		- ^	000					
Conversion to pc/h Under Base Conditions   Conversion to pc/h Under Base Condition   Conversion to pc/h Under Base Convers		11	Freeway Volur	ne, V <sub>F</sub>	3718				I № No	<u></u> ∪ O <del>11</del>
Conversion to pc/h Under Base Conditions   V	<sub>rup</sub> = 1395	ft	Ramp Volume	, V <sub>R</sub>	2252				L <sub>down</sub> =	ft
Samp Free-Flow Speed, S <sub>FR</sub>   45.0   Volume   Samp   Volume					70.0					le /le
Conversion to pc/h Under Base Conditions	$v_{\rm u} = 601 \text{ v}$	eh/h							v <sub>D</sub> =	ven/n
(pc/h)	Conversion t	to pc/h Un		111						
Series   S		V			%Truck	%Rv	f <sub>HV</sub>	fp	v = V/Pł	HF x f <sub>HV</sub> x f <sub>p</sub>
Ramp	 Freeway		0.92	Level	5	0	+	· ·		4142
Description			+ +		<del> </del>				1	
DownStream   Merge Areas   Diverge Areas   Diverge Areas	•	1	+			0				
Estimation of $v_{12}$   V <sub>12</sub> = V <sub>F</sub> (P <sub>FM</sub> )   V <sub>12</sub> = V <sub>F</sub> (P <sub>FM</sub> )	DownStream									
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			Merge Areas					Diverge Areas	3	
Comparison   Com	Estimation o	f v <sub>12</sub>				Estimation	on of v <sub>12</sub>			
Equation 13-6 or 13-7		V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )				V	= \/ + (\/ - \	/ \P	
Pro	. <sub>EQ</sub> =	1513.0	5 (Equation	13-6 or 13-7)		_	<b>v</b> 12			13)
12					)	1				
1746   pc/h (Equation 13-14 or 13-17)   pc/h (Equation 13-14 or 13-18)   pc/h (Equation 13-16, 13-18)   pc/h (Equation 13-									IIOII (EXIIIDIL	13-1)
17				on 13-14 or 13-		1			- 40 44 40	1.47\
		17)					> 0.700/b			3-17)
Yes, V <sub>12a</sub> =   2396 pc/h (Equation 13-16, 13-18, or 13-19)							•			
Yes, V <sub>12a</sub> =   13-19   13-1	$V_3 \text{ or } V_{av34} > 1.5$									10 10 00
Capacity Checks	Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =			1011 13-16,	13-18, 01
Actual Capacity LOS F? Actual Capacity LOS F? Exhibit 13-8 $V_F$ Exhibit 13-9 $V_F$ Exhibit 13-8 $V_F$ Exhibit 13-9 $V_F$ Exhibit 13-9 $V_F$ Exhibit 13-10 $V_F$ Exhibit 13-1			13-19)			Canacity	Chacks	•		
$V_{FO} = \begin{cases} V_{F} & \text{Exhibit } 13-8 \\ V_{R} & \text{Exhibit } 13-12 \\ V_{R} $	supacity one	1		anacity	LOS F2		1	ıal (	`anacity	LOS F?
$ V_{FO} = V_F - V_R                                  $		7 totaai	<del>†                                     </del>	араону	2001:	V <sub>E</sub>	71010			
Flow Entering Merge Influence Area  Actual Max Desirable Violation? $V_{R12}$ 4929 Exhibit 13-8 4600:All Yes $V_{12}$ Exhibit 13-8  Level of Service Determination (if not F) $D_R = 5.475 + 0.00734  v_R + 0.0078  V_{12} - 0.00627  L_A$ $D_R = 40.9  (pc/mi/ln)$ $D_R = 40.9  (pc/mi/ln)$ $D_R = 0.833  (Exhibit 13-11)$ $D_R = 46.7  mph  (Exhibit 13-11)$ $D_R = 65.5  mph  (Exhibit 13-11)$ $D_R = 50.5  mph  (Exhibit 13-13)$ $D_R = 0.50.5  mph  (Exhibit 13-13)$	1/	0075	E 1 11 11 40 0				. V_			
Flow Entering Merge Influence Area	v <sub>FO</sub>	6675	Exhibit 13-8		No		*R			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$						$V_R$				
$V_{R12}$ 4929         Exhibit 13-8         4600:All         Yes $V_{12}$ Exhibit 13-8           Level of Service Determination (if not F)         Level of Service Determination (if not F) $D_R = 5.475 + 0.00734 \text{ V}_R + 0.0078 \text{ V}_{12} - 0.00627 \text{ L}_A$ $D_R = 4.252 + 0.0086 \text{ V}_{12} - 0.009 \text{ L}_D$ $D_R = 40.9 \text{ (pc/mi/ln)}$ $D_R = (\text{pc/mi/ln})$ $OS = E \text{ (Exhibit 13-2)}$ $OS = (\text{Exhibit 13-2})$ Speed Determination $OS = (\text{Exhibit 13-12})$ $OS = (\text{Exhibit 13-11})$ $OS = (\text{Exhibit 13-12})$ $OS = (\text{Exhibit 13-11})$ $OS = (\text{Exhibit 13-12})$ $OS = (\text{Exhibit 13-13})$ $OS = (\text{Exhibit 13-13})$	low Enterin	g Merge Ir	nfluence A	rea		Flow Ent	tering Div	erge Influe	ence Are	а
$\begin{array}{llllllllllllllllllllllllllllllllllll$		Actual	1	Desirable	Violation?		Actual	Max De	esirable	Violation?
