



**KUNZMAN ASSOCIATES, INC.**

**NEWBERRY SPRINGS SERVICE STATION**

**TRAFFIC IMPACT ANALYSIS**

**June 22, 2016**



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## **I. INTRODUCTION**

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The purpose of this report is to provide an assessment of the traffic impacts resulting from the development of the proposed Newberry Springs Service Station project and to identify the traffic mitigation measures necessary to maintain the established level of service standard for the elements of the impacted roadway system. The traffic issues related to the proposed land use and development have been evaluated in the context of the California Environmental Quality Act.

The County of San Bernardino is the lead agency responsible for preparation of the traffic impact analysis, in accordance with California Environmental Quality Act authorizing legislation. This report analyzes traffic impacts for the anticipated opening date with partial occupancy of the development in Opening Year 2017, at which time it will be generating trips at its full potential, and for the current traffic forecast year, which is the Year 2035.

It should be noted that this development has been studied previously and that the site is partially developed. The land uses within the site have changed slightly since the original traffic study. This analysis provides a focused analysis at the immediately affected intersections. Previous fees have been paid and should be accounted for during the payment of the suggested improvement fees.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to transportation engineering, a glossary of terms is provided in Appendix A.

### **A. Project Description**

The proposed development is located east of Harvard Road between Hacienda Road and the I-15 Freeway SB Ramps. A vicinity map showing the project location is provided on Figure 1.

The project site is proposed to be developed with a 14 fueling position gasoline/service station with convenience market. Figure 2 illustrates the project site plan.

### **B. Study Area**

Regional access to the project site is mainly provided by the I-15 Freeway. Local access is provided by various roadways in the vicinity of the site. The north-south roadway which will be most affected by the project is Harvard Road. The east-west roadway which will be most affected by the project is Hacienda Road.

A series of scoping discussions were conducted with the County of San Bernardino and the California Department of Transportation to define the desired analysis locations for each future analysis year. In addition, the San Bernardino Associated Governments staff has also been contacted to discuss the project.

### C. Analysis Methodology

The analysis of the traffic impacts from the proposed development and the assessment of the required mitigation measures were based on an evaluation of the existing and forecast traffic conditions in the vicinity of the site with and without the project. The following analysis years are considered in this report:

- Existing Conditions (2016)
- Existing Plus Project Conditions<sup>1</sup>
- Project Opening Year Conditions (2017)
- Horizon Year Conditions (2035)

Existing intersection traffic conditions were established through Friday evening and Sunday mid-day peak hour traffic counts obtained by Kunzman Associates, Inc. from June 2016 (see Appendix C). In addition, truck classification counts were conducted at the study area intersections. The existing percent of trucks was used in the conversion of trucks to Passenger Car Equivalent's (see Appendix E).

Project traffic volumes for all future projections were estimated using the manual approach. Trip generation has been based upon rates obtained from the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012.

The distributions of the project trips were based on existing travel patterns calculated using existing traffic counts. This methodology was approved by the County of San Bernardino Transportation Department and the California Department of Transportation staff (see Appendix B).

The average daily traffic volume forecasts have been determined using the growth increment approach on the San Bernardino Transportation Analysis Model (SBTAM) Year 2008 and Year 2035 average daily traffic volume forecasts (see Appendix E). Traffic model plots are included in Appendix D. This difference defines the growth in traffic over the 27 year period. The incremental growth in average daily traffic volume has been factored to reflect the forecast growth between Year 2016 and Year 2035. For this purpose, linear growth between the Year 2008 base condition and the forecast Year 2035 condition was assumed. Since the increment between Year 2016 and Year 2035 is 19 years of the 27 year time frame, a factor of 0.70 (i.e., 19/27) was used.

The Year 2035 without project daily and peak hour directional roadway segment volume forecasts have been determined using the growth increment approach on the San Bernardino Transportation Analysis Model Year 2008 and Year 2035 peak hour volumes. The growth increment calculation worksheets are shown in Appendix E. Current peak hour intersection approach/departure data is a necessary input to this approach. The existing traffic count data serves as both the starting point for the refinement process, and also provides important insight into current travel patterns and the relationship between peak hour and daily traffic conditions. The initial turning movement proportions are estimated

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<sup>1</sup> The existing plus project conditions has been analyzed to comply with the Sunnyvale West Neighborhood Association v. City of Sunnyvale CEQA court case. This scenario assumes the full development of the proposed project and full absorption of the proposed project trips on the circulation system at the present time.

based upon the relationship of each approach leg's forecast traffic volume to the other legs forecast volumes at the intersection. The initial estimate of turning movement proportions is then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program Report 255. A linear programming algorithm is used to calculate individual turning movements that match the known directional roadway segment 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.

The Opening Year (2017) traffic volumes have been interpolated from the Year 2035 traffic volumes based upon a portion of the future growth increment. The remaining un-built portion of the original project is then added to the projected volumes to create the new future base volumes.

The remaining un-built portion of the original project is then added to the Year 2035 San Bernardino Transportation Analysis Model volumes to create the new future base volumes. Project traffic is then added to the new future base volumes. Quality control checks and forecast adjustments were performed as necessary to ensure that all future traffic volume forecasts reflect a minimum of 10% growth over existing traffic volumes. The result of this traffic forecasting procedure is a series of traffic volumes suitable for traffic operations analysis.

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix F) based on the Highway Capacity Manual – Transportation Research Board Special Report 209. To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection. The signalized intersections are considered deficient (Level of Service F) if the overall intersection critical volume to capacity ratio equals or exceeds 1.0, even if the Level of Service defined by the delay value is below the defined Level of Service standard. The volume to capacity ratio is defined as the critical volumes divided by the intersection capacity. A volume to capacity ratio greater than 1.0 implies an infinite queue.

The Level of Service analysis for signalized intersections has been performed using optimized signal timing. This analysis has included an assumed lost time of two seconds per phase. Signal timing optimization has considered pedestrian safety and signal coordination requirements. Appropriate time for pedestrian crossings has also been considered in the signalized intersection analysis. The following formula has been used to calculate the pedestrian minimum times for all Highway Capacity Manual runs:

$$(\text{Curb to curb distance}) / (4 \text{ feet/second}) + 7 \text{ seconds}$$

For existing/existing plus project/Opening Year (2017) traffic conditions, saturation flow rates of 1,800 vehicles per hour of green for through and right turn lanes and 1,700 vehicles per lane for single left turn lanes, 1,600 vehicles per lane for dual left turn lanes and 1,500 vehicles per lane for triple left turn lanes have been assumed for the capacity analysis.

For Year 2035 traffic conditions, saturation flow rates of 1,900 vehicles per hour of green for through and right turn lanes and 1,800 vehicles per lane for single left turn lanes, 1,700

vehicles per lane for dual left turn lanes and 1,800 vehicles per lane for double right turn lanes have been assumed for the capacity analysis.

The peak hour traffic volumes have been adjusted to peak 15 minute volumes for analysis purposes using the existing observed peak 15 minute to peak hour factors for all scenarios analyzed. Where feasible improvements in accordance with the local jurisdiction's General Plan and which result in acceptable operations cannot be identified, the Year 2035 peak hour factor has been adjusted upwards to 0.95. This is to account for the effects of congestion on peak spreading. Peak spreading refers to the tendency of traffic to spread more evenly across time as congestion increases.

The traffic mitigation needs anticipated at the time of the project opening with full occupancy and for the Year 2035 were combined into a summary of mitigation requirements and costs. The mitigation cost responsibility for the proposed development was estimated based on the percent of the increase in traffic from the existing condition to the Year 2035 that was attributed to the project generated trips.

**D. Definition of Deficiency and Significant Impact**

The following definitions of deficiencies and significant impacts have been developed in accordance with the County of San Bernardino requirements.

1. Definition of Deficiency

The definition of an intersection deficiency has been obtained from the County of San Bernardino General Plan. The General Plan states that peak hour intersection operations of Level of Service C or better are generally acceptable. Therefore, any intersection operating at Level of Service D to F will be considered deficient.

For freeway facilities, the Congestion Management Program controls the definition of deficiency for purposes of this study. The Congestion Management Program definition of deficiency is based on maintaining a Level of Service standard of Level of Service E or better, except where an existing Level of Service F condition is identified in the Congestion Management Program document (San Bernardino County Congestion Management Program Table 2-1). A Congestion Management Program deficiency is, therefore, defined as any freeway segment operating or projected to operate at Level of Service F, unless the segment is identified explicitly in the Congestion Management Program document.

The identification of a Congestion Management Program deficiency requires further analysis in satisfaction of Congestion Management Program requirements, including:

- Evaluation of the mitigation measures required to restore traffic operations to an acceptable level with respect to Congestion Management Program Level of Service standards.
- Calculation of the project share of new traffic on the impacted Congestion Management Program facility during peak hours of traffic.

- Estimation of the cost required to implement the improvements required to restore traffic operations to an acceptable Level of Service as described above.

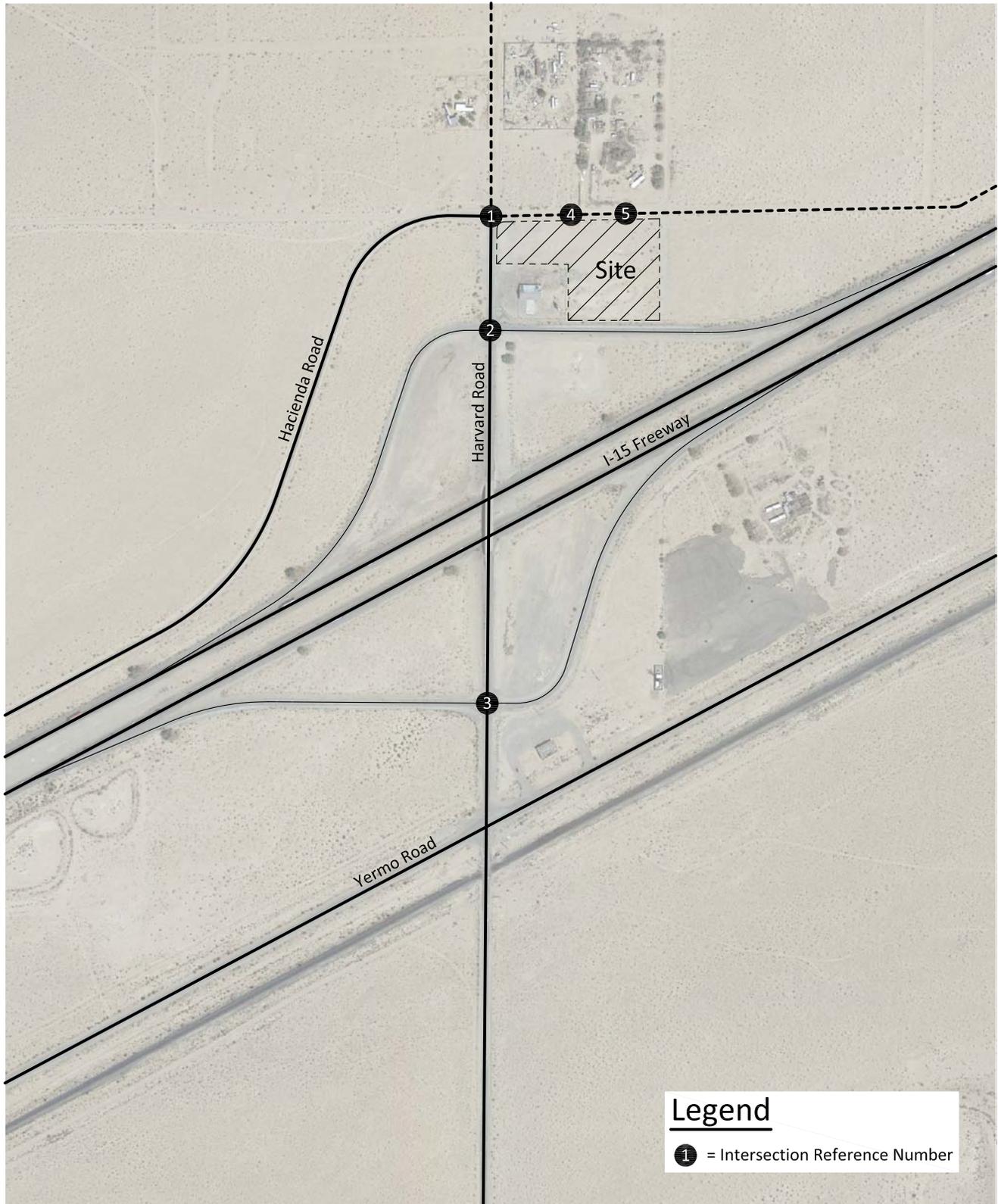
This study incorporates each of these aspects for all locations where a Congestion Management Program deficiency is identified.

2. Definition of Significant Impact

The identification of significant impacts is a requirement of the California Environmental Quality Act. The County of San Bernardino General Plan and Circulation Element have been adopted in accordance with California Environmental Quality Act requirements, and any roadway improvements within the County of San Bernardino that are consistent with these documents are not considered a significant impact, so long as the project contributes its “fair share” funding for improvements.

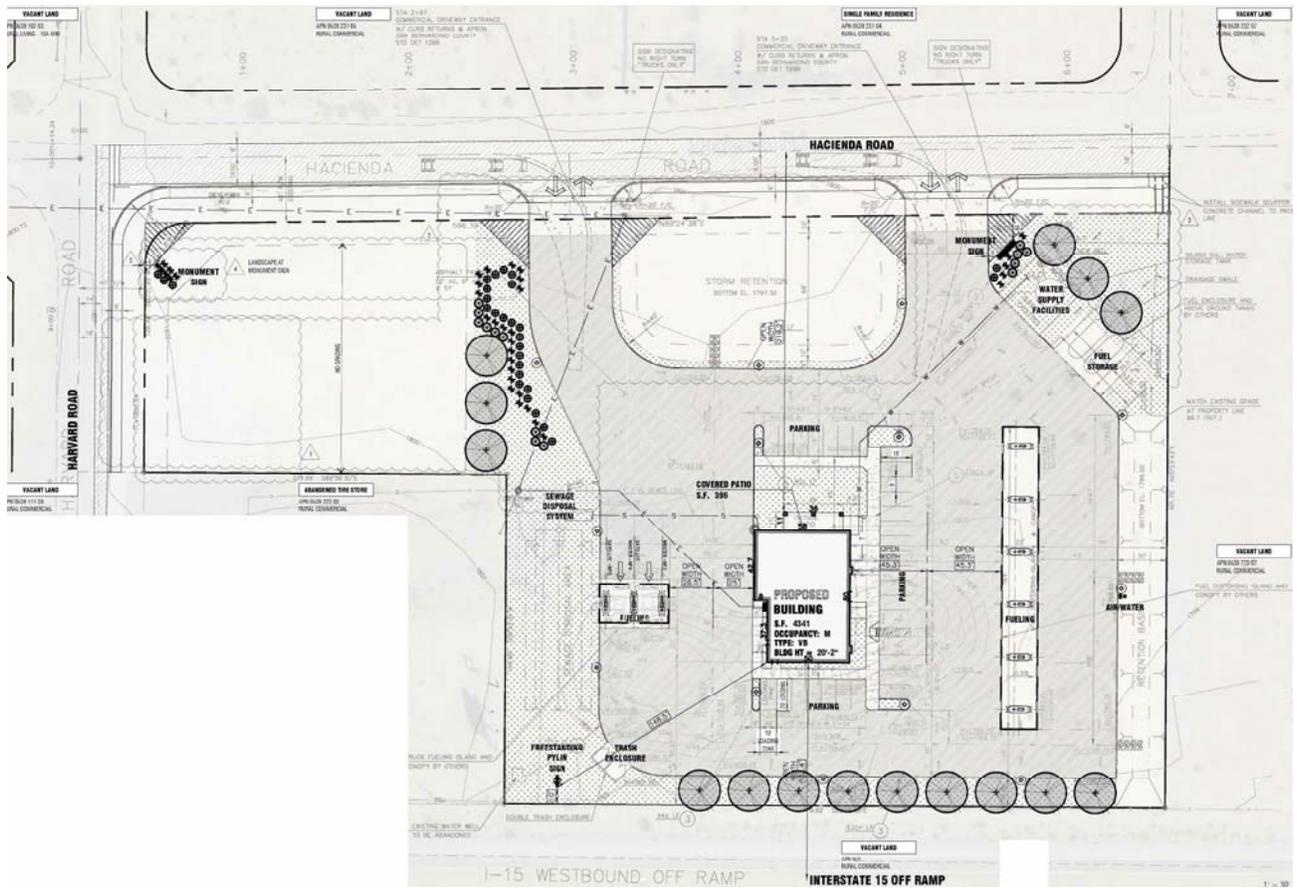
A traffic impact is considered significant if the project both: i) contributes measurable traffic to and ii) substantially and adversely changes the Level of Service at any off-site location projected to experience deficient operations under foreseeable cumulative conditions, where feasible improvements consistent with the County of San Bernardino General Plan cannot be constructed.

Figure 1  
Project Location Map



**Legend**  
① = Intersection Reference Number

Figure 2  
Site Plan



## **II. EXISTING CONDITIONS**

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### **A. Existing Roadway System**

Figure 3 identifies the existing conditions for the study area roadways. The number of through lanes for existing roadways and the existing intersection controls are identified.

Regional access to the project site is mainly provided by the I-15 Freeway. Local access is provided by various roadways in the vicinity of the site. The north-south roadway which will be most affected by the project is Harvard Road. The east-west roadway which will be most affected by the project is Hacienda Road.

### **B. Existing Volumes**

Existing intersection traffic conditions were established through Friday evening and Sunday mid-day peak hour traffic counts obtained by Kunzman Associates, Inc. from June 2016 (see Appendix C) and shown on Figures 4 and 5, respectively. Explicit peak hour factors have been calculated using the data collected for this effort as well. The Friday evening peak hour traffic volumes were identified by counting the two-hour period from 4:00 PM – 6:00 PM. The Sunday mid-day peak hour traffic volumes were identified by counting the three-hour period from 12:00 Noon – 3:00 PM. The peak periods were defined by the County of San Bernardino and verified by the California Department of Transportation.

Traffic volumes at project access points have been calculated using the turning movement volumes at adjacent intersections. If more than one intersection counted contributes traffic to a street segment, the highest volumes are utilized. It is important to note that vehicles appear to be temporarily parking near the project site. The project access points assume this higher volume that will not likely occur once the project is built.

It should be noted that a large number of vehicles are by-passing the I-15 Freeway in the northbound direction on Friday evening by driving Yermo Road north, making a left onto Harvard Road, and then making a right onto the I-15 Freeway NB Ramps. This movement significantly impacts the study area. This known traffic volume pattern is what determined the special peak hours for this analysis.

### **C. Existing Level of Service**

The existing delay and Level of Service for the intersection in the vicinity of the project are shown in Table 1. The study area intersections currently operate within acceptable Levels of Service during the peak hours for existing traffic conditions. Existing delay worksheets are provided in Appendix F.

### **D. Planned Transportation Improvements and Relationship to General Plan**

The County of San Bernardino General Plan Circulation Element is shown on Figure 6. Existing and future roadways are included in the Circulation Element of the General Plan and are graphically depicted on Figure 6. This figure shows the nature and extent of arterial

highways that are needed to adequately serve the ultimate development depicted by the Land Use Element of the General Plan. The County of San Bernardino General Plan roadway cross-sections are illustrated on Figure 7.

**Table 1**

**Existing Intersection Delay and Level of Service**

Intersection	Jurisdiction	Traffic Control <sup>3</sup>	Intersection Approach Lanes <sup>1</sup>												Peak Hour Delay Level of Service <sup>2</sup>	
			Northbound			Southbound			Eastbound			Westbound			Friday Evening	Sunday Mid-day
			L	T	R	L	T	R	L	T	R	L	T	R		
Harvard Road (NS) at: Hacienda Road (EW) - #1	County of San Bernardino	CSS	0	1	0	0	1	0	0	1	0	0	1	0	9.1-A	9.2-A
I-15 Freeway SB Ramps (EW) - #2	California Department of Transportation	CSS	0	1	0	0	1	0	0	0	0	0	1	0	9.2-A	11.4-B
I-15 Freeway NB Ramps (EW) - #3	California Department of Transportation	CSS	0	1	0	0	1	0	0	1	0	0	0	0	9.4-A	11.5-B

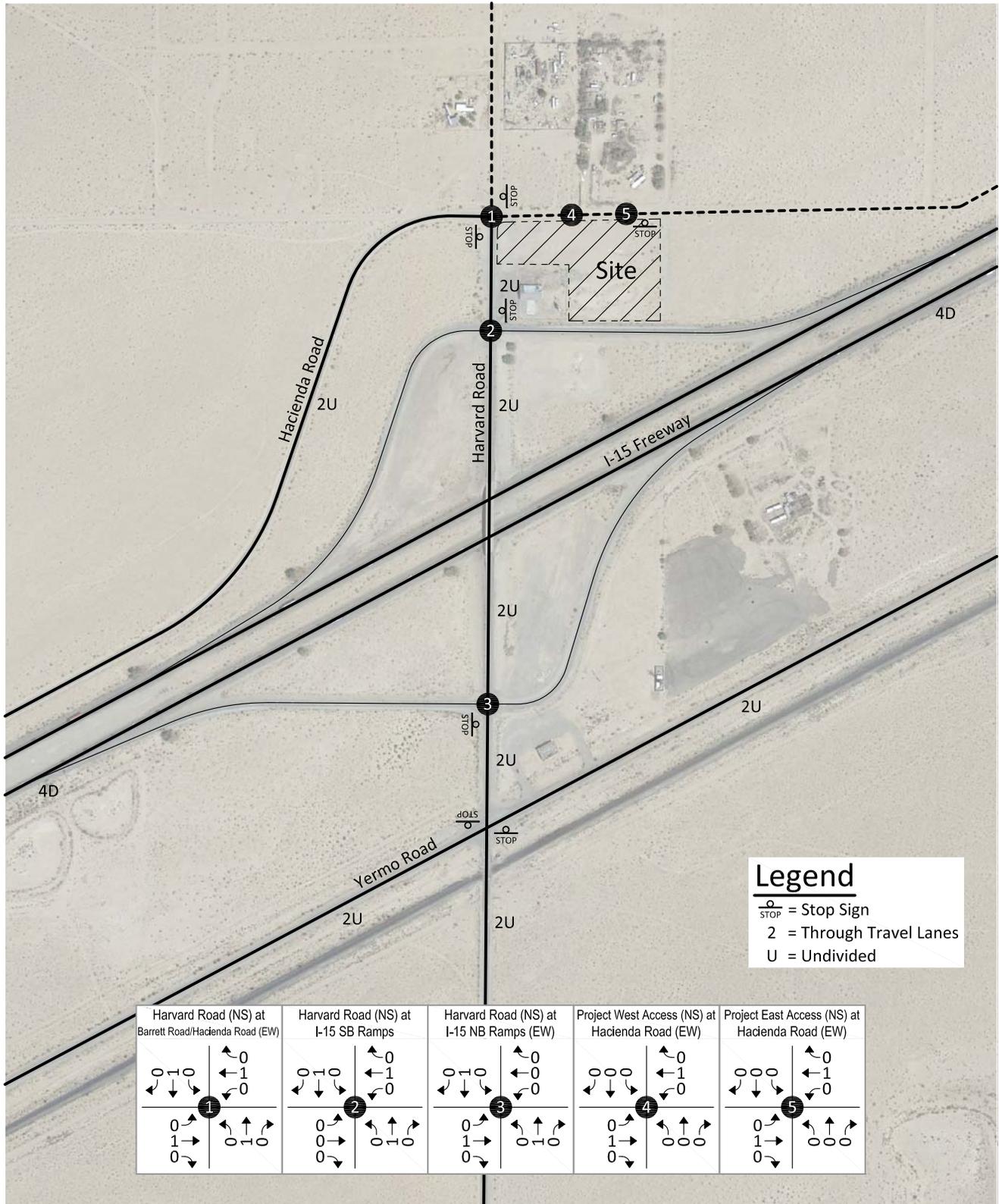
<sup>1</sup> When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right

<sup>2</sup> Delay and level of service has been calculated using the following analysis software: Vistro, Version 4.00-00. Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

<sup>3</sup> CSS = Cross Street Stop

Figure 3  
Existing Through Travel Lanes and Intersection Controls



**Legend**  
 = Stop Sign  
 2 = Through Travel Lanes  
 U = Undivided

Harvard Road (NS) at Barrett Road/Hacienda Road (EW)	Harvard Road (NS) at I-15 SB Ramps	Harvard Road (NS) at I-15 NB Ramps (EW)	Project West Access (NS) at Hacienda Road (EW)	Project East Access (NS) at Hacienda Road (EW)

Figure 4  
Existing Friday Evening Peak Hour Intersection Turning Movement Volumes