Level of Service Determination (if not F)         Level of Service Determination (if not F) $D_R = 5.475 + 0.00734  v_R + 0.0078  V_{12} - 0.00627  L_A$ $D_R = 4.252 + 0.0086  V_{12} - 0.009  L_D$ $D_R = 40.9  (\text{pc/mi/ln})$ $D_R = (\text{pc/mi/ln})$ $LOS = E  (\text{Exhibit 13-2})$ $LOS = (\text{Exhibit 13-2})$ Speed Determination         Speed Determination $M_S = 0.833  (\text{Exibit 13-11})$ $D_S = (\text{Exhibit 13-12})$ $S_R = 46.7  \text{mph}  (\text{Exhibit 13-11})$ $S_R = \text{mph}  (\text{Exhibit 13-12})$ $S_0 = 65.5  \text{mph}  (\text{Exhibit 13-13})$ $S_0 = \text{mph}  (\text{Exhibit 13-13})$	V <sub>R12</sub>	4929	Exhibit 13-8	4600:All	Yes	V <sub>12</sub>		Exhibit 13-8	<u> </u>	<u> </u>
$\begin{array}{llllllllllllllllllllllllllllllllllll$		rice Deterr	nination (i	f not F)		Level of	Service L	Determinati	ion (if no	ot F)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	$D_R = 5.475 +$	+ 0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> - 0.0	0627 L <sub>A</sub>			<sub>R</sub> = 4.252 +	- 0.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	$O_{R} = 40.9  (pc/n)$	ni/ln)				$D_R = (pc$	c/mi/ln)			
Speed DeterminationSpeed Determination $M_{\rm S} = 0.833$ (Exibit 13-11) $D_{\rm S} = (Exhibit 13-12)$ $S_{\rm R} = 46.7$ mph (Exhibit 13-11) $S_{\rm R} = mph$ (Exhibit 13-12) $S_{\rm O} = 65.5$ mph (Exhibit 13-11) $S_{\rm O} = mph$ (Exhibit 13-12) $S_{\rm C} = 50.5$ mph (Exhibit 13-13) $S_{\rm C} = mph$ (Exhibit 13-13)		13-2)				1	xhibit 13-2)			
$M_{\rm S} = 0.833  ({\rm Exhibit}  13-11)$ $D_{\rm S} = ({\rm Exhibit}  13-12)$ $S_{\rm R} = 46.7  {\rm mph}  ({\rm Exhibit}  13-11)$ $S_{\rm R} = {\rm mph}  ({\rm Exhibit}  13-12)$ $S_{\rm O} = 65.5  {\rm mph}  ({\rm Exhibit}  13-11)$ $S_{\rm C} = 50.5  {\rm mph}  ({\rm Exhibit}  13-13)$ $S_{\rm C} = {\rm mph}  ({\rm Exhibit}  13-13)$						Speed D	etermina	tion		
$S_R$ = 46.7 mph (Exhibit 13-11) $S_R$ = mph (Exhibit 13-12) $S_0$ = 65.5 mph (Exhibit 13-11) $S_0$ = mph (Exhibit 13-12) $S_0$ = mph (Exhibit 13-13) $S_0$ = mph (Exhibit 13-13)	•					<del>  '                                   </del>				
$S_0$ = 65.5 mph (Exhibit 13-11) $S_0$ = mph (Exhibit 13-12) $S_0$ = mph (Exhibit 13-13) $S_0$ = mph (Exhibit 13-13)	-	•				1	•	12)		
S = 50.5 mph (Exhibit 13-13) S = mph (Exhibit 13-13)	**					1	•	•		
	•	,				1 '				
yright © 2014 University of Florida, All Rights Reserved HCS2010 <sup>TM</sup> Version 6.65 Generated: 5/19/2015	'	<u> </u>	I Diabta D				-	10)	0	E/40/0045 12

		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET			
General Info	rmation			Site Infor						
Analyst	CHS		Fı	reeway/Dir of Tr	avel	I-215 N	lorthbound			
Agency or Company	<i>l</i> Urbai	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp		
Date Performed	5/19/			urisdiction		Caltrar				
Analysis Time Perio		eak Hour		nalysis Year		2035 V	Vithout Pro	ject w/ IMPRO\	/	
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		F	han af Lanaa Ni						I	
Upstream Adj F	Ramp	1	ber of Lanes, N	3					Downstre	am Adj
☐ Yes [	On	Ramp Numbe	•	1					Ramp	
	_  011		ane Length, L <sub>A</sub>						✓ Yes	✓ On
☑ No □	Off	Deceleration I	Lane Length L <sub>D</sub>	280					□No	Off
		Freeway Volu	me, V <sub>F</sub>	4319						
L <sub>up</sub> =	ft	Ramp Volume	e, V <sub>R</sub>	601					L <sub>down</sub> =	1395 ft
.,		Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	2252 vob/k
V <sub>u</sub> = v	reh/h	Ramp Free-Fl	low Speed, S <sub>FR</sub>	45.0					v <sub>D</sub> –	2252 veh/h
Conversion t	o pc/h Und		110							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f	f	v – V/DHI	x f <sub>HV</sub> x f <sub>D</sub>
(pc/11)	(Veh/hr)	FIII	Terrain	/0 TTUCK			f <sub>HV</sub>	f <sub>p</sub>		·
Freeway	4319	0.92	Level	5	0	0.	976	1.00	4	812
Ramp	601	0.92	Level	11	0	0.	948	1.00	(	889
UpStream									<u> </u>	
DownStream	2252	0.92	Level	7	0	0.	966	1.00	2	533
Estimation o	fv	Merge Areas			Estima	tion c	of v	Diverge Areas		
LStillation o					LStilla	iioii c				
	$V_{12} = V_{F}$							= V <sub>R</sub> + (V <sub>F</sub> - \		
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-1	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	608 using Ed	quation (Ext	nibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		3	196 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		16	616 pc/h (Eq	uation 13-1	4 or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h? 🗌 Yes	s 🗌 No					00 pc/h?	☐Yes ☑No	)	
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5								Yes <b></b> No		
If Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub>			c/h (Equatio		3-18, or 13-
	13-19)							9)		
Capacity Che	1				Capaci	ty Ch				
	Actual	C	Capacity	LOS F?	<u> </u>		Actual		apacity	LOS F?
					V <sub>F</sub>		4812	Exhibit 13	-8 7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{I}$	F-V <sub>R</sub>	4123	Exhibit 13	-8 7200	No
					$V_R$		689	Exhibit 13-	10 2100	No
Flow Enterin	g Merge In	fluence A	rea	•	Flow E	nterin	g Dive	rge Influe	nce Area	
	Actual	T-	Desirable	Violation?		_	Actual	Max Desira		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		3196	Exhibit 13-8	4400:All	No
Level of Serv	rice Detern	nination (	if not F)	I.		f Ser	vice De	termination	n (if not	F)
D <sub>R</sub> = 5.475 + 0								.0086 V <sub>12</sub> - 0		
D <sub>R</sub> = (pc/mi/lr	• •	12	A		D <sub>R</sub> = 2	9.2 (pc		12	D	
LOS = (Exhibit	•						bit 13-2)			
Speed Deteri					Speed			<u> </u>		
_					<del> </del>					
M <sub>S</sub> = (Exibit 1	*						xhibit 13			
	nibit 13-11)						(Exhibit			
	nibit 13-11)						(Exhibit			
S = mph (Exi	nibit 13-13)				S = 6	4.1 mph	(Exhibit	13-13)		
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## **APPENDIX 8.18:**

HORIZON YEAR (2035) WITH PROJECT CONDITIONS FREEWAY MERGE/DIVERGE
ANALYSIS WORKSHEETS WITH IMPROVEMENTS



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		RAMP	S AND RAM	IP JUNCTI	ONS WC	RKS	HEET			
General Info	rmation	umi		Site Infor						
Analyst	CHS		Fi	reeway/Dir of Ti		I-215 S	outhbound			
Agency or Compan	ıy Urba	n Crossroads,	Inc. Ju	unction		Harley I	Knox Off-F	amp		
Date Performed	5/19/	2015	Ju	urisdiction		Caltran	3			
Analysis Time Peri		Peak Hour		nalysis Year		2035 W	ith Project	w/ IMPROV		
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs										
Upstream Adj	Ramp	1	ber of Lanes, N	3					Downstrea	m Adj
Yes	On	Ramp Numbe	•	1					Ramp	
	_		ane Length, L <sub>A</sub> ane Length L <sub>D</sub>	105					✓ Yes	<b>☑</b> On
✓ No	Off	Freeway Volu		195 6003					□No	Off
L <sub>up</sub> =	ft	Ramp Volume		2226					L <sub>down</sub> =	1420 ft
up 			·, •R -Flow Speed, S <sub>FF</sub>	70.0						
V <sub>u</sub> =	veh/h		ow Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	396 veh/h
Conversion	to pc/h Uni		111							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f HV	fp	v = V/PHF	x f x f
	(Veh/hr) 6003	0.92	Level	6	0	_	971	1.00	672	
Freeway Ramp	2226	0.92	Level	8	0	_	962	1.00	251	
UpStream	2220	0.52	LOVOI		<u> </u>	0.0	702	1.00	20	10
DownStream	396	0.92	Level	25	0	0.8	389	1.00	48	4
		Merge Areas				•		iverge Areas		
Estimation o	of v <sub>12</sub>				Estimat	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	P <sub>ED</sub>	
L <sub>EQ</sub> =		ation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-1		
P <sub>FM</sub> =		Equation (E			P <sub>FD</sub> =			476 using Eqi		
V <sub>12</sub> =	pc/h	1 (	,		V <sub>12</sub> =			19 pc/h	(	,
V <sub>3</sub> or V <sub>av34</sub>	•	Faustion 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			02 pc/h (Equ	ation 13 <sub>-</sub> 1/	or 13 <sub>-</sub> 17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7		-	-14-01-13-17)			> 271		.oz pc/ir(∟qu ]Yes ☑No	allon 15-14	01 13-17)
Is $V_3$ or $V_{av34} > 2.7$					۵	• .		Yes ✓ No		
			-16, 13-18, or			-		⊒ Yes ເ⊻∷No c/h (Equation	13-16 13-	18 or 13-
If Yes,V <sub>12a</sub> =	13-19)		10, 10 10, 01		If Yes,V <sub>12a</sub> =	=	19		10 10, 10	10, 01 10
Capacity Ch	ecks				Capacit	y Che	ecks			
	Actual	C	apacity	LOS F?			Actual	Са	pacity	LOS F?