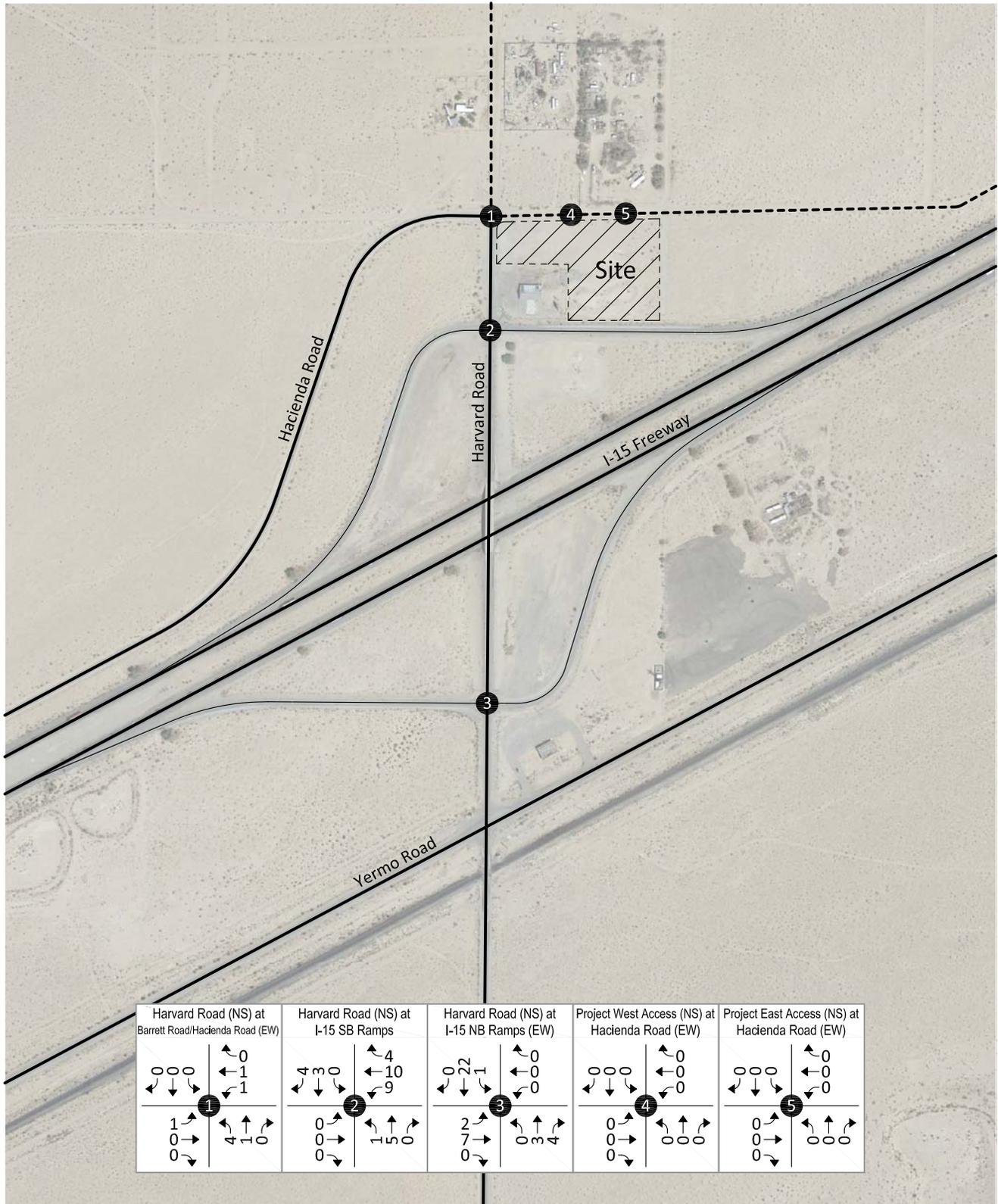


Figure 5

Existing Sunday Mid-Day Peak Hour Intersection Turning Movement Volumes

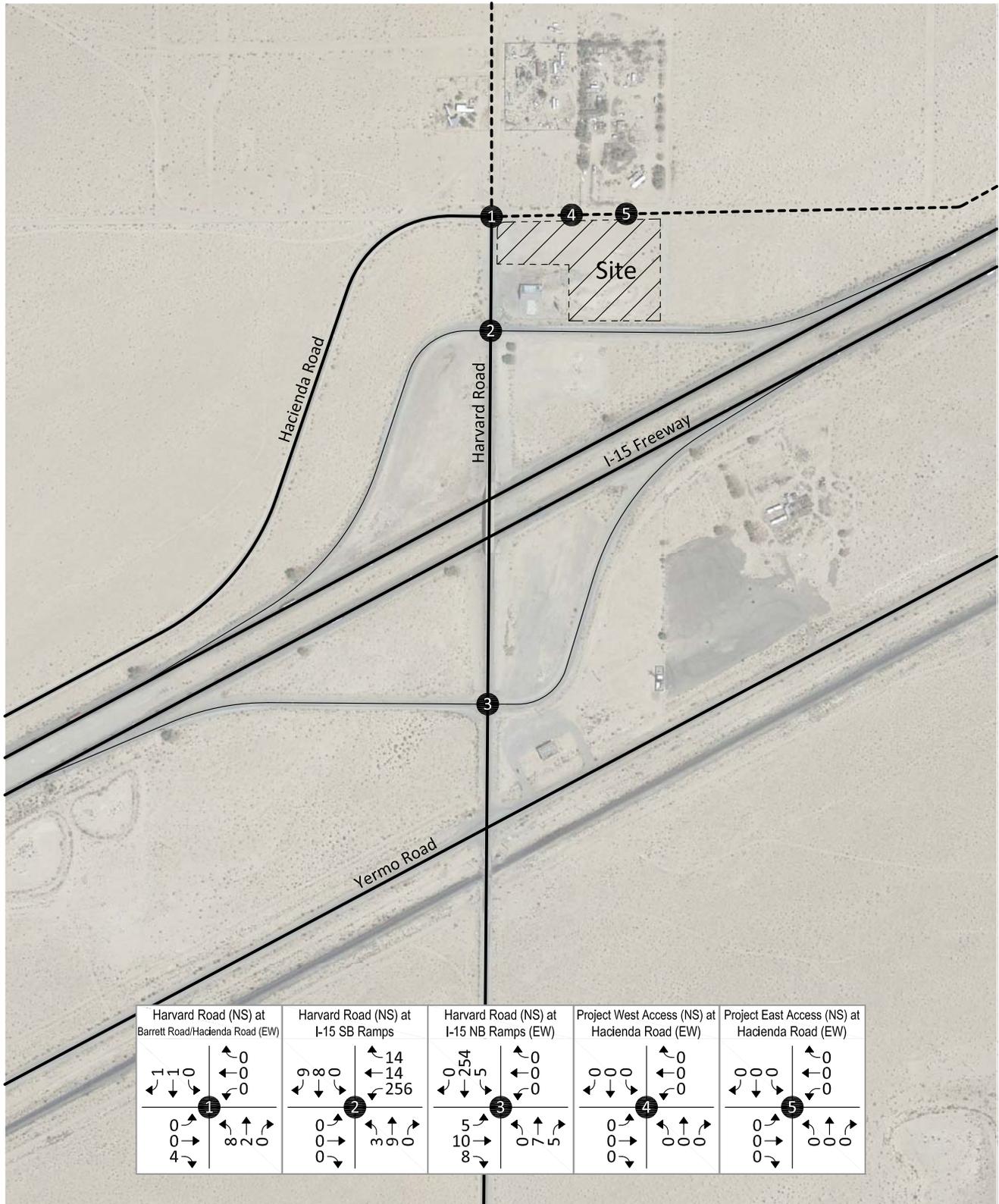
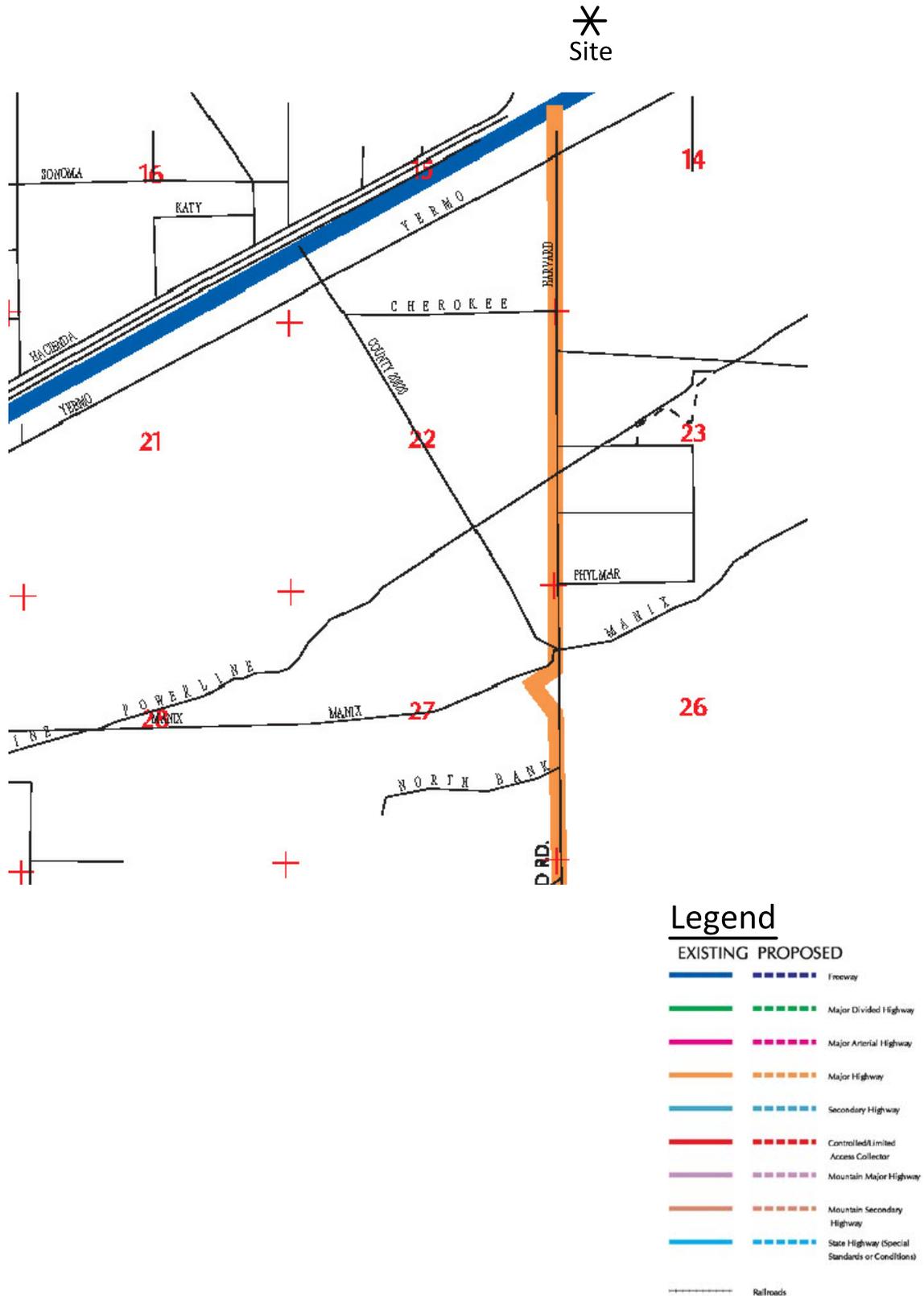
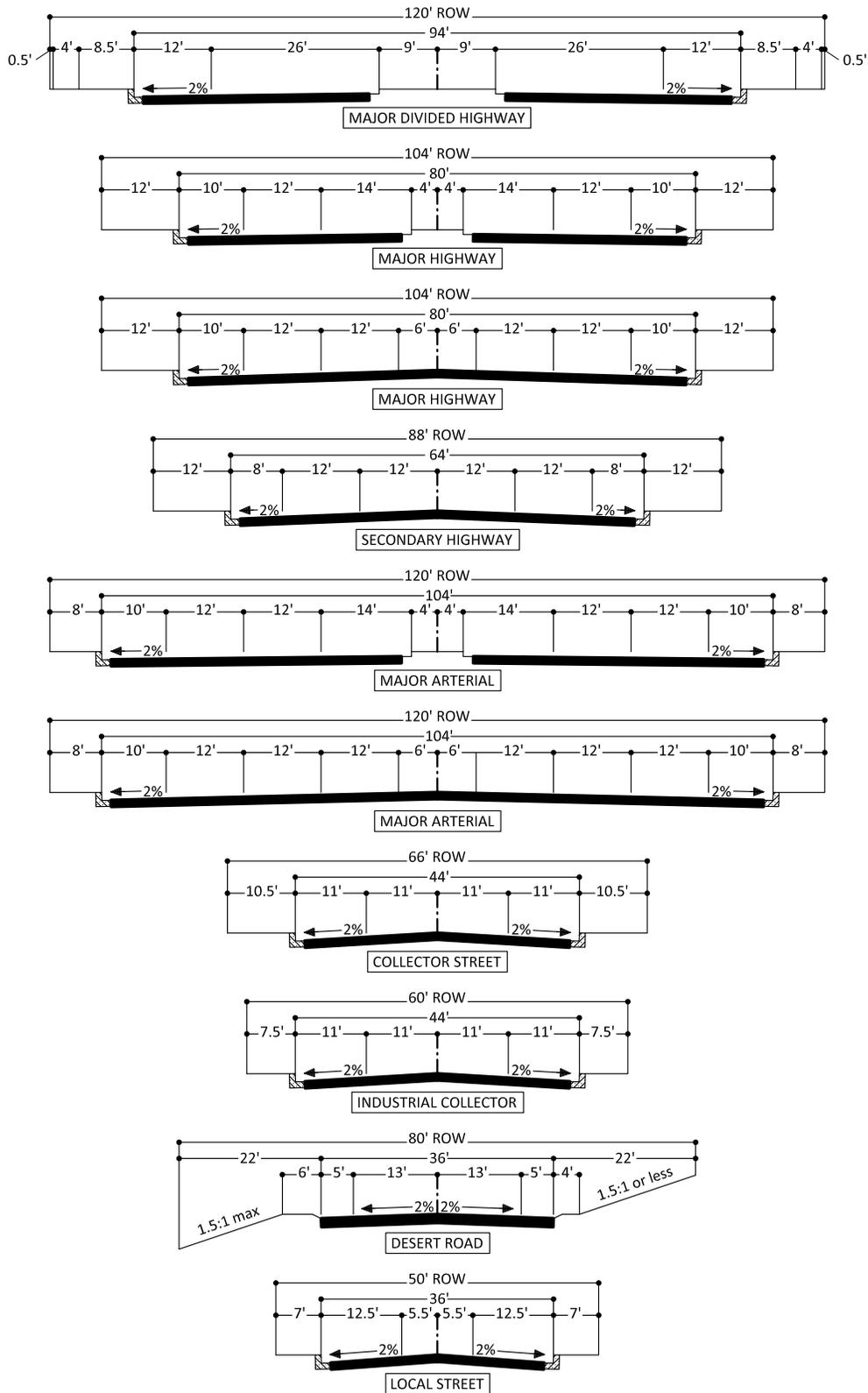


Figure 6  
 County of San Bernardino General Plan Circulation Element



# Figure 7 County of San Bernardino General Plan Roadway Cross-Sections



### III. PROJECT TRAFFIC

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#### A. Project Description

The project site is proposed to be developed with a 14 fueling position gasoline/service station with convenience market.

#### B. Trip Generation

The trips generated by the project are determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are based on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and life styles remain similar to what are known today. A major change in these variables may affect trip generation rates.

Trip generation rates were determined for daily traffic and Friday evening peak hour inbound and outbound traffic, and Sunday mid-day peak hour inbound and outbound traffic for the proposed land use. By multiplying the trip generation rates by the land use quantity, the traffic volumes are determined. The project trip generation is based upon rates obtained from the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012.

Peak hour trip generation rates for Friday evening and Sunday Mid-day peak periods are not available. Weekday evening peak hour of generator trip generation has been used because it is the highest trip generating period for this land use.

The proposed service station is projected to consist of 12 passenger car fueling positions and 2 diesel truck fueling positions. In order to provide a "conservative" analysis, the 2 diesel truck fueling positions have been assumed to have the same trip generation as a passenger car fueling position.

Peak hour trip generation rates for Friday evening and Sunday mid-day peak periods are not available. Weekday evening peak hour of generator trip generation has been used because it is the highest trip generating period for this type of land use. Weekday daily trip generation rates have been used.

As shown in Table 2, the proposed development is projected to generate approximately 2,279 daily vehicle trips, 190 of which will occur during the Friday evening peak hour and 190 of which will occur during the Sunday mid-day peak hour.

It should be noted that for the service station land use, a portion of the trips would come from pass-by trips, trips that are currently on the roadway system. In order to analyze a "conservative" scenario in terms of the assignment of trips, the traffic volumes from the service station have not been reduced as a result of pass-by trips (see Appendix G).

**C. Trip Distribution**

The distributions of the project trips were based on existing travel patterns calculated using existing traffic counts. This methodology was approved by the County of San Bernardino Transportation Department and the California Department of Transportation staff. Figures 8 and 9 contain the directional distributions of the project trips for the proposed land use.

**D. Trip Assignment**

Based on the identified trip generation and distributions, Friday evening and Sunday mid-day peak hour intersection turning movement volumes expected from the project are shown on Figures 10 and 11, respectively.

Based on the maximum trip generation for the project being assumed for both Friday evening and Sunday mid-day and the likely trip distribution of basically equal vehicle trips coming from northbound and southbound trips along this stretch of the I-15 Freeway, Figures 10 and 11 display the same project trips for both Friday evening and Sunday mid-day peak periods.

**Table 2**  
**Project Trip Generation<sup>1</sup>**

Land Use	Quantity <sup>2</sup>	Units <sup>3</sup>	Friday Evening <sup>4</sup>			Sunday Afternoon <sup>4</sup>			Daily <sup>5</sup>
			Inbound	Outbound	Total	Inbound	Outbound	Total	
<b><u>Trip Generation Rates</u></b>									
Gasoline/Service Station with Convenience Market		FP	6.79	6.78	13.57	6.79	6.78	13.57	162.78
<b><u>Trips Generated</u></b>									
Gasoline/Service Station with Convenience Market	14	FP	95	95	190	95	95	190	2,279

<sup>1</sup> Source: Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012, Land Use Code 945.

<sup>2</sup> The proposed service station is projected to consist of 12 passenger car fueling positions and 2 diesel truck fueling positions. To remain conservative, the 2 diesel truck fueling positions have been assumed to have the same trip generation as a passenger car fueling position.

<sup>3</sup> FP = Fueling Positions

<sup>4</sup> Peak hour trip generation rates for Friday evening and Saturday Mid-day peak periods are not available. Weekday evening peak hour of generator trip generation has been used because it is the highest trip generating period for this land use.

<sup>5</sup> Weekday daily trip generation rates have been used.