					$V_{F}$		6721	Exhibit 13-8	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	4205	Exhibit 13-8	7200	No
					$V_R$		2516	Exhibit 13-1	0 2100	Yes
Flow Enterin	ng Merge In	fluence A	rea	•	Flow Er	nterin	g Dive	ge Influen	ce Area	
	Actual		Desirable	Violation?		_	ctual	Max Desirat		Violation?
		Exhibit 13-8			V <sub>12</sub>	4	519	Exhibit 13-8	4400:All	Yes
V <sub>R12</sub>					I evel o	f Serv	ice De	terminatio	n (if not F	7)
	vice Detern	nination (	if not F)							
							.252 + 0	.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
<b>Level of Ser</b> D <sub>R</sub> = 5.475 + 0	0.00734 v <sub>R</sub> +							.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
Level of Ser $D_R = 5.475 + 0$ $D_R = (pc/mi/l)$	0.00734 v <sub>R</sub> + ln)				D <sub>R</sub> = 4	D <sub>R</sub> = 4 1.4 (pc/		.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
Level of Ser $D_{R} = 5.475 + 0$ $D_{R} = (pc/mi/l)$	0.00734 v <sub>R</sub> + ln) t 13-2)				D <sub>R</sub> = 4	D <sub>R</sub> = 4 1.4 (pc/ (Exhib	mi/ln) it 13-2)		009 L <sub>D</sub>	
Level of Ser $D_{R} = 5.475 + 0$ $D_{R} = (pc/mi/l)$ $LOS = (Exhibit)$ Speed Deter	0.00734 v <sub>R</sub> + ln) t 13-2) rmination				D <sub>R</sub> = 4 LOS = F <b>Speed L</b>	D <sub>R</sub> = 4 1.4 (pc/ (Exhib <b>Deter</b> i	mi/ln) it 13-2)	on	009 L <sub>D</sub>	
Level of Ser $D_{R} = 5.475 + ($ $D_{R} = (pc/mi/l)$ $LOS = (Exhibit)$ Speed Deter $M_{S} = (Exibit)$	0.00734 v <sub>R</sub> + in) t 13-2) rmination 13-11)				D <sub>R</sub> = 4 LOS = F <b>Speed L</b> D <sub>s</sub> = 0	D <sub>R</sub> = 4 1.4 (pc/ (Exhib <b>Deteri</b> .524 (Ex	mi/ln) it 13-2) <b>minatic</b>	o <b>n</b>	009 L <sub>D</sub>	
Level of Ser $D_{R} = 5.475 + ($ $D_{R} = (pc/mi/l)$ $LOS = (Exhibit)$ Speed Deter $M_{S} = (Exibit)$ $S_{R} = mph (Exhibit)$	0.00734 v <sub>R</sub> + in) t 13-2) rmination 13-11) khibit 13-11)				$D_R = 4$ $LOS = F$ $Speed L$ $D_S = 0$ $S_R = 5$	D <sub>R</sub> = 4 1.4 (pc/ (Exhib <b>Deteri</b> .524 (Ex	mi/ln) it 13-2) <b>minatic</b> khibit 13-	12) 13-12)	009 L <sub>D</sub>	
$\begin{array}{lll} \textbf{Level of Ser} \\ \textbf{D}_{R} = 5.475 + 0 \\ \textbf{D}_{R} = & (\text{pc/mi/l} \\ \textbf{LOS} = & (\text{Exhibit}) \\ \textbf{Speed Deter} \\ \textbf{M}_{S} = & (\text{Exibit} \\ \textbf{S}_{R} = & \text{mph (Ex} \\ \textbf{S}_{0} = & \text{mph (Ex)} \\ \textbf{S}_{0} = $	0.00734 v <sub>R</sub> + in) t 13-2) rmination 13-11)				D <sub>R</sub> = 4 LOS = F <b>Speed L</b> D <sub>s</sub> = 0. S <sub>R</sub> = 5.5 S <sub>0</sub> = 7.5	D <sub>R</sub> = 4 1.4 (pc/ (Exhib Deteri .524 (Ex 5.3 mph 2.1 mph	mi/ln) it 13-2) minatic chibit 13- (Exhibit	12) 13-12) 13-12)	009 L <sub>D</sub>	

	RA	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET			
General Info				Site Infor					
Analyst Agency or Compan Date Performed	CHS y Urba	n Crossroads, /2015	Inc. Ju	eeway/Dir of Tr nction risdiction	avel I	I-215 Southbo Harley Knox ( Caltrans			
Analysis Time Perio		Peak Hour		nalysis Year			oject w/ IMPROV		
Project Description				,			9,000 117 11111 110 1		
Inputs			,						
Jpstream Adj Ram	р	Freeway Num Ramp Numbe	nber of Lanes, N	3				Downstro Ramp	eam Adj
✓ Yes □ O	n	I '	ane Length, L <sub>A</sub>	260				Yes	On
□ No ☑ O	)ff	Deceleration   Freeway Volu	Lane Length L <sub>D</sub>	3777				☑ No	Off
- <sub>up</sub> = 1420	ft	Ramp Volume		396				L <sub>down</sub> =	ft
ир		1	e-Flow Speed, S <sub>FF</sub>	70.0				1	
$v_{\rm u} = 2226$	veh/h	1	low Speed, S <sub>FR</sub>	70.0 45.0				V <sub>D</sub> =	veh/h
2	4/	<u> </u>	111	45.0					
Conversion	to pc/n Und		Conditions		1		<u> </u>		
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	$F x f_{HV} x f_{p}$
Freeway	3777	0.92	Level	5	0	0.976	1.00		4208
Ramp	396	0.92	Level	25	0	0.889	1.00		484
UpStream	2226	0.92	Level	8	0	0.962	1.00		2516
DownStream									
		Merge Areas			Fatimati		Diverge Areas	<u> </u>	
Estimation o					Estimati	on or v <sub>12</sub>	2		
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>1</sub> ,	= V <sub>R</sub> + (V <sub>F</sub> - \	/ <sub>P</sub> )P <sub>ED</sub>	
- <sub>EQ</sub> =	1070.93	3 (Equation	13-6 or 13-7)		L <sub>EQ</sub> =	12	(Equation 1		13)
P <sub>FM</sub> =	0.585	using Equa	tion (Exhibit 13-6)		P <sub>FD</sub> =		using Equat		
/ <sub>12</sub> =	2461	pc/h			V <sub>12</sub> =		pc/h		,
′ <sub>3</sub> or V <sub>av34</sub>		pc/h (Equati	on 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	n 13 <sub>-</sub> 14 or 13.	.17)
	17)					> 2 700 nc/l	h? ☐ Yes ☐ N		11)
Is $V_3$ or $V_{av34} > 2.7$							<sup>11</sup> □ res □ N <sup>2</sup> □ Yes □ N		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5							pc/h (Equat		13-18 or
f Yes,V <sub>12a</sub> =		pc/h (Equati 13-19)	on 13-16, 13-		If Yes,V <sub>12a</sub> =		13-19)	1011 10-10,	10-10, 01
Capacity Ch		13-19)			Capacity	, Checks	<u> </u>		
supuoity on	Actual		Capacity	LOS F?		Act		Capacity	LOS F?
	7.10.00.		- upudity		V <sub>F</sub>	7.00	Exhibit 1		
	4000	E 1 11 11 40 0		l	V <sub>FO</sub> = V <sub>F</sub>	- V_	Exhibit 1	_	
$V_{FO}$	4692	Exhibit 13-8		No		*R	Exhibit 1		+
					$V_R$		10		
Flow Enterin	g Merge In	fluence A	\rea		Flow En	tering Di	verge Influe	ence Area	<del></del>
	Actual		Desirable	Violation?		Actual	Max De	esirable	Violation?
$V_{R12}$	2945	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8	3	
Level of Serv	vice Detern	nination (	if not F)			Service	Determinati	ion (if no	t F)
D <sub>R</sub> = 5.475	+ 0.00734 v <sub>R</sub> + 0	0.0078 V <sub>12</sub> - 0.	00627 L <sub>A</sub>			O <sub>R</sub> = 4.252	+ 0.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
) <sub>R</sub> = 26.6 (pc/	mi/ln)				1	c/mi/ln)		_	
OS = C (Exhibi	*				1	xhibit 13-2	)		
Speed Deter					Speed D				
•					<b>-</b>	xhibit 13-12)	4.11011		
•	xibit 13-11)					oh (Exhibit 13	_12\		
	n (Exhibit 13-11)				1	•	•		
	(Exhibit 13-11)				I * '	oh (Exhibit 13	•		
							-13)		
S = 61.7 mph pyright © 2014 Unive	rsity of Florida, All	Rights Reserve	d			oh (Exhibit 13- Version 6.65	-13)	Generated:	5/19/2015

	KAI	MIPS AND	RAMP JUNG	SHONS W	OKKOHE	ET.					
General Infor				Site Infor							
Analyst Agency or Company Date Performed Analysis Time Period	5/19/	n Crossroads,	Inc. Ju Ju	eeway/Dir of Tr nction risdiction alysis Year	H (	I-215 Northbound Harley Knox On-Ramp Caltrans 2035 With Project w/ IMPROV					
Project Description				,							
Inputs			,								
Upstream Adj Ramp		Freeway Num Ramp Numbe	ber of Lanes, N	3				Downstrea Ramp	am Adj		
✓ Yes   ☐ On	ı	· '	ane Length, L <sub>A</sub>	300				Yes	On		
□ No ☑ Off	F	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	4691				✓No	Off		
- <sub>up</sub> = 1395 :	ft	Ramp Volume	•	1227				L <sub>down</sub> =	ft		
ир 1000		1	-Flow Speed, S <sub>FF</sub>	70.0							
$V_{\rm u} = 649 \text{ ve}$	eh/h	1	low Speed, S <sub>FR</sub>	70.0 45.0				V <sub>D</sub> =	veh/h		
Conversion to	o ne/h Un		110	43.0							
	<i>ο ρεπι οπ</i>										
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x t <sub>HV</sub> x t <sub>p</sub>		
Freeway	4691	0.92	Level	2	0	0.990	1.00		150		
Ramp	1227	0.92	Level	16	0	0.926	1.00		440		
UpStream	649	0.92	Level	17	0	0.922	1.00	1	765		
DownStream	<u> </u>	Merge Areas					Diverge Areas				
Estimation of		morgo / mode			Estimation of v <sub>12</sub>						
	V <sub>12</sub> = V <sub>F</sub>	(P)									
_ =			13-6 or 13-7)			V <sub>12</sub>	= V <sub>R</sub> + (V <sub>F</sub> - V				
- <sub>EQ</sub> = P =					L <sub>EQ</sub> = (Equation 13-12 or 13-13)						
P <sub>FM</sub> = / =			tion (Exhibit 13-6)		P <sub>FD</sub> = using Equation (Exhibit 13-7)						
/ <sub>12</sub> =	2984   2166	•	on 13-14 or 13-		V <sub>12</sub> =		pc/h				
$V_3$ or $V_{av34}$	17)	porii (Equati	011 10-14 01 10-		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation		7)		
Is $V_3$ or $V_{av34} > 2,70$						•	Yes No				
Is $V_3$ or $V_{av34} > 1.5 *$	V <sub>12</sub> /2 <b>✓</b> Ye	s 🗌 No			1		☐ Yes ☐ No				
f Yes,V <sub>12a</sub> =		pc/h (Equati 13-19)	on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equati 13-19)	on 13-16, 1	3-18, or		
Capacity Che	cks				Capacity	Checks					
	Actual		Capacity	LOS F?		Actu		apacity	LOS F?		
					$V_{F}$		Exhibit 13	3-8			
1.7	6590	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13	3-8			
$V_{FO}$		1 1					Exhibit 1	3-			
$V_{FO}$					V <sub>R</sub>			·			
	y Morgo In	fluores	lroa		V <sub>R</sub>	toring Div	10				
		1		Violation?		1 -	erge Influe	nce Area	Violation?		
Flow Entering	Actual	Max	Desirable	Violation?	Flow Ent	tering Div	rerge Influe Max De	nce Area	Violation?		
Flow Entering V <sub>R12</sub>	Actual 4424	Max Exhibit 13-8	Desirable 4600:All	Violation?	Flow Ent	Actual	10 Terge Influe Max De Exhibit 13-8	nce Area			
Flow Entering  V <sub>R12</sub> Level of Servi	Actual 4424 ice Detern	Max Exhibit 13-8	Desirable 4600:All if not F)		Flow Ent	Actual Service D	erge Influe Max De Exhibit 13-8	esirable on (if not			
V <sub>R12</sub> Level of Serv	Actual 4424 <i>ice Detern</i> 0.00734 v <sub>R</sub> + (	Max Exhibit 13-8	Desirable 4600:All if not F)		Flow Ent	Actual  Service D  R = 4.252 +	10 Terge Influe Max De Exhibit 13-8	esirable on (if not			
Flow Entering $V_{R12}$ Level of Serve $D_{R} = 5.475 + D_{R} = 37.4 \text{ (pc/m)}$	Actual 4424 <b>ice Detern</b> 0.00734 v <sub>R</sub> + 0 ii/ln)	Max Exhibit 13-8	Desirable 4600:All if not F)		Flow Ent	Actual  Service E  O <sub>R</sub> = 4.252 + c/mi/ln)	erge Influe Max De Exhibit 13-8	esirable on (if not			
Flow Entering $V_{R12}$ Level of Serv. $D_{R} = 5.475 + D_{R} = 37.4 \text{ (pc/m}$ $OS = E \text{ (Exhibit)}$	Actual 4424 <i>ice Detern</i> 0.00734 v <sub>R</sub> + 0 ii/ln) 13-2)	Max Exhibit 13-8	Desirable 4600:All if not F)		V <sub>12</sub> Level of  D <sub>R</sub> = (po	Actual  Service E  O <sub>R</sub> = 4.252 +  c/mi/ln)  xhibit 13-2)	merge Influe Max De Exhibit 13-8 Determinati 0.0086 V <sub>12</sub> -	esirable on (if not			
Flow Entering $V_{R12}$ Level of Serve $D_R = 5.475 + D_R = 37.4 \text{ (pc/m}$ $D_R = 5.475 + D_R = 37.4 \text{ (pc/m}$ $D_R = 5.475 + D_R = 37.4 \text{ (pc/m}$	Actual 4424  ice Detern 0.00734 v <sub>R</sub> + 0 ii/ln) 13-2) mination	Max Exhibit 13-8	Desirable 4600:All if not F)		Flow Ent	Actual  Service L  O <sub>R</sub> = 4.252 +  c/mi/ln)  xhibit 13-2)  eterminat	merge Influe Max De Exhibit 13-8 Determinati 0.0086 V <sub>12</sub> -	esirable on (if not			
Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $D_R = 37.4 \text{ (pc/m}$ $D_R = 6.475 + 0$ $D_R = 37.4 \text{ (pc/m}$ $D_R = 6.475 + 0$	Actual 4424  ice Detern 0.00734 v <sub>R</sub> + 0 ii/ln) 13-2) inination bit 13-11)	Max Exhibit 13-8	Desirable 4600:All if not F)		V <sub>12</sub>   Level of   D <sub>R</sub> = (po   LOS = (E: Speed D   D <sub>S</sub> = (Ex	Actual  Service E  O <sub>R</sub> = 4.252 + c/mi/ln)  xhibit 13-2)  eterminate  chibit 13-12)	merge Influe Max De Exhibit 13-8 Determination 0.0086 V <sub>12</sub> -	esirable on (if not			
Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $OS = E \text{ (Exhibit)}$ Speed Detern $M_S = 0.619 \text{ (Exit)}$ $S_R = 52.7 \text{ mph (}$	Actual 4424  ice Detern 0.00734 v <sub>R</sub> + 0 id/ln) 13-2) mination bit 13-11) (Exhibit 13-11)	Max Exhibit 13-8	Desirable 4600:All if not F)		Flow Ent	Actual  Service E  O <sub>R</sub> = 4.252 +  c/mi/ln)  xhibit 13-2)  eterminate  chibit 13-12)  sh (Exhibit 13-1	max De Exhibit 13-8  Determination  0.0086 V <sub>12</sub> - 1	esirable on (if not			
Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + D_R = 37.4 \text{ (pc/m}$ $OS = E \text{ (Exhibit)}$ Speed Detern $M_S = 0.619 \text{ (Exit)}$ $S_R = 52.7 \text{ mph} \text{ (}$ $S_0 = 64.0 \text{ mph} \text{ (}$	Actual 4424  ice Detern 0.00734 v <sub>R</sub> + 0 ii/ln) 13-2) inination bit 13-11)	Max Exhibit 13-8	Desirable 4600:All if not F)		Flow Entire V <sub>12</sub> Level of D <sub>R</sub> = (potential LOS = (E: Speed D) D <sub>S</sub> = (Ex S <sub>R</sub> = mp) S <sub>0</sub> = mp	Actual  Service E  O <sub>R</sub> = 4.252 + c/mi/ln)  xhibit 13-2)  eterminate  chibit 13-12)	max De Exhibit 13-8  Determination  0.0086 V <sub>12</sub> - 1  tion  2)	esirable on (if not	Violation?		