Figure 8  
Project Outbound Trip Distribution

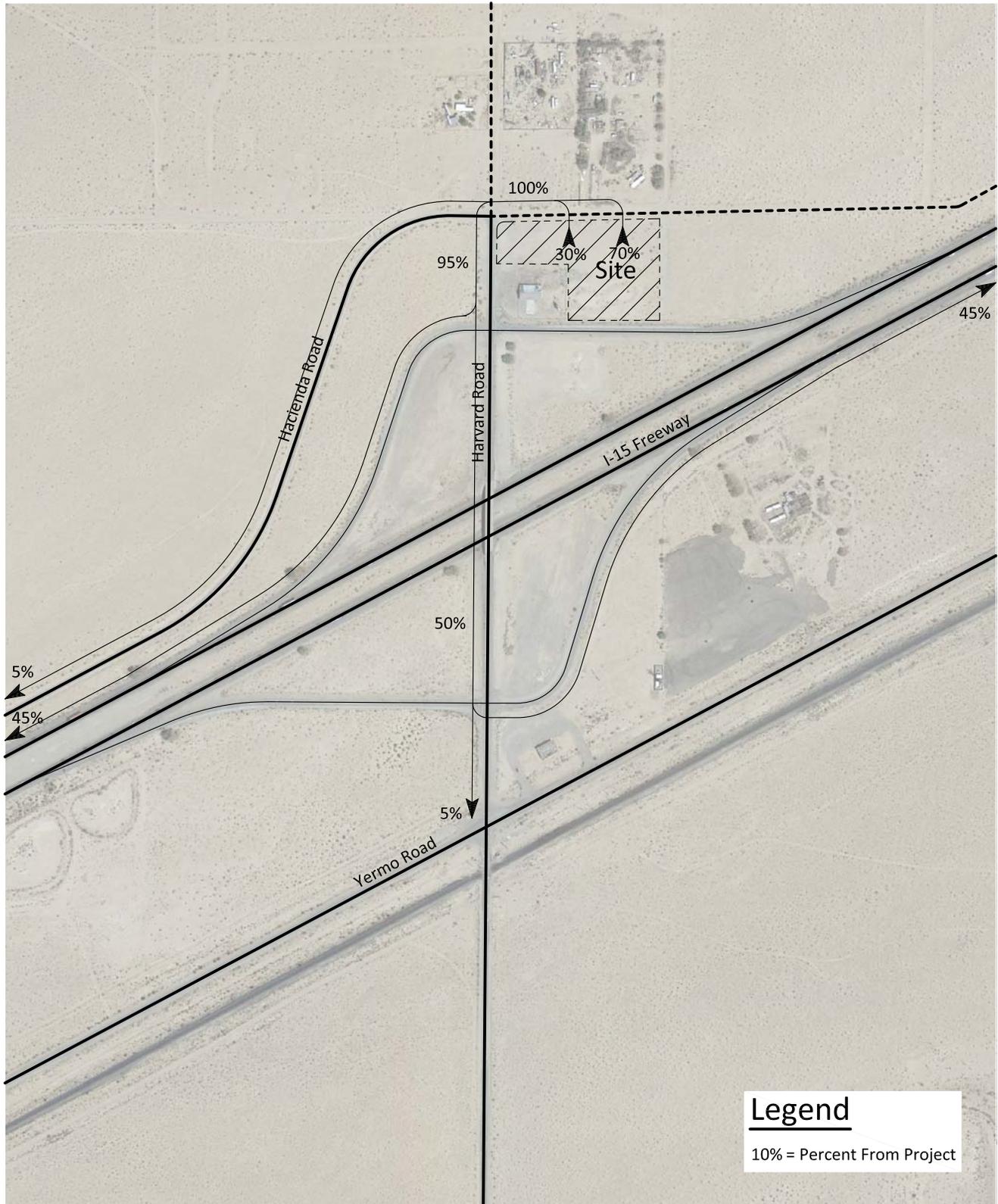
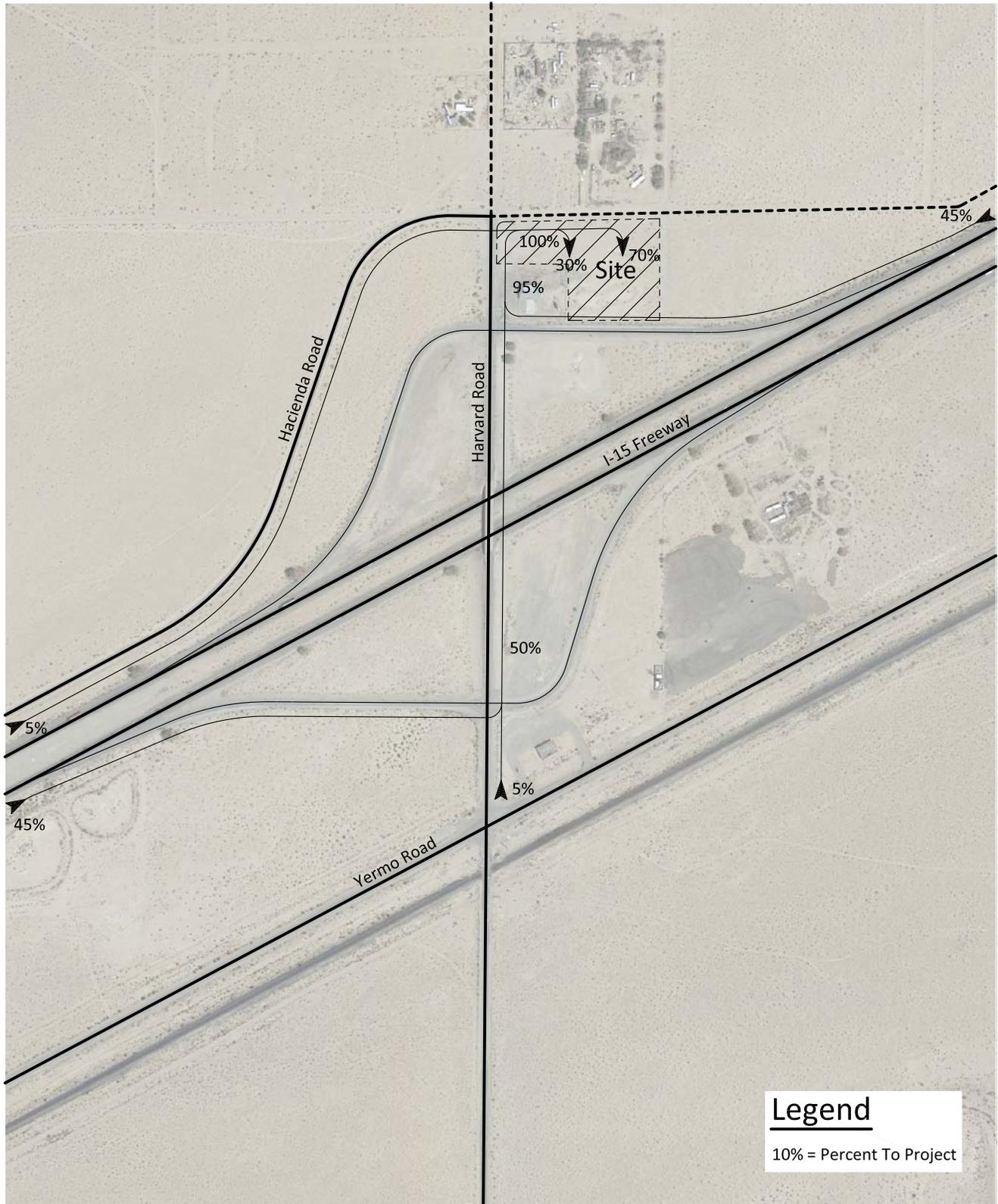


Figure 9  
Project Inbound Trip Distribution



**Legend**  
10% = Percent To Project

Figure 10  
 Project Friday Evening Peak Hour Intersection Turning Movement Volumes

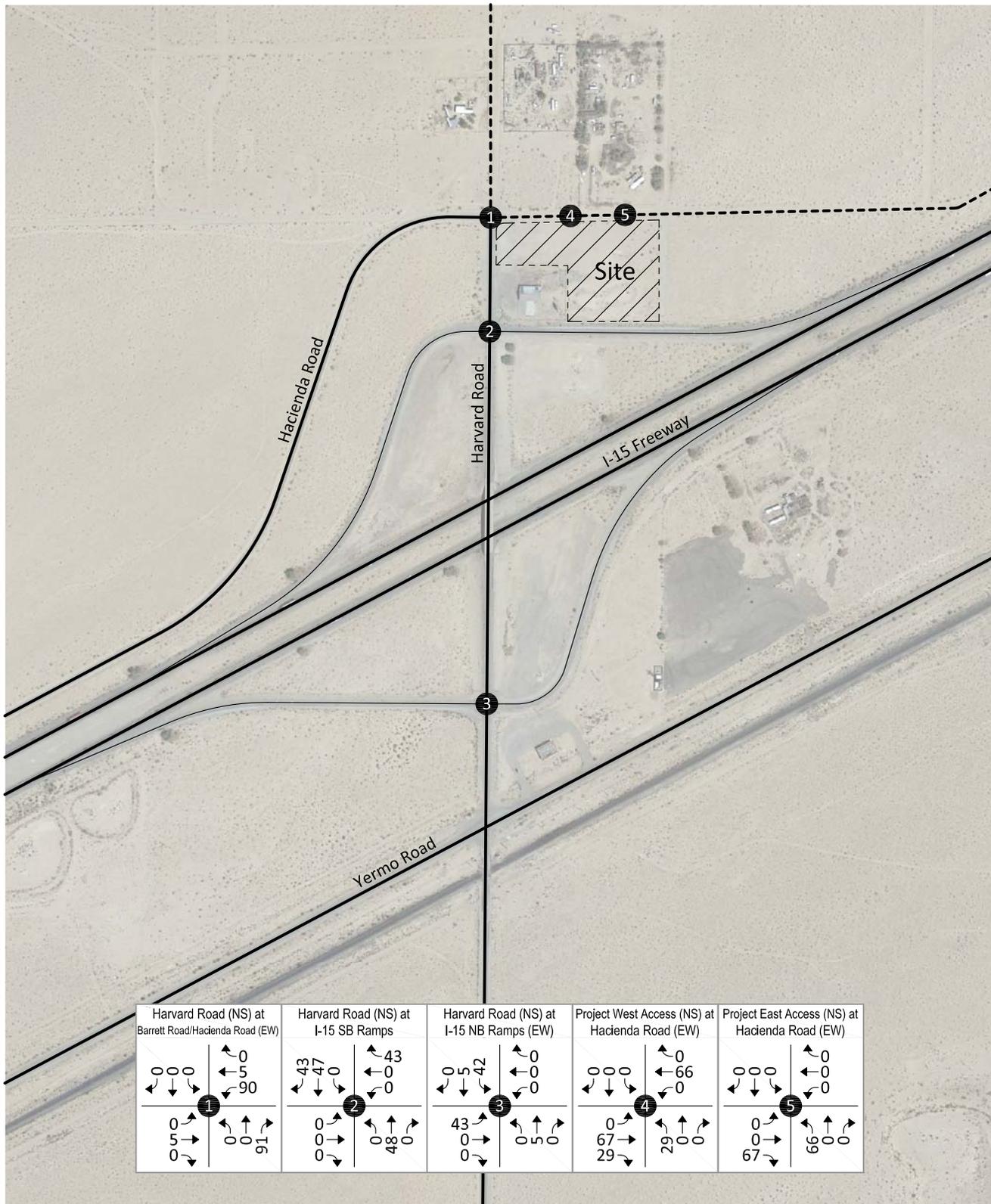
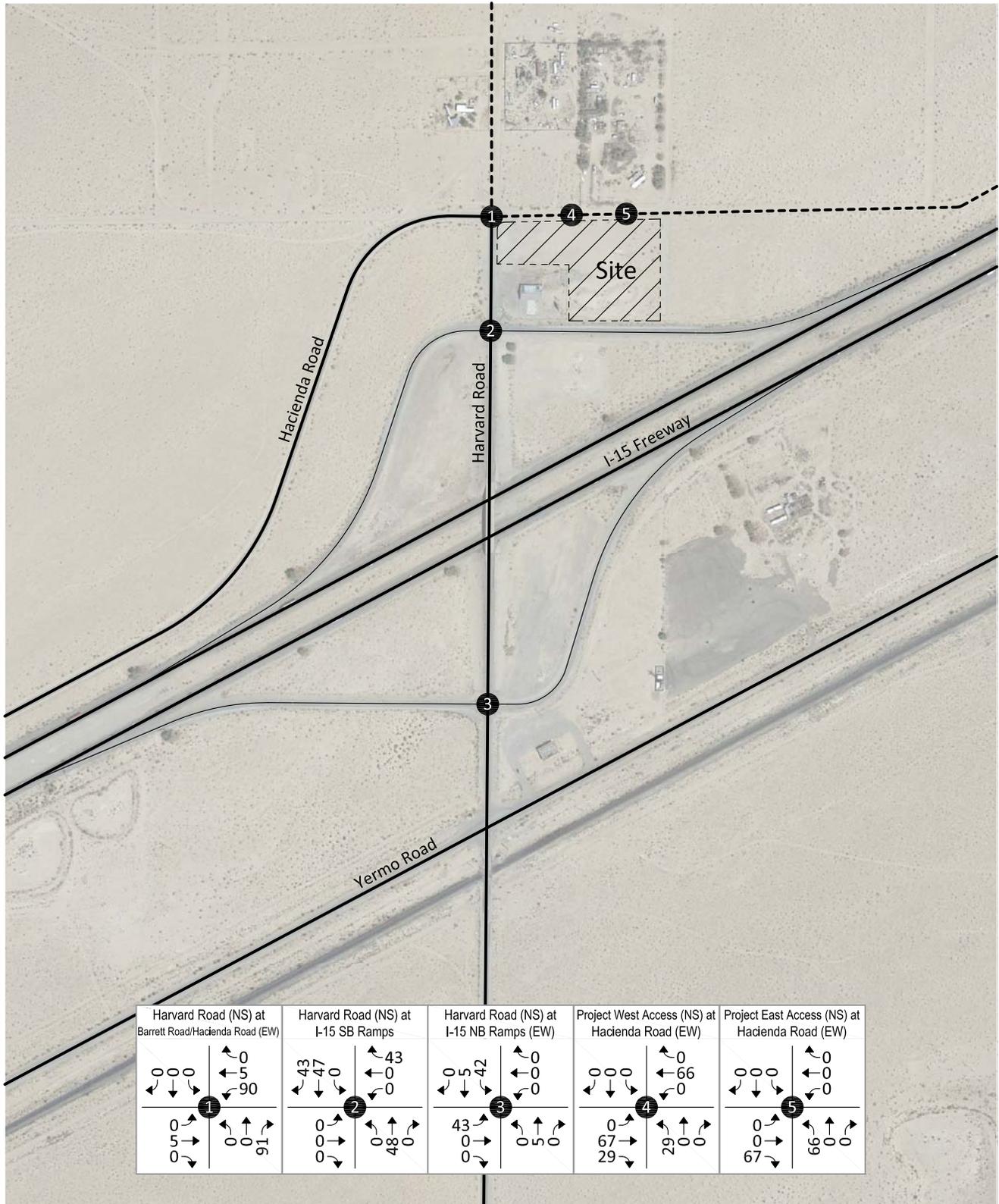


Figure 11

Project Sunday Mid-Day Peak Hour Intersection Turning Movement Volumes



## **IV. FUTURE CONDITIONS**

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### **A. Future Volumes**

As described within Section I.C., the Year 2035 average daily traffic volume forecasts with the project are developed using a growth increment process based on volumes predicted by the San Bernardino Transportation Analysis Model Year 2008 and Year 2035 traffic models. The growth increment for Year 2035 on each roadway segment is the increase in San Bernardino Transportation Analysis Model volumes from existing Year 2016 to Year 2035. The final Year 2035 roadway segment volume used for analysis purposes is then determined by adding the Year 2035 growth increment volume to the existing counted volume.

The Opening Year (2017) traffic projections have been interpolated between Year 2035 traffic volumes and existing traffic volumes utilizing a portion of the growth increment (see Section I.C.). Project traffic volumes for all future projections were estimated using the manual approach.

### **B. Future Level of Service**

#### **1. Existing Plus Project**

The Existing Plus Project delay and Level of Service for the study area roadway network are shown in Table 3 without and with improvements. Existing Plus Project delay calculation worksheets are provided in Appendix F. Existing Plus Project Friday evening and Sunday mid-day peak hour intersection turning movement volumes are shown on Figures 12 and 13, respectively.

For Existing Plus Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours.

#### **2. Opening Year (2017) Without Project**

The Opening Year (2017) Without Project delay and Level of Service for the study area roadway network without the proposed project are shown in Table 4 without and with improvements. Opening Year (2017) Without Project delay calculation worksheets are provided in Appendix F. Opening Year (2017) Without Project Friday evening and Sunday mid-day peak hour intersection turning movement volumes are shown on Figures 14 and 15, respectively.

For Opening Year (2017) Without Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours.

#### **3. Opening Year (2017) With Project**

The Opening Year (2017) With Project delay and Level of Service for the study area roadway network are shown in Table 5 without and with improvements. Opening

Year (2017) With Project delay calculation worksheets are provided in Appendix F. Opening Year (2017) With Project Friday evening and Sunday mid-day peak hour intersection turning movement volumes are shown on Figures 16 and 17, respectively.

For Opening Year (2017) With Project traffic conditions, the study area intersections are projected to operate at an acceptable Levels of Service during the peak hours.

4. Year 2035 Without Project

The Year 2035 Without Project delay and Level of Service for the study area roadway network are shown in Table 6 without and with improvements. Year 2035 Without Project delay calculation worksheets are provided in Appendix F. Year 2035 Without Project Friday evening and Sunday mid-day peak hour intersection turning movement volumes are shown on Figures 18 and 19, respectively.

For Year 2035 Without Project traffic conditions, the study area intersections are projected to operate at an acceptable Levels of Service during the peak hours.

5. Year 2035 With Project

The Year 2035 With Project delay and Level of Service for the study area roadway network are shown in Table 7 without and with improvements. Year 2035 With Project delay calculation worksheets are provided in Appendix F. Year 2035 With Project Friday evening and Sunday mid-day peak hour intersection turning movement volumes are shown on Figures 20 and 21, respectively.

For Year 2035 With Project traffic conditions, the study area intersections are projected to operate at an acceptable Levels of Service during the peak hours.

**C. Intersection Level of Service Summary**

Table 8 provides a summary of the study area intersection Levels of Service during the peak hours.

**D. Freeway Ramp Queuing Analysis**

Table 9 provides a freeway ramp queuing analysis. It appears that more than adequate ramp storage area is provided for the freeway ramps for all scenarios.