		RAMP	S AND RAM	IP JUNCTI	ONS WO	ORKS	HEET				
General Info	rmation		_	Site Infor							
Analyst	CHS		F	reeway/Dir of Tr	avel	I-215 N	lorthbound				
Agency or Company	y Urbai	n Crossroads,	Inc. Ju	unction		Harley	Knox Off-F	Ramp			
Date Performed	5/19/2		Jı	urisdiction		Caltrar	IS				
Analysis Time Perio		eak Hour		nalysis Year		2035 V	Vith Project	w/ IMPROV			
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)								
Inputs		I									
Upstream Adj F	Ramp	1	ber of Lanes, N	3					Downstre	am Adj	
☐Yes [	On	Ramp Numbe	•	1					Ramp		
			ane Length, L <sub>A</sub>						✓ Yes	✓ On	
☑ No [		Lane Length L <sub>D</sub>	280					□No	Off		
		Freeway Volu	me, V <sub>F</sub>	5340							
L <sub>up</sub> =	ft	Ramp Volume	e, V <sub>R</sub>	649					L <sub>down</sub> =	1395 ft	
V,, = \	/eh/h	Freeway Free	-Flow Speed, $S_{\rm FF}$	70.0					V <sub>D</sub> =	1227 veh/h	
v <sub>u</sub> – (	/611/11	Ramp Free-Fl	low Speed, S <sub>FR</sub>	45.0					1.0	1227 VCII/1	
Conversion	to pc/h Und	der Base	Conditions						•		
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>	
Freeway	(Veh/hr) 5340	0.92	Level	4	0	0	980	1.00	_	920	
Ramp	649	0.92	Level	17	0	_	922	1.00		765	
UpStream	0-10	0.02	LOVOI		Ť		ULL	1.00		100	
DownStream	1227	0.92	Level	16	0	0.	926	1.00	1	440	
	<u> </u>	Merge Areas		•		•		Diverge Areas			
Estimation o	f v <sub>12</sub>				Estimation of v <sub>12</sub>						
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>EM</sub> )			$V_{12} = V_R + (V_F - V_R)P_{FD}$						
L <sub>EQ</sub> =		tion 13-6 or	13-7)		L <sub>EQ</sub> = (Equation 13-12 or 13-13)						
P <sub>FM</sub> =		Equation (			P <sub>FD</sub> = 0.577 using Equation (Exhibit 13-7)						
V <sub>12</sub> =	pc/h	Equation (	_XIIIDIC 10 0)		V <sub>12</sub> =			738 pc/h	quation (Ex	11011 10-1	
V <sub>12</sub> = V <sub>3</sub> or V <sub>av34</sub>	•	Fauction 12	-14 or 13-17)		V <sub>12</sub> – V <sub>3</sub> or V <sub>av34</sub>			•	unting 10 (	14 0 10 17)	
			-14 01 13-17)					182 pc/h (Eq		14 01 13-17)	
Is $V_3$ or $V_{av34} > 2.7$								☐Yes ☑No			
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5			-16, 13-18, or					☐ Yes ☑ No oc/h (Equatio		2 10 or 13	
If Yes,V <sub>12a</sub> =	13-19)		-10, 13-16, 01		If Yes,V <sub>12a</sub>	=		oc/ii (⊑qualio 9)	111 13-10, 1	D-10, UI 13-	
Capacity Ch	ecks				Capaci	ty Ch	ecks	,			
	Actual	C	Capacity	LOS F?		•	Actual		Capacity	LOS F?	
					V <sub>F</sub>		5920	Exhibit 13	3-8 7200	No	
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V	F - VR	5155	Exhibit 13	3-8 7200	No	
					V <sub>R</sub>		765	Exhibit 13-	-10 2100	No	
Flow Enterin	a Merae In	fluence A	lroa					rge Influe			
riow Linteriii	Actual	T-	Desirable	Violation?	1 10W L	_	Actual	Max Desir		Violation?	
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	_	3738	Exhibit 13-8	4400:All	No	
Level of Serv	ice Detern		if not F)								
$D_R = 5.475 + 0$					Level of Service Determination (if not F) $D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$						
D <sub>R</sub> = (pc/mi/lr	• • • • • • • • • • • • • • • • • • • •	0.0070 12	0.00027 L <sub>A</sub>		D = 2			.0000 112	3.000 L <sub>D</sub>		
	*				D <sub>R</sub> = 33.9 (pc/mi/ln) LOS = D (Exhibit 13-2)						
`											
Speed Deter	mination				Speed						
M <sub>S</sub> = (Exibit 1	•				1 -		xhibit 13				
S <sub>R</sub> = mph (Ex	hibit 13-11)						(Exhibit				
	hibit 13-11)				1		(Exhibit				
S = mph (Ex	hibit 13-13)						(Exhibit	13-13)			
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8.18-4

		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET				
General Infor	rmation			Site Infor							
Analyst	CHS		Fr	reeway/Dir of Tr		I-215 S	outhbound				
Agency or Company	Urbai	n Crossroads,	Inc. Ju	unction	Harley Knox Off-Ramp						
Date Performed	5/19/			urisdiction	Caltrans						
Analysis Time Perio		eak Hour		Analysis Year 2035 With Project w/ IMPROV							
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)								
Inputs		l									
Upstream Adj F	Ramp	Ramp Numbe	ber of Lanes, N	3 1					Downstre	am Adj	
□Yes	On	l '	ane Length, L <sub>Δ</sub>	1					Ramp	[/] On	
✓ No	No Off Deceleration Lane Length L								✓ Yes	☑ On	
	_011	Freeway Volu	me, V <sub>F</sub>	5925					□ No	Off	
L <sub>up</sub> = 1	ft	Ramp Volume	11	1559					L <sub>down</sub> =	1420 ft	
V,, = v	eh/h		-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	926 veh/h	
ů v	CIIIII	Ramp Free-Fl	ow Speed, S <sub>FR</sub>	45.0							
Conversion t	o pc/h Und	der Base	Conditions	Į.	_						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv f <sub>F</sub>		f <sub>HV</sub> f <sub>p</sub>		$v = V/PHF \times f_{HV} \times$		
Freeway	5925	0.92	Level	5	0	0.	976	1.00	6	601	
Ramp	1559	0.92	Level	16	0	0.	926	1.00	1	830	
UpStream		<u> </u>									
DownStream	926	0.92	Level	21	0	0.	905	1.00	1	112	
Estimation of	f v	Merge Areas			Diverge Areas  Estimation of v <sub>12</sub>						
		<u> </u>									
	$V_{12} = V_F$				$V_{12} = V_R + (V_F - V_R)P_{FD}$						
L <sub>EQ</sub> =		ition 13-6 or			L <sub>EQ</sub> = (Equation 13-12 or 13-13)						
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> = 0.511 using Equation (Exhibit 13-7)						
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		42	267 pc/h			
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		$V_3$ or $V_{av34}$		23	334 pc/h (Eq	uation 13-1	4 or 13-17)	
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h? 🗌 Ye:	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 2,7	00 pc/h?	Yes ☑ No	)		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5	* V <sub>12</sub> /2  Yes	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.5	* V <sub>12</sub> /2	]Yes ☑No	)		
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub>		_ p	c/h (Equatio		3-18, or 13-	
Capacity Che					Capacit		ecks	9)			
	Actual	C	apacity	LOS F?			Actual		Capacity	LOS F?	
					V <sub>F</sub>		6601	Exhibit 13		No	
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{I}$	- V <sub>R</sub>	4771	Exhibit 13	-8 7200	No	
. 0					V <sub>R</sub>		1830	Exhibit 13-	-10 2100	No	
Flow Entering	g Merge In	fluence A	rea	•	Flow E	nterin	g Dive	rge Influe	nce Area	•	
	Actual	T-	Desirable	Violation?		_	Actual	Max Desira		Violation?	
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	4	1267	Exhibit 13-8	4400:All	No	
Level of Serv	rice Detern	nination (	if not F)	•	Level of Service Determination (if not F)						
$D_R = 5.475 + 0$	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>		D <sub>R</sub> = 4.252 + 0.0086 V <sub>12</sub> - 0.009 L <sub>D</sub>						
D <sub>R</sub> = (pc/mi/lr	1)				$D_R = 3$	9.2 (pc	/mi/ln)				
LOS = (Exhibit	13-2)				LOS = E	(Exhil	oit 13-2)				
Speed Deterr	mination				Speed I	Deter	minatio	on			
M <sub>S</sub> = (Exibit 1					<del>                                     </del>		xhibit 13-				
	nibit 13-11)						(Exhibit				
	nibit 13-11)						(Exhibit				
	nibit 13-13)				I *		(Exhibit				
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	IVA)		RAMP JUNG	SHONS W	/ORKSHE	EET				
General Infor				Site Infor						
Analyst Agency or Company Date Performed	CHS Urba	n Crossroads, /2015	Inc. Ju	eeway/Dir of Tr nction risdiction	avel I	avel I-215 Southbound Harley Knox On-Ramp Caltrans				
Date Periormed Analysis Time Period		Peak Hour		nsulction alysis Year		Caitrans 2035 With Pi	roject w/ IME	PROV		
Project Description				iaiysis i cai		ZUJJ WILII FI	TOJECT W/ TIVIF	ROV		
Inputs	Tatox Logicalor	- Conton i naco								
Jpstream Adj Ramp		1	ber of Lanes, N	3					Downstre	am Adj
☑Yes ☐Or	า	Ramp Numbe	•	1				ľ	Ramp	
E 103			ane Length, L <sub>A</sub>	260					☐ Yes	On
□ No ☑ Of	f	Deceleration I Freeway Volu	Lane Length L <sub>D</sub> me, V <sub>⊏</sub>	4366					✓ No	Off
- <sub>up</sub> = 1420	ft	Ramp Volume		926				L	down =	ft
•			-Flow Speed, S <sub>FF</sub>	70.0						
$I_{u} = 1559         $	∕eh/h		low Speed, S <sub>FR</sub>	45.0				[	/ <sub>D</sub> =	veh/h
Conversion to	o nc/h Un		110	+0.0						
	<i>∪                                    </i>	1			1	1 .		. 1		
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$		f <sub>p</sub>	/ = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	4366	0.92	Level	1	0	0.995	1.	00		769
Ramp	926	0.92	Level	21	0	0.905		00		112
UpStream	1559	0.92	Level	16	0	0.926	1.	00	1	830
DownStream	<u> </u>	Marga Arasa			<u> </u>		Discourse	A #0.00		
Estimation of		Merge Areas			Diverge Areas  Estimation of v <sub>12</sub>					
					LStillati	011 01 41	2			
	$V_{12} = V_{F}$					V.	<sub>12</sub> = V <sub>R</sub> + (	$(V_F - V_R)$	$P_{FD}$	
- <sub>EQ</sub> =			13-6 or 13-7)		L <sub>EQ</sub> = (Equation 13-12 or 13-13)					
P <sub>FM</sub> =	0.585	using Equat	tion (Exhibit 13-6)		P <sub>FD</sub> = using Equation (Exhibit 13-7)					
/ <sub>12</sub> =	2789				V <sub>12</sub> = pc/h					
/ <sub>3</sub> or V <sub>av34</sub>		pc/h (Equati	on 13-14 or 13-		V <sub>3</sub> or V <sub>av34</sub> pc/h (Equation 13-14 or 13-17)					
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	17) ∩ nc/h2 □ ∨o.	o Mo			Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No					
ls V <sub>3</sub> or V <sub>av34</sub> > 2,70					Is V <sub>3</sub> or V <sub>av3</sub>					
f Yes,V <sub>12a</sub> =	2789		on 13-16, 13-		If Yes,V <sub>12a</sub> =				13-16, 1	3-18, or
	10, 01									
Capacity Che	cks	10-10)			Capacity	/ Check				
Capacity Che	1	,	Capacity	LOS F?	Capacity	· · ·		Capa	acity	LOS F?
Capacity Che	Actual	,	Capacity	LOS F?		· · ·	ctual	Capa	acity	LOS F?
	Actual	(	Capacity		V <sub>F</sub>	Ac	ctual Ex	xhibit 13-8		LOS F?
Capacity Che	1	,	Capacity	LOS F?	V <sub>F</sub>	Ac	ctual Ex	xhibit 13-8 xhibit 13-8		LOS F?
	Actual	(	Capacity		V <sub>F</sub>	Ac	ctual Ex	xhibit 13-8		LOS F?
V <sub>FO</sub>	Actual 5881	Exhibit 13-8			V <sub>F</sub>	- V <sub>R</sub>	ctual Ex	xhibit 13-8 xhibit 13-8 xhibit 13- 10		LOS F?