**Table 3**

**Existing Plus Project Intersection Delay and Level of Service**

Intersection	Jurisdiction	Traffic Control <sup>3</sup>	Intersection Approach Lanes <sup>1</sup>												Peak Hour Delay Level of Service <sup>2</sup>	
			Northbound			Southbound			Eastbound			Westbound			Friday Evening	Sunday Mid-day
			L	T	R	L	T	R	L	T	R	L	T	R		
Harvard Road (NS) at:																
Hacienda Road (EW) - #1	County of San Bernardino	CSS	0	1	0	0	1	0	0	1	0	0	1	0	10.2-B	10.4-B
I-15 Freeway SB Ramps (EW) - #2	California Department of Transportation	CSS	0	1	0	0	1	0	0	0	0	0	1	0	10.7-B	14.8-B
I-15 Freeway NB Ramps (EW) - #3	California Department of Transportation	CSS	0	1	0	0	1	0	0	1	0	0	0	0	11.5-B	13.9-B
Project West Access (NS) at:																
Hacienda Road (EW) - #4	County of San Bernardino	<b>CSS</b>	0	<b>1</b>	0	0	0	0	0	1	0	0	1	0	9.4-A	9.4-A
Project East Access (NS) at:																
Hacienda Road (EW) - #5	County of San Bernardino	<b>CSS</b>	0	<b>1</b>	0	0	0	0	0	1	0	0	1	0	8.9-A	8.9-A

<sup>1</sup> When a right turn lane 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; **BOLD** = Improvement

<sup>2</sup> Delay and level of service has been calculated using the following analysis software: Vistro, Version 4.00-00. Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

<sup>3</sup> CSS = Cross Street Stop

**Table 4**

**Opening Year (2017) Without Project Intersection Delay and Level of Service**

Intersection	Jurisdiction	Traffic Control <sup>3</sup>	Intersection Approach Lanes <sup>1</sup>												Peak Hour Delay Level of Service <sup>2</sup>	
			Northbound			Southbound			Eastbound			Westbound			Friday Evening	Sunday Mid-day
			L	T	R	L	T	R	L	T	R	L	T	R		
Harvard Road (NS) at:																
Hacienda Road (EW) - #1	County of San Bernardino	CSS	0	1	0	0	1	0	0	1	0	0	1	0	9.2-A	9.2-A
I-15 Freeway SB Ramps (EW) - #2	California Department of Transportation	CSS	0	1	0	0	1	0	0	0	0	0	1	0	9.3-A	11.4-B
I-15 Freeway NB Ramps (EW) - #3	California Department of Transportation	CSS	0	1	0	0	1	0	0	1	0	0	0	0	9.4-A	11.6-B

<sup>1</sup> When a right turn lane 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

<sup>2</sup> Delay and level of service has been calculated using the following analysis software: Vistro, Version 4.00-00. Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

<sup>3</sup> CSS = Cross Street Stop

**Table 5**

**Opening Year (2017) With Project Intersection Delay and Level of Service**

Intersection	Jurisdiction	Traffic Control <sup>3</sup>	Intersection Approach Lanes <sup>1</sup>												Peak Hour Delay Level of Service <sup>2</sup>	
			Northbound			Southbound			Eastbound			Westbound			Friday Evening	Sunday Mid-day
			L	T	R	L	T	R	L	T	R	L	T	R		
Harvard Road (NS) at:																
Hacienda Road (EW) - #1	County of San Bernardino	CSS	0	1	0	0	1	0	0	1	0	0	1	0	10.4-B	10.4-B
I-15 Freeway SB Ramps (EW) - #2	California Department of Transportation	CSS	0	1	0	0	1	0	0	0	0	0	1	0	10.8-B	14.9-B
I-15 Freeway NB Ramps (EW) - #3	California Department of Transportation	CSS	0	1	0	0	1	0	0	1	0	0	0	0	11.6-B	14.0-B
Project West Access (NS) at:																
Hacienda Road (EW) - #4	County of San Bernardino	<u>CSS</u>	0	<u>1</u>	0	0	0	0	0	1	0	0	1	0	9.4-A	9.4-A
Project East Access (NS) at:																
Hacienda Road (EW) - #5	County of San Bernardino	<u>CSS</u>	0	<u>1</u>	0	0	0	0	0	1	0	0	1	0	8.9-A	8.9-A

<sup>1</sup> When a right turn lane 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; **BOLD** = Improvement

<sup>2</sup> Delay and level of service has been calculated using the following analysis software: Vistro, Version 4.00-00. Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

<sup>3</sup> CSS = Cross Street Stop

**Table 6**

**Year 2035 Without Project Intersection Delay and Level of Service**

Intersection	Jurisdiction	Traffic Control <sup>3</sup>	Intersection Approach Lanes <sup>1</sup>												Peak Hour Delay Level of Service <sup>2</sup>	
			Northbound			Southbound			Eastbound			Westbound			Friday Evening	Sunday Mid-day
			L	T	R	L	T	R	L	T	R	L	T	R		
Harvard Road (NS) at:																
Hacienda Road (EW) - #1	County of San Bernardino	CSS	0	1	0	0	1	0	0	1	0	0	1	0	9.2-A	9.3-A
I-15 Freeway SB Ramps (EW) - #2	California Department of Transportation	CSS	0	1	0	0	1	0	0	0	0	0	1	0	9.4-A	11.3-B
I-15 Freeway NB Ramps (EW) - #3	California Department of Transportation	CSS	0	1	0	0	1	0	0	1	0	0	0	0	9.4-A	11.4-B

<sup>1</sup> When a right turn lane 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; **BOLD** = Improvement

<sup>2</sup> Delay and level of service has been calculated using the following analysis software: Vistro, Version 4.00-00. Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

<sup>3</sup> CSS = Cross Street Stop

**Table 7**

**Year 2035 With Project Intersection Delay and Level of Service**

Intersection	Jurisdiction	Traffic Control <sup>3</sup>	Intersection Approach Lanes <sup>1</sup>												Peak Hour Delay Level of Service <sup>2</sup>	
			Northbound			Southbound			Eastbound			Westbound			Friday Evening	Sunday Mid-day
			L	T	R	L	T	R	L	T	R	L	T	R		
Harvard Road (NS) at:																
Hacienda Road (EW) - #1	County of San Bernardino	CSS	0	1	0	0	1	0	0	1	0	0	1	0	9.9-A	10.1-B
I-15 Freeway SB Ramps (EW) - #2	California Department of Transportation	CSS	0	1	0	0	1	0	0	0	0	0	1	0	10.5-B	13.9-B
I-15 Freeway NB Ramps (EW) - #3	California Department of Transportation	CSS	0	1	0	0	1	0	0	1	0	0	0	0	10.4-B	13.3-B
Project West Access (NS) at:																
Hacienda Road (EW) - #4	County of San Bernardino	<u>CSS</u>	0	<u>1</u>	0	0	0	0	0	1	0	0	1	0	9.4-A	9.4-A
Project East Access (NS) at:																
Hacienda Road (EW) - #5	County of San Bernardino	<u>CSS</u>	0	<u>1</u>	0	0	0	0	0	1	0	0	1	0	9.8-A	8.9-A

<sup>1</sup> When a right turn lane 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; **BOLD** = Improvement

<sup>2</sup> Delay and level of service has been calculated using the following analysis software: Vistro, Version 4.00-00. Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

<sup>3</sup> CSS = Cross Street Stop

Table 8

Intersection Delay and Level of Service Summary

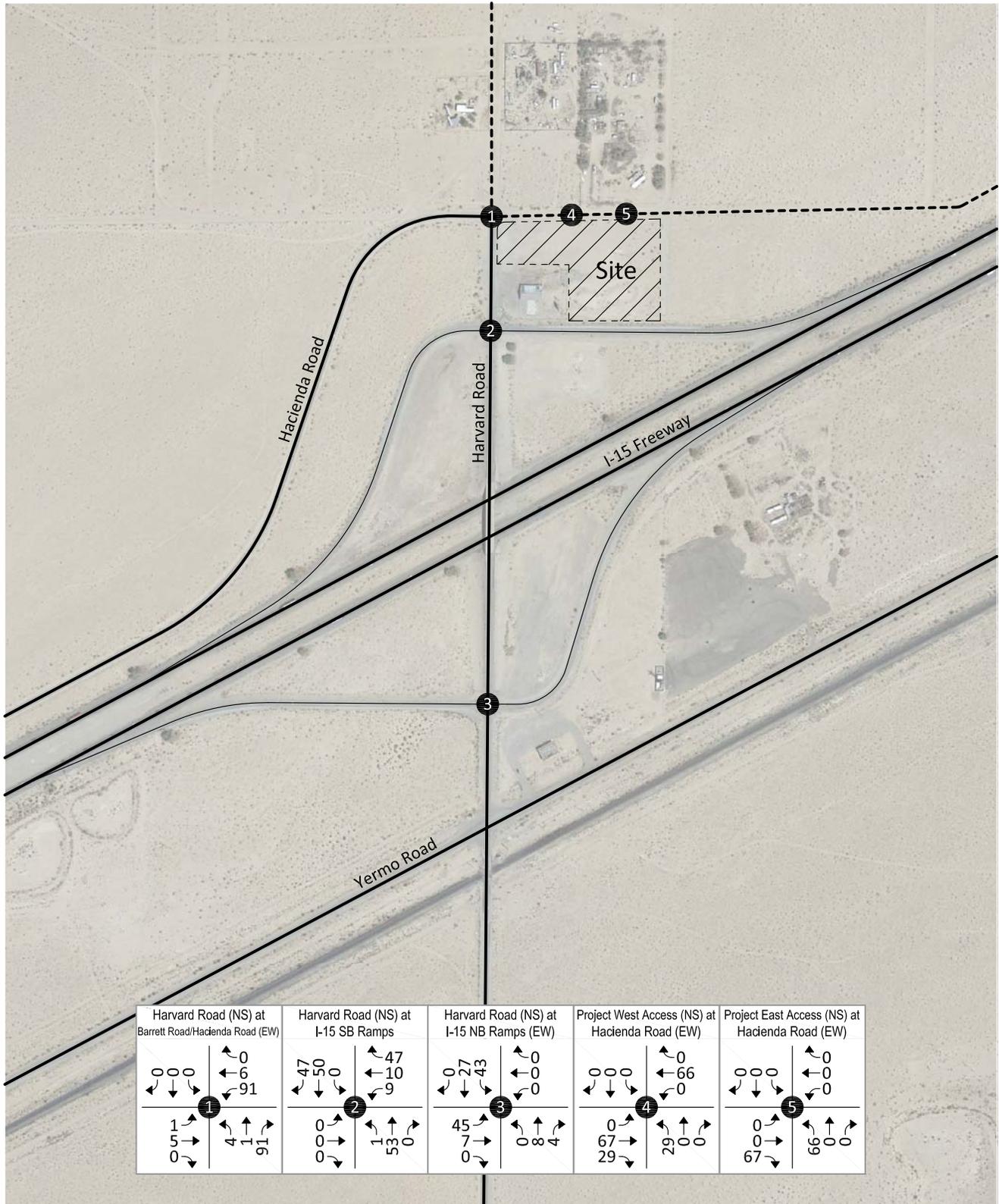
Intersection	Jurisdiction	Peak Hour Delay Level of Service											
		Existing		Existing Plus Project		Opening Year (2017)				Year 2035			
						Without Project		With Project		Without Project		With Project	
		Friday Evening	Sunday Mid-day	Friday Evening	Sunday Mid-day	Friday Evening	Sunday Mid-day	Friday Evening	Sunday Mid-day	Friday Evening	Sunday Mid-day	Friday Evening	Sunday Mid-day
Harvard Road (NS) at:													
Hacienda Road (EW) - #1	County of San Bernardino	9.1-A	9.2-A	10.2-B	10.4-B	9.2-A	9.2-A	10.4-B	10.4-B	9.2-A	9.3-A	9.9-A	10.1-B
I-15 Freeway SB Ramps (EW) - #2	California Department of Transportation	9.2-A	11.4-B	10.7-B	14.8-B	9.3-A	11.4-B	10.8-B	14.9-B	9.4-A	11.3-B	10.5-B	13.9-B
I-15 Freeway NB Ramps (EW) - #3	California Department of Transportation	9.4-A	11.5-B	11.5-B	13.9-B	9.4-A	11.6-B	11.6-B	14.0-B	9.4-A	11.4-B	10.4-B	13.3-B
Project West Access (NS) at:													
Hacienda Road (EW) - #4	County of San Bernardino	NA	NA	9.4-A	9.4-A	NA	NA	9.4-A	9.4-A	NA	NA	9.4-A	9.4-A
Project East Access (NS) at:													
Hacienda Road (EW) - #5	County of San Bernardino	NA	NA	8.9-A	8.9-A	NA	NA	8.9-A	8.9-A	NA	NA	9.8-A	8.9-A

**Table 9**

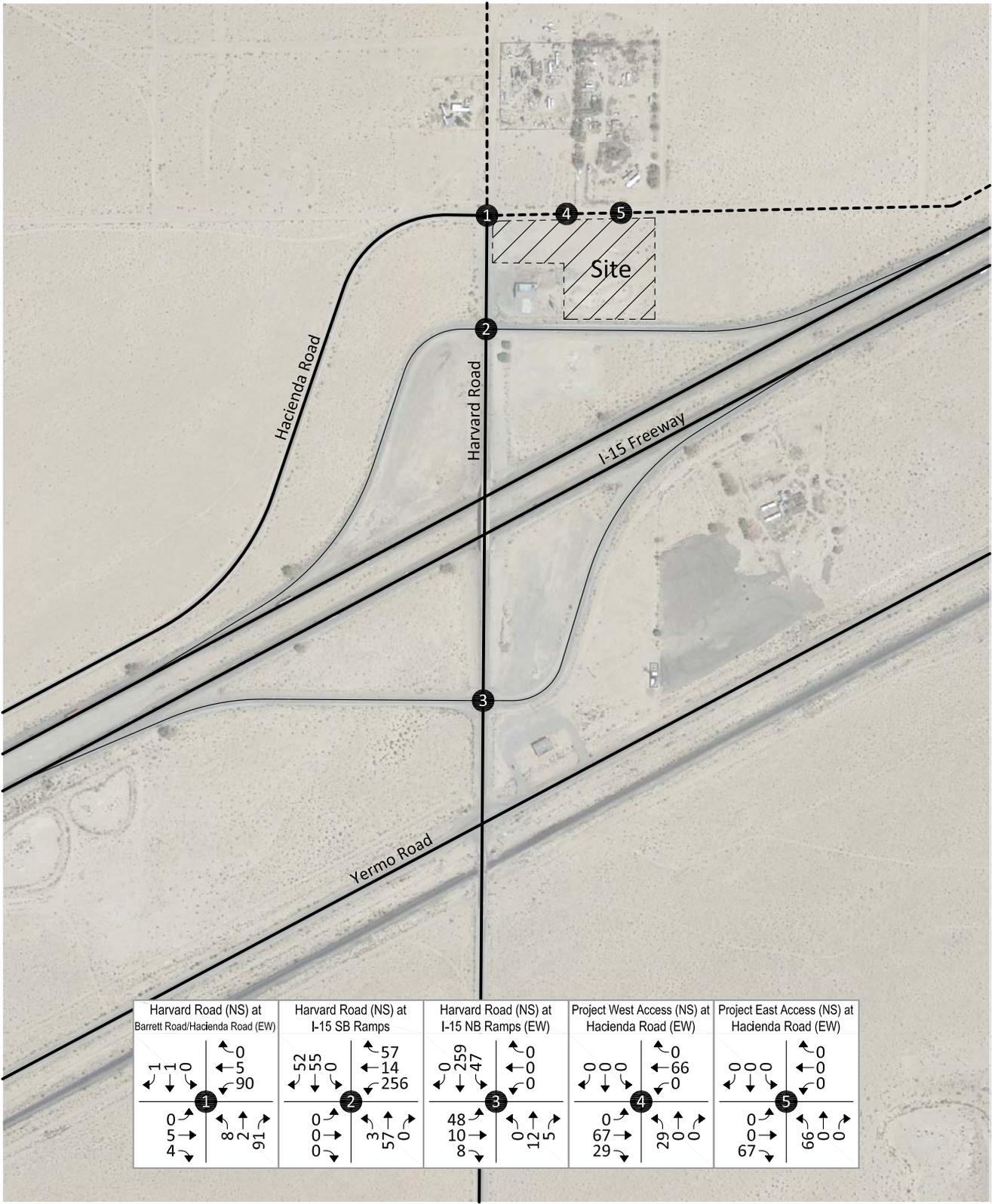
**Freeway Ramp Queuing Analysis**

Intersection Number	Leg	Scenario	Storage Length In Feet		
			Currently Provided	Minimum Required	
				Peak Hour	
				Friday	Sunday
2	East	Existing	1,575	50	225
		Existing Plus Project	1,575	50	275
		Opening Year (2017) Without Project	1,575	50	250
		Opening Year (2017) With Project	1,575	50	275
		Year 2035 Without Project	1,575	50	275
		Year 2035 With Project	1,575	50	300
3	West	Existing	1,610	50	50
		Existing Plus Project	1,610	50	50
		Opening Year (2017) Without Project	1,610	50	50
		Opening Year (2017) With Project	1,610	50	50
		Year 2035 Without Project	1,610	50	50
		Year 2035 With Project	1,610	50	50