V <sub>FO</sub> Flow Entering	Actual 5881	Exhibit 13-8			$V_F$ $V_{FO} = V_F$ $V_R$	- V <sub>R</sub>	etual Ex	xhibit 13-8 xhibit 13-8 xhibit 13- 10	ce Area	
V <sub>FO</sub> Flow Entering	Actual 5881 <b>g Merge In</b>	Exhibit 13-8	Irea	No	$V_F$ $V_{FO} = V_F$ $V_R$	- V <sub>R</sub>	etual Ex	xhibit 13-8 xhibit 13-8 xhibit 13- 10 <b>nfluenc</b>	ce Area	
V <sub>FO</sub> Flow Entering V <sub>R12</sub>	5881 <b>G Merge In</b> Actual  3901	Exhibit 13-8  Diffuence A  Max Exhibit 13-8	<b>Area</b> Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$	- V <sub>R</sub>	ctual Exhibit	xhibit 13-8 xhibit 13-8 xhibit 13- 10 <b>nfluenc</b> Max Desin bit 13-8	ce Area	Violation
V <sub>FO</sub> Flow Entering V <sub>R12</sub> Level of Serv	5881 <b>G Merge In</b> Actual  3901	Exhibit 13-8  Influence A  Max Exhibit 13-8  Inination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F \cdot V_R$ Flow Entirely $V_{12}$ Level of	- V <sub>R</sub>	ctual Exhibit	xhibit 13-8 xhibit 13-8 xhibit 13- 10 nfluend Max Desirabit 13-8	ce Area	Violation
V <sub>FO</sub> Flow Entering  V <sub>R12</sub> Level of Serv  D <sub>R</sub> = 5.475 +	5881  5881  G Merge In Actual 3901  ice Detern 0.00734 v R + 0	Exhibit 13-8  Influence A  Max Exhibit 13-8  Inination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$ Flow Entertain $V_{12}$ Level of	tering D Actual	ctual Exhibit	xhibit 13-8 xhibit 13-8 xhibit 13- 10 nfluend Max Desirabit 13-8	ce Area	Violation
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = 33.8 \text{ (pc/m}$	Actual  5881  G Merge In  Actual  3901  ice Detern  0.00734 v R + 0	Exhibit 13-8  Influence A  Max Exhibit 13-8  Inination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = (pred)$	tering D Actual	iverge III Exhit	xhibit 13-8 xhibit 13-8 xhibit 13- 10 nfluend Max Desirabit 13-8	ce Area	Violation <sup>2</sup>
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + D_R = 33.8 \text{ (pc/m}$ .OS = D (Exhibit	5881  5881  G Merge In  Actual  3901  ice Detern  0.00734 v R + (  ni/ln)  13-2)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Inination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$ Flow Entirely $V_{12}$ Level of $D_R = (po$ $LOS = (E)$	tering D Actual  Service  O <sub>R</sub> = 4.252 c/mi/ln) cxhibit 13-2	etual Exhibition Exhib	xhibit 13-8 xhibit 13-8 xhibit 13- 10 nfluend Max Desirabit 13-8	ce Area	Violation <sup>2</sup>
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + D_R = 33.8 \text{ (pc/m}$ $D_R = 5.475 + D_R = 33.8 \text{ (pc/m}$ $D_R = 5.475 + D_R = 33.8 \text{ (pc/m}$	Actual  5881  G Merge In  Actual  3901  ice Detern  0.00734 v R + 0  ii/ln)  13-2)  mination	Exhibit 13-8  Influence A  Max Exhibit 13-8  Inination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$ Flow Enter $V_{12}$ Level of $D_R = (p_0 + p_0)$ LOS = (E  Speed D	tering D Actual Service Corporation (A) Actual Actu	iverge III Exhile 2 + 0.0086	xhibit 13-8 xhibit 13-8 xhibit 13- 10 nfluend Max Desirabit 13-8	ce Area	Violation <sup>2</sup>
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + D_R = 33.8 \text{ (pc/m}$ $OS = D \text{ (Exhibit)}$ Speed Determing $M_S = 0.490 \text{ (Exhibit)}$	Actual  5881  G Merge In  Actual  3901  ice Detern  0.00734 v R + (  ni/ln)  13-2)  mination  bit 13-11)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Inination (	Area Desirable 4600:All	No Violation?	V <sub>F</sub> V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub> V <sub>12</sub> Level of  D <sub>R</sub> = (polytopic LOS = (E)  Speed D  D <sub>S</sub> = (E)	tering D Actual  Service  O <sub>R</sub> = 4.252  c/mi/ln)  ixhibit 13-12)	iverge II Exhii Exhii 2 + 0.0086	xhibit 13-8 xhibit 13-8 xhibit 13- 10 nfluend Max Desirabit 13-8	ce Area	Violation <sup>2</sup>
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = 33.8 \text{ (pc/m}$ $D_R = 0.490 \text{ (Exilate of Section 1)}$ $D_R = 0.490 \text{ (Exilate of Section 2)}$	Actual  5881 <b>G Merge In</b> Actual  3901 <b>ice Detern</b> 0.00734 v <sub>R</sub> + 0  ii/ln)  13-2) <b>mination</b> bit 13-11)  (Exhibit 13-11)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Inination (	Area Desirable 4600:All	No Violation?	V <sub>F</sub> V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub> V <sub>12</sub> Level of  D <sub>R</sub> = (po LOS = (E) Speed D S <sub>R</sub> = (E) S <sub>R</sub> = mp	tering D Actual  Service  O <sub>R</sub> = 4.252 c/mi/ln) (xhibit 13-12) ch (Exhibit 13-12)	Exhibit   Exhi	xhibit 13-8 xhibit 13-8 xhibit 13- 10 nfluend Max Desirabit 13-8	ce Area	Violation
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + D_R = 33.8 \text{ (pc/m}$ $OS = D \text{ (Exhibit)}$ Speed Determ $M_S = 0.490 \text{ (Exion)}$ $S_R = 56.3 \text{ mph}$ $S_0 = 64.7 \text{ mph}$	Actual  5881  G Merge In  Actual  3901  ice Detern  0.00734 v R + (  ni/ln)  13-2)  mination  bit 13-11)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Inination (	Area Desirable 4600:All	No Violation?	V <sub>F</sub> V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub> V <sub>12</sub> Level of  D <sub>R</sub> = (po LOS = (E) Speed D D <sub>S</sub> = (E) S <sub>R</sub> = mp S <sub>0</sub> = mp	tering D Actual  Service  O <sub>R</sub> = 4.252  c/mi/ln)  ixhibit 13-12)	Exhi	xhibit 13-8 xhibit 13-8 xhibit 13- 10 nfluend Max Desirabit 13-8	ce Area	Violation

Analyst CHS Freeway/Dir of Travel I-215 Northbound Agency or Company Urban Crossroads, Inc. Junction Harley Knox On-Ramp Date Performed 5/19/2015 Jurisdiction Caltrans Analysis Time Period PM Peak Hour Analysis Year 2035 With Project w/ IMPR Project Description Knox Logistics Center Phase II TIA (JN 09347)  Inputs  Upstream Adj Ramp Ramp Number of Lanes, N 3 Ramp Number of Lanes, N 1 Acceleration Lane Length, L <sub>A</sub> 300 Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> 3710	OV					
Agency or Company Urban Crossroads, Inc. Junction Harley Knox On-Ramp Date Performed 5/19/2015 Jurisdiction Caltrans Analysis Time Period PM Peak Hour Analysis Year 2035 With Project w/ IMPR Project Description Knox Logistics Center Phase II TIA (JN 09347)  Inputs  Uptream Adj Ramp Freeway Number of Lanes, N 3 Ramp Number of Lanes, N 1 Acceleration Lane Length, LA 300  Deceleration Lane Length LD Freeway Volume, VF 3710	OV					
Date Performed       5/19/2015       Jurisdiction       Caltrans         Analysis Time Period       PM Peak Hour       Analysis Year       2035 With Project w/ IMPR         Project Description       Knox Logistics Center Phase II TIA (JN 09347)         Inputs         Jerreway Number of Lanes, N       3         Ramp Number of Lanes, N       1         Acceleration Lane Length, LA       300         Deceleration Lane Length LD       Freeway Volume, VF         Freeway Volume, VF       3710	OV					
Analysis Time Period PM Peak Hour Analysis Year 2035 With Project w/ IMPR  Project Description Knox Logistics Center Phase II TIA (JN 09347)  Inputs  Upstream Adj Ramp Freeway Number of Lanes, N 3 Ramp Number of Lanes, N 1 Acceleration Lane Length, L <sub>A</sub> 300  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> 3710	OV					
Project Description Knox Logistics Center Phase II TIA (JN 09347)  Inputs  Upstream Adj Ramp  Freeway Number of Lanes, N 3  Ramp Number of Lanes, N 1  Acceleration Lane Length, L <sub>A</sub> 300  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> 3710						
Inputs  Upstream Adj Ramp  Freeway Number of Lanes, N 3  Ramp Number of Lanes, N 1  ✓ Yes On Acceleration Lane Length, L <sub>A</sub> 300  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> 3710						
Freeway Number of Lanes, N 3 Ramp Number of Lanes, N 1  ✓ Yes On Acceleration Lane Length, L <sub>A</sub> 300  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> 3710						
Ramp Number of Lanes, N 1  Acceleration Lane Length, L <sub>A</sub> 300  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> 3710						
✓ Yes On Acceleration Lane Length, L <sub>A</sub> 300  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> 3710	Downstream Adj					
□ No □ Off Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> 3710	Ramp					
Freeway Volume, V <sub>F</sub> 3710	☐ Yes ☐ On					
Freeway Volume, V <sub>F</sub> 3710						
	☑ No ☐ Off					
<sub>up</sub> = 1395 ft Ramp Volume, V <sub>R</sub> 2308	L <sub>down</sub> = ft					
Freeway Free-Flow Speed, S <sub>FF</sub> 70.0	$V_D = veh/h$					
Ramp Free-Flow Speed, S <sub>FR</sub> 45.0						
Conversion to pc/h Under Base Conditions						
(pc/h) V PHF Terrain %Truck %Rv f <sub>HV</sub> f <sub>p</sub>	$v = V/PHF \times f_{HV} \times f_{D}$					
(Volum)						
Freeway 3710 0.92 Level 5 0 0.976 1.00						
Ramp 2308 0.92 Level 8 0 0.962 1.00						
UpStream 610 0.92 Level 11 0 0.948 1.00	700					
OownStream Birogra Areas						
Merge Areas Diverge A Estimation of v <sub>12</sub> Estimation of v <sub>12</sub>	ireas					
·-						
$V_{12} = V_F (P_{FM})$ $V_{12} = V_R + (V_F)$	V <sub>D</sub> )P <sub>-D</sub>					
= 1527.30 (Equation 13.6 or 13.7)	L <sub>EQ</sub> = (Equation 13-12 or 13-13)					
D = 0.577 using Equation (Exhibit 12.6)	1 - 3					
/ = 2297 pg/b	115					
1746 ng/h /Faustion 12 14 or 12						
3 01 vav34 17)   v3 01 vav34   pc/n (Equ	uation 13-14 or 13-17)					
Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No	□No					
Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes $\square$ No	□No					
pc/h (Fo	quation 13-16, 13-18, or					
$Yes, V_{12a} = 2387 \text{ pc/n (Equation 13-16, 13-16)}$						
Capacity Checks Capacity Checks						
Actual Capacity LOS F? Actual	Capacity LOS F?					
	ibit 13-8					
	bit 13-8					
FO TOUR	ibit 13-					
	10					
Flow Entering Merge Influence Area Flow Entering Diverge Inf						
	ax Desirable Violation					
V <sub>R12</sub> 4996 Exhibit 13-8 4600:All Yes V <sub>12</sub> Exhibit						
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ $D_R = 4.252 + 0.0086 V_A$	<sub>12</sub> - 0.009 L <sub>D</sub>					
$D_{R} = 41.4 \text{ (pc/mi/ln)}$ $D_{R} = \text{ (pc/mi/ln)}$						
OS = E (Exhibit 13-2) LOS = (Exhibit 13-2)						
Speed Determination Speed Determination						
$M_{\rm S} = 0.871$ (Exibit 13-11) $D_{\rm S} = (Exhibit 13-12)$						
0						
R 100 mp. (= 110 mp.)						
$S_0 = 65.5 \text{ mph (Exhibit 13-11)}$ $S_0 = \text{mph (Exhibit 13-12)}$						
S = 49.5 mph (Exhibit 13-13)						
= 49.5 mph (Exhibit 13-13) S = mph (Exhibit 13-13)	Generated: 5/19/2015 10					

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		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	rmation			Site Infor						
Analyst	CHS		Fı	reeway/Dir of Tr		I-215 N	orthbound			
Agency or Company	Urbai	n Crossroads,	Inc. Ju	unction	Harley Knox Off-Ramp					
Date Performed	5/19/			urisdiction	Caltrans					
Analysis Time Perio		eak Hour		Analysis Year 2035 With Project w/ IMPROV						
Project Description	Knox Logistics	Center Phase	II TIA (JN 09347)							
Inputs		le v								
Upstream Adj R	Ramp	1 '	nber of Lanes, N	3					Downstre	am Adj
	On	Ramp Numbe	•	1					Ramp	
☐ Yes ☐	_  OII		Lane Length, L <sub>A</sub>						✓ Yes	✓ On
☑ No □	Off	Deceleration	Lane Length L <sub>D</sub>	280					□No	Off
		Freeway Volu	ime, V <sub>F</sub>	4320						
L <sub>up</sub> = 1	ft	Ramp Volume	e, V <sub>R</sub>	610					L <sub>down</sub> =	1395 ft
		Freeway Free	e-Flow Speed, S <sub>FF</sub>	70.0						0000
V <sub>u</sub> = v	eh/h		low Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	2308 veh/h
Conversion t	o pc/h Und		110							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f	f	V = V/DUI	= x f <sub>HV</sub> x f <sub>p</sub>
(pc/11)	(Veh/hr)	FIIF	remain				f <sub>HV</sub>	f <sub>p</sub>		· · · · · · · · · · · ·
Freeway	4320	0.92	Level	6	0	0.	.971	1.00	4	837
Ramp	610	0.92	Level	11	0	0.	.948	1.00		700
UpStream								4.00	<u> </u>	•
DownStream	2308	0.92	Level	8	0	0.	.962	1.00	2	609
Estimation of	fv	Merge Areas			Fetimat	tion c	of v	Diverge Areas		
LStillation of					Estimation of v <sub>12</sub>					
	$V_{12} = V_{F}$				$V_{12} = V_R + (V_F - V_R)P_{FD}$					
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> = (Equation 13-12 or 13-13)					
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	607 using Ed	quation (Ext	nibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		32	211 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		16	626 pc/h (Eq	uation 13-1	4 or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h? 🗌 Yes	s 🗌 No					'00 pc/h? [	Yes <b></b> No	)	
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5								Yes ☑ No		
If Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub>			c/h (Equatio		3-18, or 13-
	13-19)							9)		
Capacity Che	1	1		1	Capacit	ty Ch		1 -		
	Actual		Capacity	LOS F?	ļ		Actual		apacity	LOS F?
					V <sub>F</sub>		4837	Exhibit 13	-8 7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	F-V <sub>R</sub>	4137	Exhibit 13	-8 7200	No
					$V_R$		700	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	fluence A	\rea		Flow E	nterin	g Dive	rge Influei	nce Area	
	Actual	Max	Desirable	Violation?			Actual	Max Desira	able	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	;	3211	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)	•	Level o	f Ser	vice De	terminatio	n (if not	<i>F</i> )
$D_R = 5.475 + 0$					Level of Service Determination (if not F) $D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$					
D <sub>R</sub> = (pc/mi/lr	• • •	12	A			9.3 (pc		12	D	
LOS = (Exhibit	*						bit 13-2)			
Speed Deterr	-				Speed	_		<u> </u>		
_					-					
M <sub>S</sub> = (Exibit 1	•						xhibit 13			
	nibit 13-11)						(Exhibit			
, ,	nibit 13-11)				I *		(Exhibit			
	nibit 13-13)						(Exhibit	13-13)		
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