**Figure 12**  
**Existing Plus Project Friday**  
**Evening Peak Hour Intersection Turning Movement Volumes**

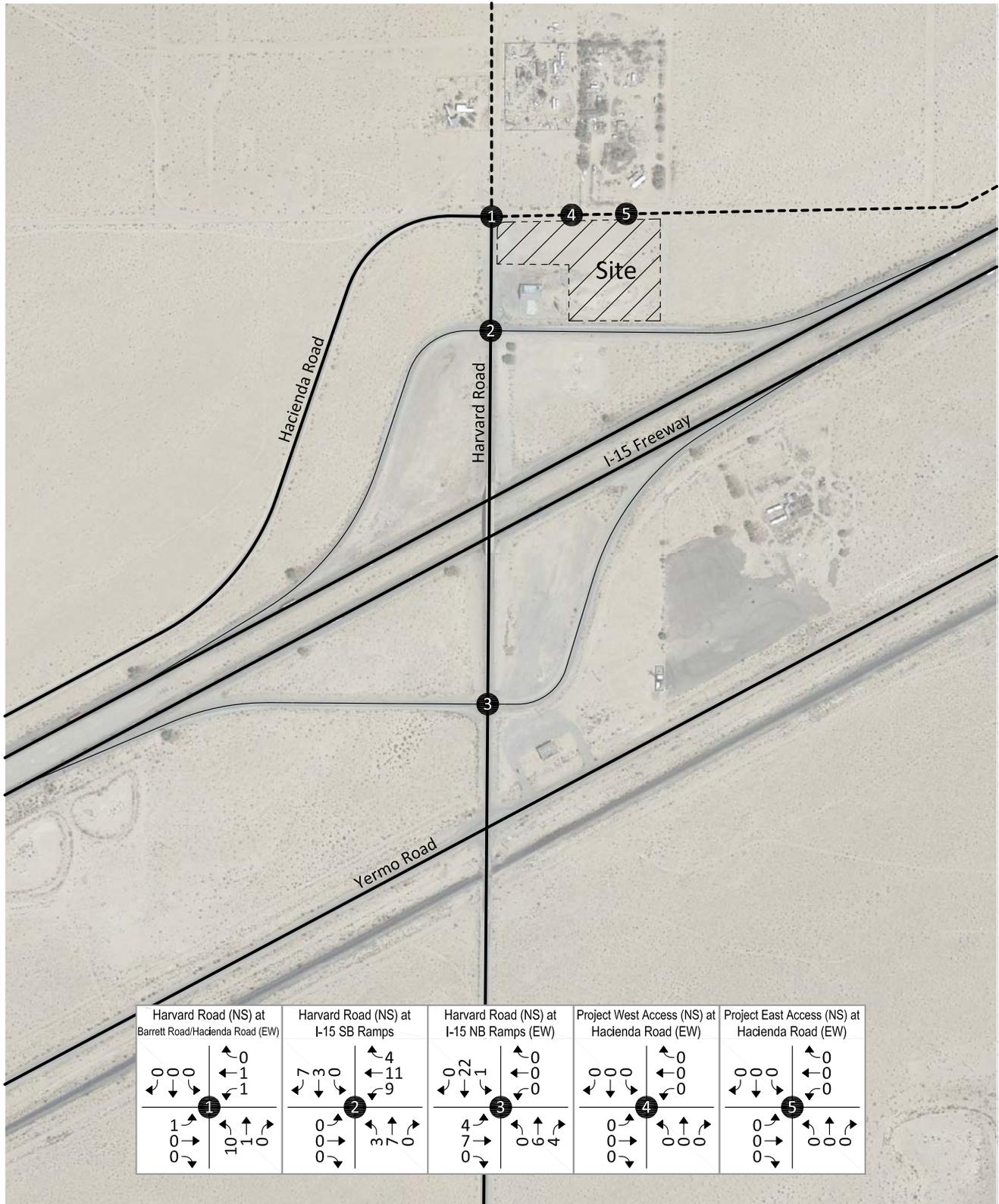


**Figure 13**  
**Existing Plus Project Sunday**  
**Mid-Day Peak Hour Intersection Turning Movement Volumes**

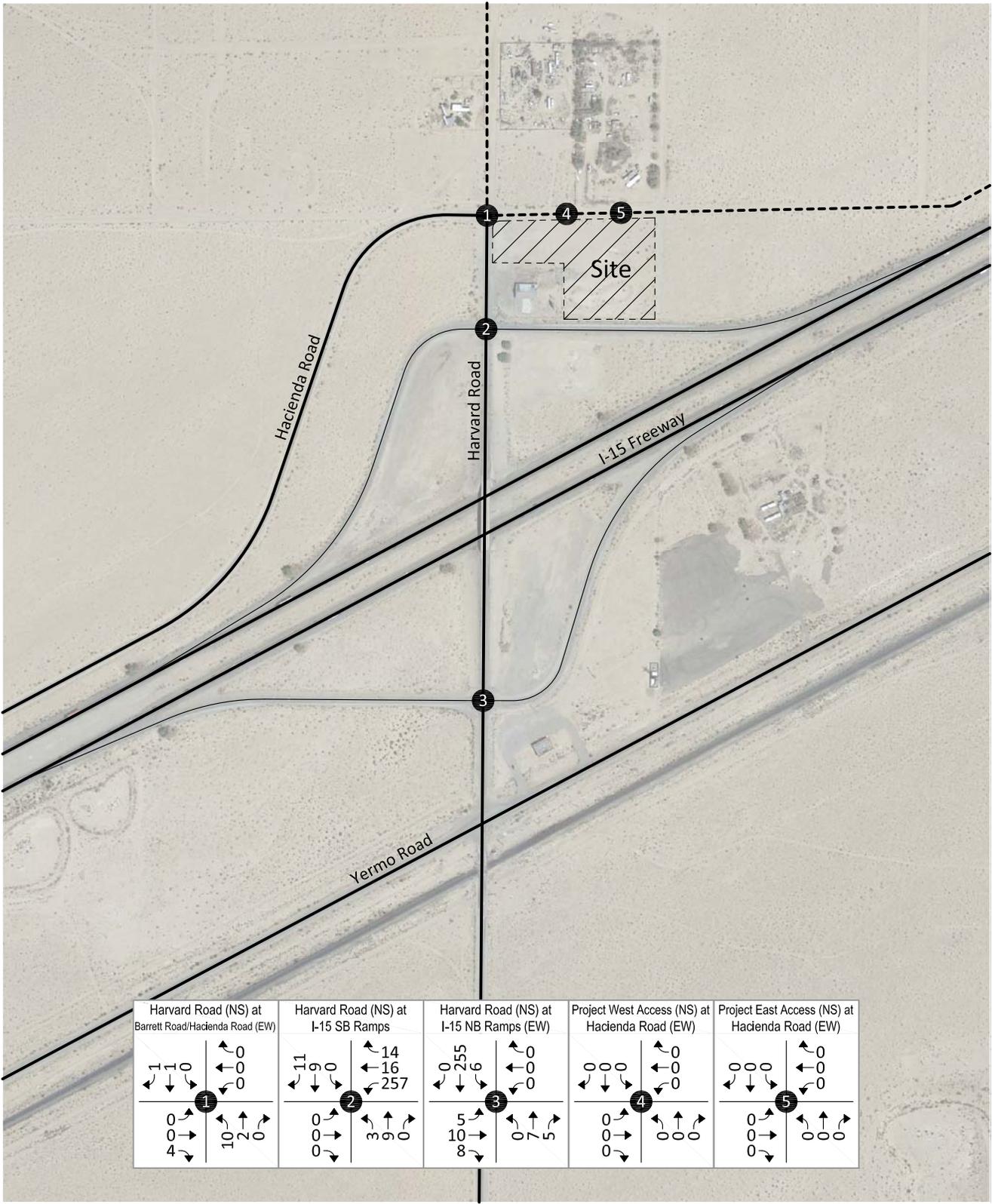


Harvard Road (NS) at Barrett Road/Hacienda Road (EW)	Harvard Road (NS) at I-15 SB Ramps	Harvard Road (NS) at I-15 NB Ramps (EW)	Project West Access (NS) at Hacienda Road (EW)	Project East Access (NS) at Hacienda Road (EW)																																																																															
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**Figure 14**  
**Opening Year (2017) Without Project Friday**  
**Evening Peak Hour Intersection Turning Movement Volumes**

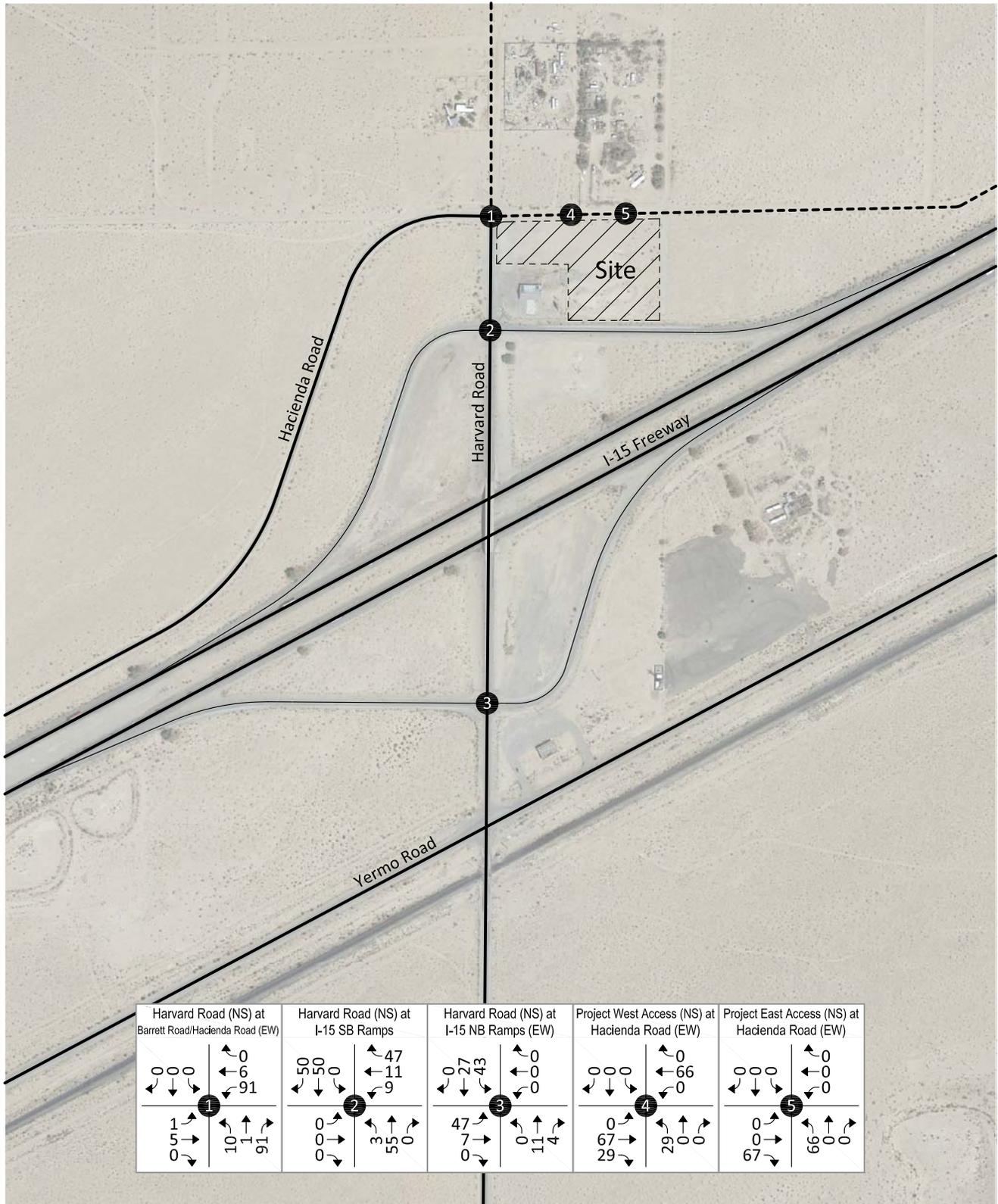


**Figure 15**  
**Opening Year (2017) Without Project Sunday**  
**Mid-Day Peak Hour Intersection Turning Movement Volumes**

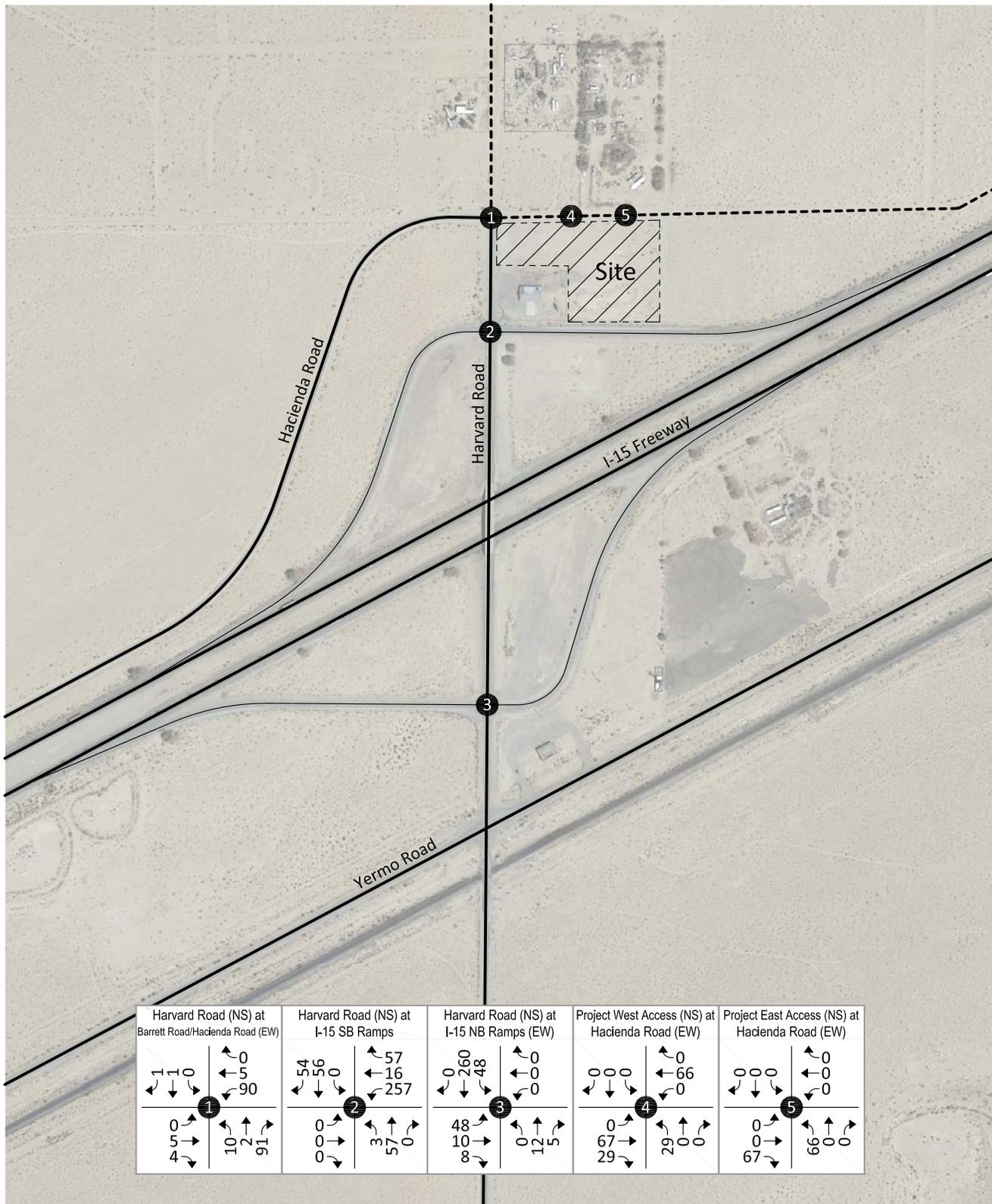


Harvard Road (NS) at Barrett Road/Hacienda Road (EW)	Harvard Road (NS) at I-15 SB Ramps	Harvard Road (NS) at I-15 NB Ramps (EW)	Project West Access (NS) at Hacienda Road (EW)	Project East Access (NS) at Hacienda Road (EW)

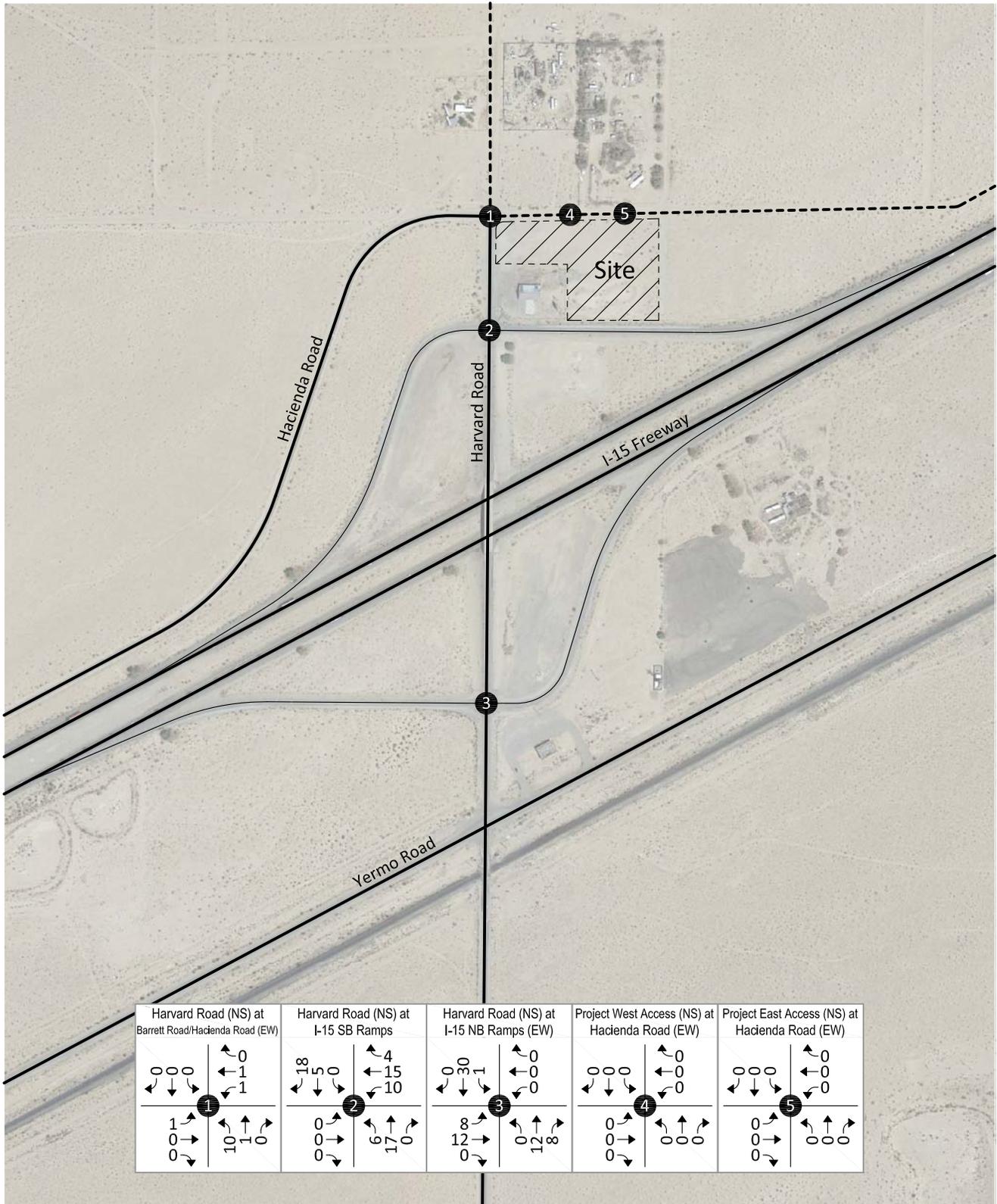
**Figure 16**  
**Opening Year (2017) With Project Friday**  
**Evening Peak Hour Intersection Turning Movement Volumes**



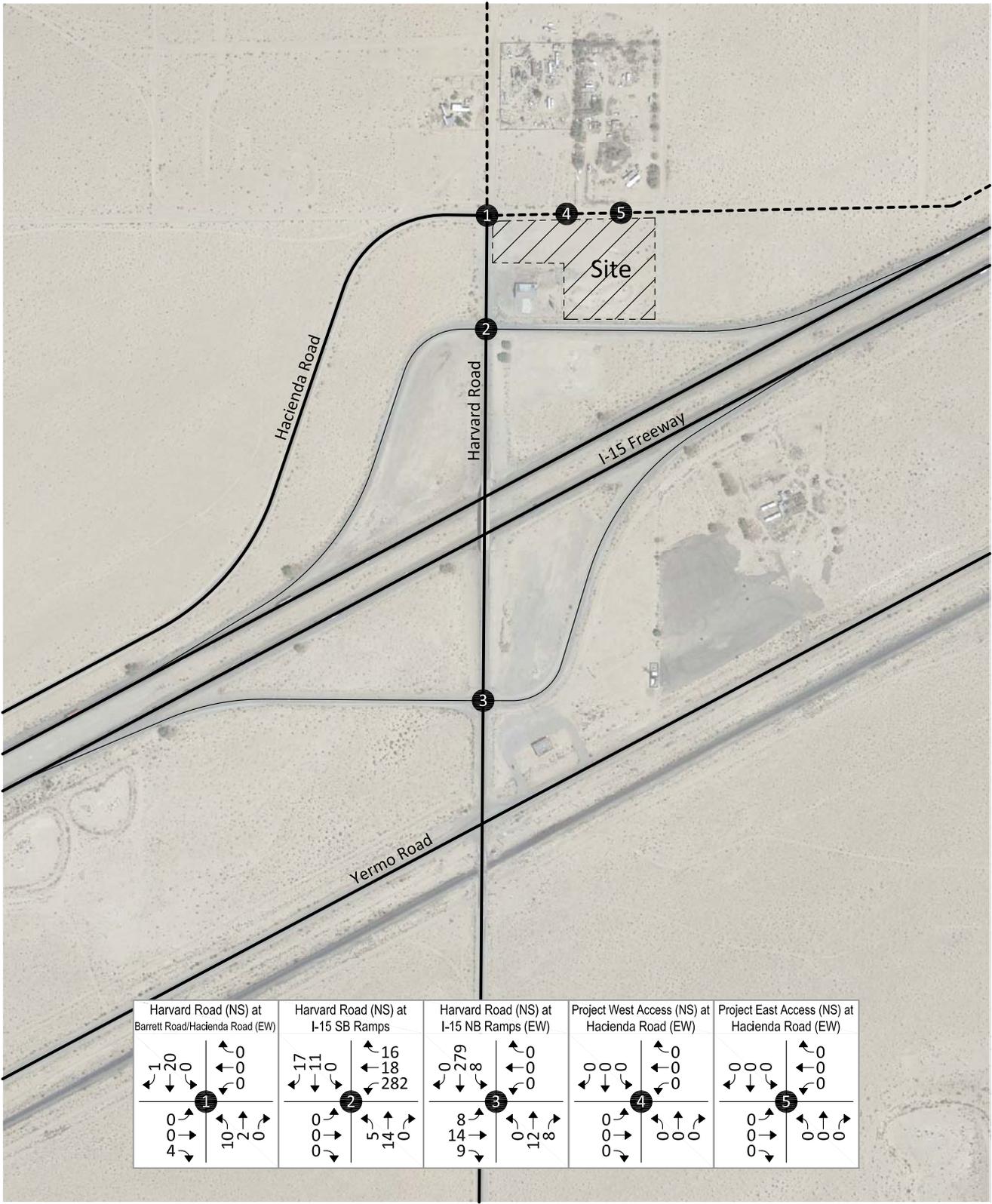
**Figure 17**  
**Opening Year (2017) With Project Sunday**  
**Mid-Day Peak Hour Intersection Turning Movement Volumes**



**Figure 18**  
**Year 2035 Without Project Friday**  
**Evening Peak Hour Intersection Turning Movement Volumes**

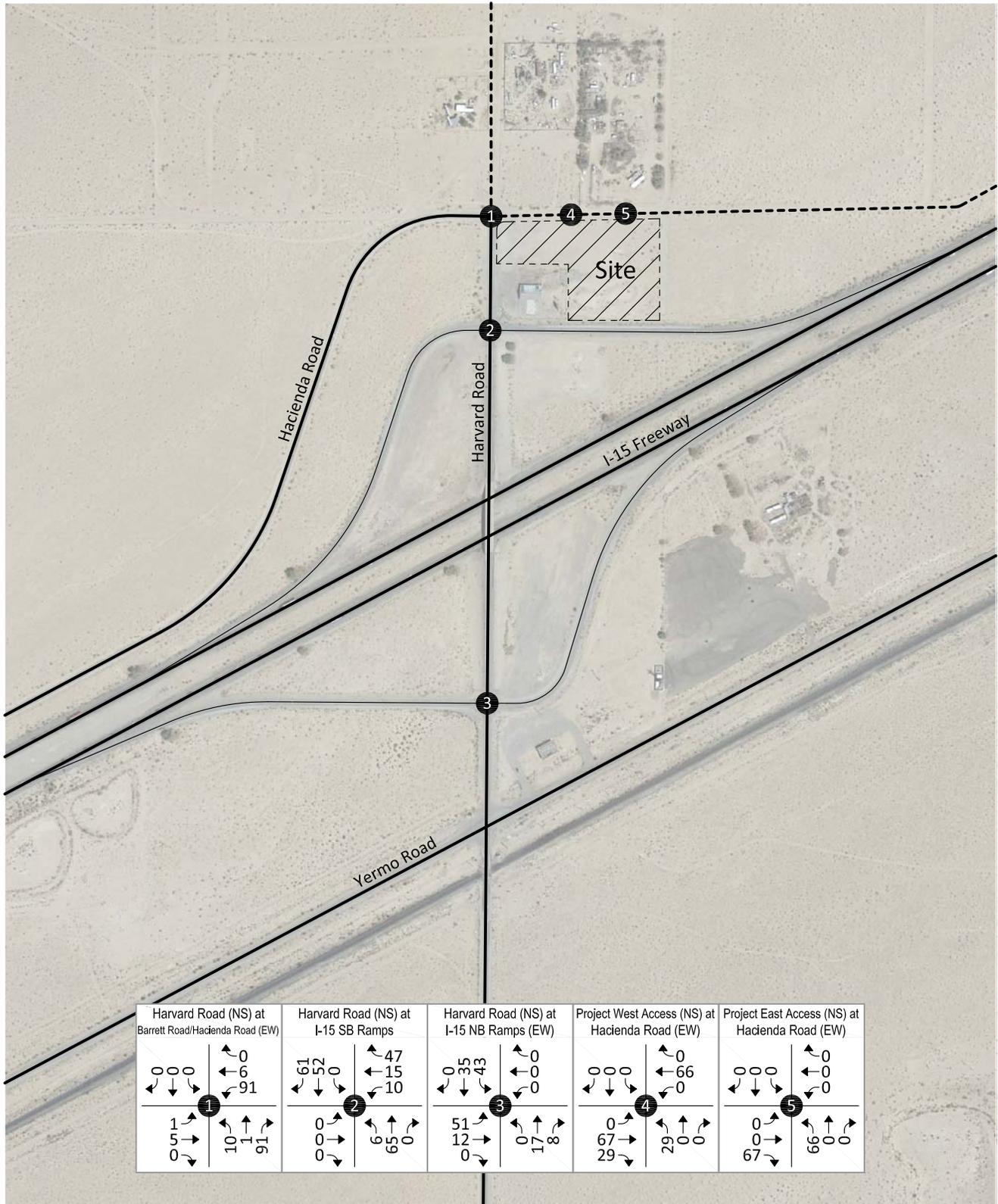


**Figure 19**  
**Year 2035 Without Project Sunday**  
**Mid-Day Peak Hour Intersection Turning Movement Volumes**

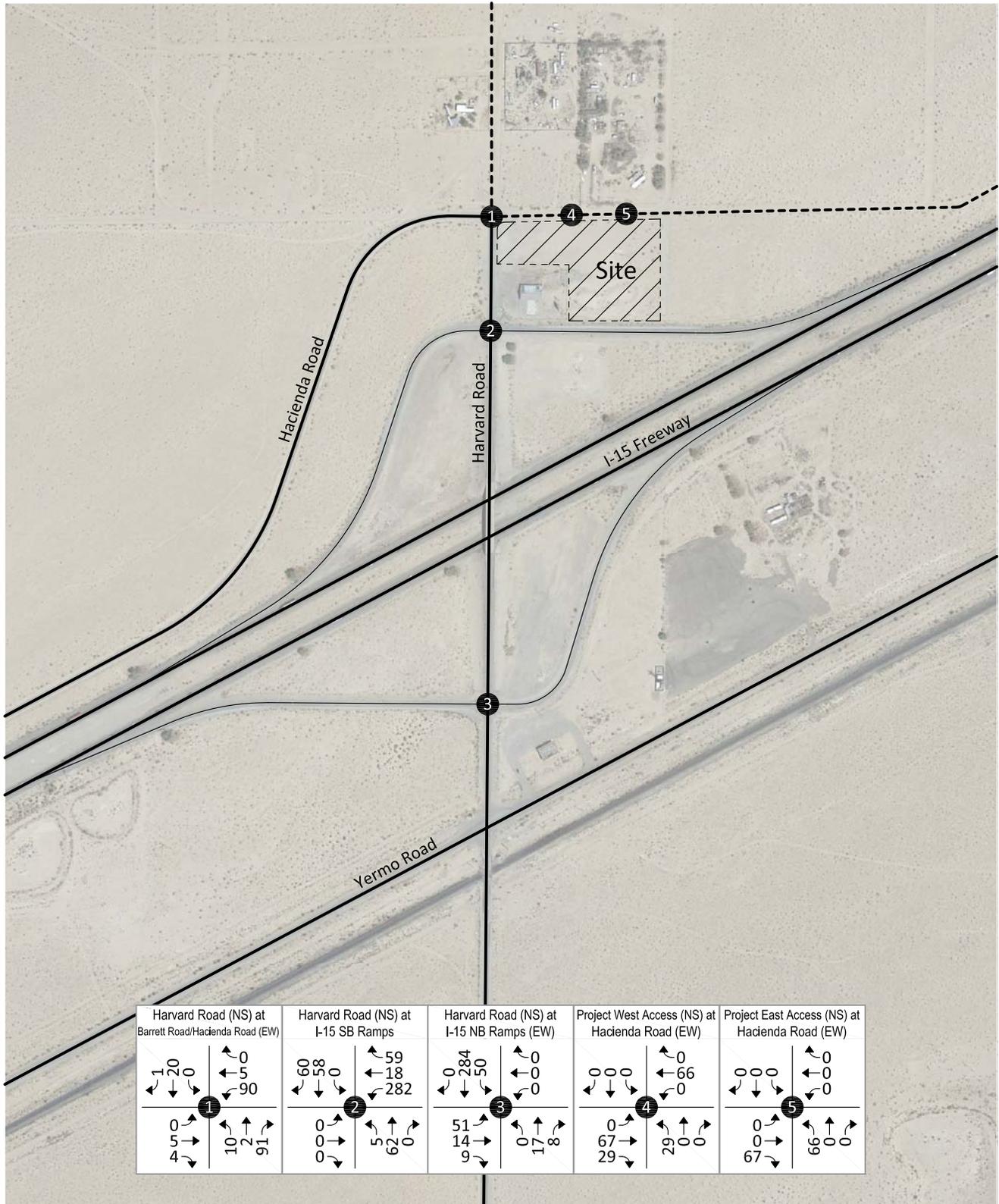


Harvard Road (NS) at Barrett Road/Hacienda Road (EW)	Harvard Road (NS) at I-15 SB Ramps	Harvard Road (NS) at I-15 NB Ramps (EW)	Project West Access (NS) at Hacienda Road (EW)	Project East Access (NS) at Hacienda Road (EW)

**Figure 20**  
**Year 2035 With Project Friday**  
**Evening Peak Hour Intersection Turning Movement Volumes**



**Figure 21**  
**Year 2035 With Project Sunday**  
**Mid-Day Peak Hour Intersection Turning Movement Volumes**



## V. CONCLUSIONS AND RECOMMENDATIONS

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### A. Summary

The traffic issues related to the proposed land uses and development have been evaluated in the context of the California Environmental Quality Act.

The County of San Bernardino is the lead agency responsible for preparation of the traffic impact analysis, in accordance with California Environmental Quality Act authorizing legislation. This report analyzes traffic impacts for the anticipated opening date with full occupancy of the development in Year 2017, at which time it will be generating trips at its full potential, and for the current traffic forecast year, which is the Year 2035.

A series of scoping discussions were conducted with the County of San Bernardino and the California Department of Transportation to define the desired analysis locations for each future analysis year. In addition, the San Bernardino Associated Governments staff has also been contacted to discuss the project.

The average daily traffic volume forecasts have been determined using the growth increment approach on the San Bernardino Transportation Analysis Model Year 2008 and Year 2035 average daily traffic volume forecasts (see Appendix E). Traffic model plots are included in Appendix D. This difference defines the growth in traffic over the 27 year period. The incremental growth in average daily traffic volume has been factored to reflect the forecast growth between Year 2016 and Year 2035. For this purpose, linear growth between the Year 2008 base condition and the forecast Year 2035 condition was assumed. Since the increment between Year 2016 and Year 2035 is 19 years of the 27 year time frame, a factor of 0.70 (i.e., 19/27) was used.

The Year 2035 without project daily and peak hour directional roadway segment volume forecasts have been determined using the growth increment approach on the San Bernardino Transportation Analysis Model Year 2008 and Year 2035 peak hour volumes. The growth increment calculation worksheets are shown in Appendix E. Current peak hour intersection approach/departure data is a necessary input to this approach. The existing traffic count data serves as both the starting point for the refinement process, and also provides important insight into current travel patterns and the relationship between peak hour and daily traffic conditions. The initial turning movement proportions are estimated based upon the relationship of each approach leg's forecast traffic volume to the other legs forecast volumes at the intersection. The initial estimate of turning movement proportions is then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program Report 255. A linear programming algorithm is used to calculate individual turning movements that match the known directional roadway segment 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.

Project traffic volumes were then added to the Year 2035 San Bernardino Transportation Analysis Model volumes. Quality control checks and forecast adjustments were performed

as necessary to ensure that all future traffic volume forecasts reflect a minimum of 10% growth over existing traffic volumes. The result of this traffic forecasting procedure is a series of traffic volumes suitable for traffic operations analysis.

**B. Existing Conditions**

Regional access to the project site is mainly provided by the I-15 Freeway. Local access is provided by various roadways in the vicinity of the site. The north-south roadway which will be most affected by the project is Harvard Road. The east-west roadway which will be most affected by the project is Hacienda Road.

The existing delay and Level of Service for the intersection in the vicinity of the project are shown in Table 1. The study area intersections currently operate within acceptable Levels of Service during the peak hours for existing traffic conditions.

**C. Project Traffic**

Trip generation rates were determined for daily traffic and morning peak hour inbound and outbound traffic, and evening peak hour inbound and outbound traffic for the proposed land uses. By multiplying the trip generation rates by the land use quantity, the traffic volumes are determined. The project trip generation is based upon rates obtained from the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012.

Peak hour trip generation rates for Friday evening and Sunday mid-day peak periods are not available. Weekday evening peak hour of generator trip generation has been used because it is the highest trip generating period for this land use.

As shown in Table 2, the proposed development is projected to generate approximately 2,279 daily vehicle trips, 190 of which will occur during the Friday evening peak hour and 190 of which will occur during the Sunday mid-day peak hour.

The distributions of the project trips were based on existing travel patterns calculated using existing traffic counts. This methodology was approved by the County of San Bernardino Transportation Department and the California Department of Transportation and the California Department of Transportation staff.

**D. Future Conditions**

An Existing Plus Project, Opening Year (2017) analysis, and Year 2035 analysis are included in this report. Existing Plus Project traffic operations analysis has been completed for Friday evening and Sunday mid-day peak hours and is shown in Table 3. Opening Year (2017) traffic operations analysis has been completed for Friday evening and Sunday mid-day peak hours and is shown in Tables 4 and 5. Year 2035 traffic operations analysis has been completed for Friday evening and Sunday mid-day peak hours and is shown in Tables 6 and 7.

For Existing Plus Project traffic conditions, the study area intersections are projected to operate at an acceptable Levels of Service during the peak hours.

For Opening Year (2017) Without Project traffic conditions, the study area intersections are projected to operate at an acceptable Levels of Service during the peak hours.

For Opening Year (2017) With Project traffic conditions, the study area intersections are projected to operate at an acceptable Levels of Service during the peak hours.

For Year 2035 Without Project traffic conditions, the study area intersections are projected to operate at an acceptable Levels of Service during the peak hours.

For Year 2035 With Project traffic conditions, the study area intersections are projected to operate at an acceptable Levels of Service during the peak hours.

## **E. Recommendations**

Site-specific circulation and access recommendations are depicted on Figure 22.

### **1. On-Site Improvements**

Construct Harvard Road from Hacienda Road to the south project boundary at its ultimate cross-section width including landscaping and parkway improvements in conjunction with development.

Construct Hacienda Road from the Harvard Road to the east project boundary at its ultimate cross-section width including landscaping and parkway improvements in conjunction with development.

The project site should provide sufficient parking spaces to meet County of San Bernardino parking code requirements in order to service on-site parking demand.

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

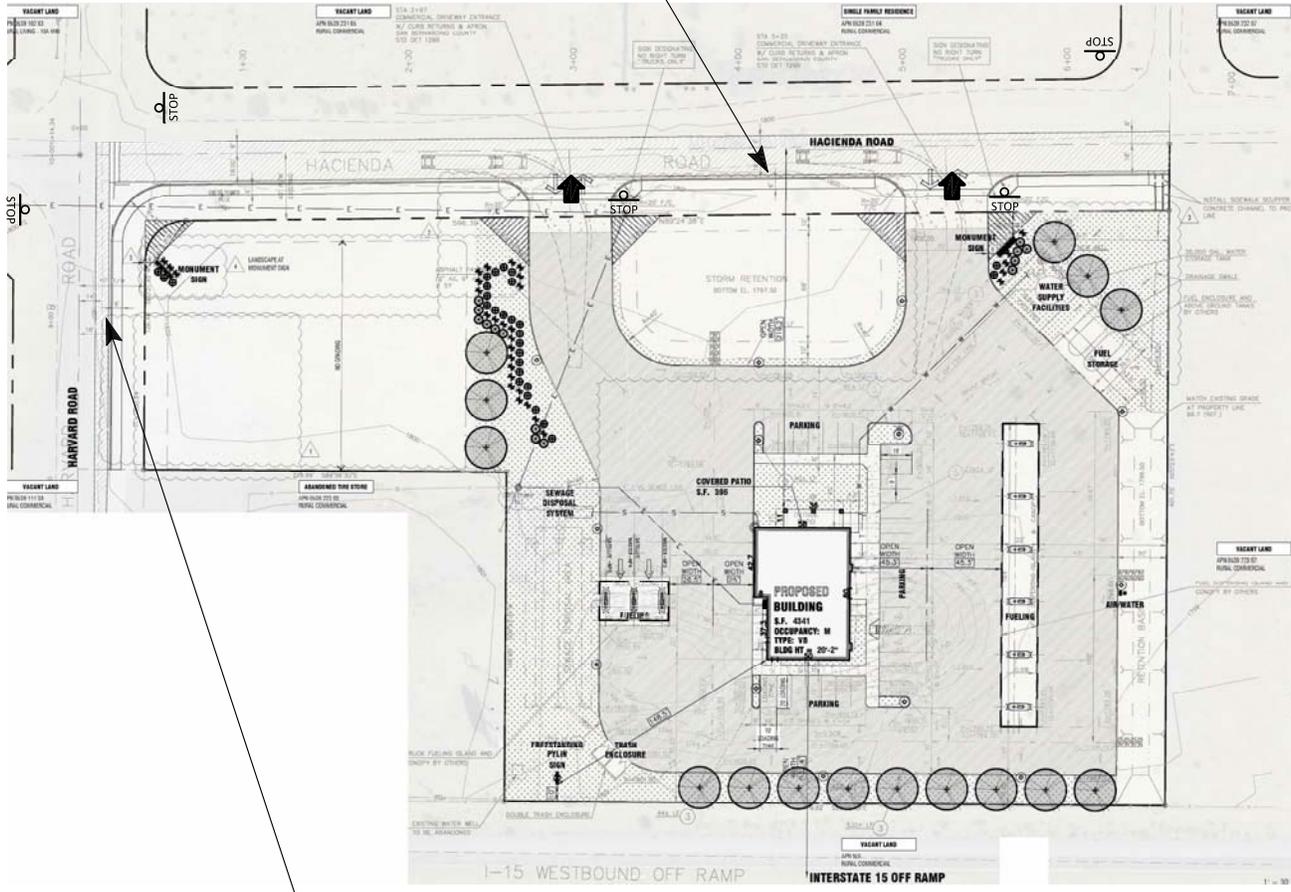
Sight distance at each project access should be reviewed with respect to California Department of Transportation/County of San Bernardino standards in conjunction with the preparation of final grading, landscaping, and street improvement plans.

### **2. Off-Site Improvements**

As is the case for any roadway design, the County of San Bernardino should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

Figure 22  
Circulation Recommendations

Construct Hacienda Road from the Harvard Road to the east project boundary at its ultimate cross-section width including landscaping and parkway improvements in conjunction with development.



Construct Harvard Road from Hacienda Road to the south project boundary at its ultimate cross-section width including landscaping and parkway improvements in conjunction with development.

The project site should provide sufficient parking spaces to meet County of San Bernardino parking code requirements in order to service on-site parking demand.

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

Sight distance at each project access should be reviewed with respect to California Department of Transportation/County of San Bernardino standards in conjunction with the preparation of final grading, landscaping, and street improvement plans.

As is the case for any roadway design, the County of San Bernardino should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

**Legend**

- = Stop Sign
- ◀ = Full Access Driveway

## **APPENDICES**

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**Appendix A – Glossary of Transportation Terms**

**Appendix B – Scoping Agreement**

**Appendix C – Traffic Count Worksheets**

**Appendix D – SBTAM Model Plots**

**Appendix E – Future Growth Increment Calculation Worksheets**

**Appendix F – Explanation and Calculation of Intersection Delay**

**Appendix G – Pass-By Trips**

**APPENDIX A**

**GLOSSARY OF TRANSPORTATION TERMS**

## GLOSSARY OF TRANSPORTATION TERMS

### COMMON ABBREVIATIONS

AC:	Acres
ADT:	Average Daily Traffic
Caltrans:	California Department of Transportation
DU:	Dwelling Unit
ICU:	Intersection Capacity Utilization
LOS:	Level of Service
TSF:	Thousand Square Feet
V/C:	Volume/Capacity
VMT:	Vehicle Miles Traveled

### TERMS

**AVERAGE DAILY TRAFFIC:** The total volume during a year divided by the number of days in a year. Usually only weekdays are included.

**BANDWIDTH:** The number of seconds of green time available for through traffic in a signal progression.

**BOTTLENECK:** A constriction along a travelway that limits the amount of traffic that can proceed downstream from its location.

**CAPACITY:** The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

**CHANNELIZATION:** The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

**CLEARANCE INTERVAL:** Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

**CORDON:** An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

**CYCLE LENGTH:** The time period in seconds required for one complete signal cycle.

**CUL-DE-SAC STREET:** A local street open at one end only, and with special provisions for turning around.

**DAILY CAPACITY:** The daily volume of traffic that will result in a volume during the peak hour equal to the capacity of the roadway.

**DELAY:** The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

**DEMAND RESPONSIVE SIGNAL:** Same as traffic-actuated signal.

**DENSITY:** The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

**DETECTOR:** A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

**DESIGN SPEED:** A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

**DIRECTIONAL SPLIT:** The percent of traffic in the peak direction at any point in time.

**DIVERSION:** The rerouting of peak hour traffic to avoid congestion.

**FORCED FLOW:** Opposite of free flow.

**FREE FLOW:** Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

**GAP:** Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

**HEADWAY:** Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

**INTERCONNECTED SIGNAL SYSTEM:** A number of intersections that are connected to achieve signal progression.

**LEVEL OF SERVICE:** A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

**LOOP DETECTOR:** A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

**MINIMUM ACCEPTABLE GAP:** Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

**MULTI-MODAL:** More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

**OFFSET:** The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

**PLATOON:** A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

**PASSENGER CAR EQUIVALENTS (PCE):** One car is one Passenger Car Equivalent. A truck is equal to 2 or 3 Passenger Car Equivalents in that a truck requires longer to start, goes slower, and accelerates slower. Loaded trucks have a higher Passenger Car Equivalent than empty trucks.

**PEAK HOUR:** The 60 consecutive minutes with the highest number of vehicles.

**PRETIMED SIGNAL:** A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

**PROGRESSION:** A term used to describe the progressive movement of traffic through several signalized intersections.

**SCREEN-LINE:** An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

**SIGNAL CYCLE:** The time period in seconds required for one complete sequence of signal indications.

**SIGNAL PHASE:** The part of the signal cycle allocated to one or more traffic movements.

**STARTING DELAY:** The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through a signalized intersection.

**TRAFFIC-ACTUATED SIGNAL:** A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

**TRIP:** The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

**TRIP-END:** One end of a trip at either the origin or destination; i.e. each trip has two trip-ends. A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

**TRIP GENERATION RATE:** The quantity of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

**TRUCK:** A vehicle having dual tires on one or more axles, or having more than two axles.

**UNBALANCED FLOW:** Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

**VEHICLE MILES OF TRAVEL:** A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

**APPENDIX B**

**SCOPING AGREEMENT**



## SCOPE FOR TRAFFIC STUDY

<b>Project Name:</b>	Newberry Springs Service Station Project
----------------------	--

This Scope for Traffic Study acknowledges San Bernardino County Department of Public Works, Traffic Division requirements of traffic impact analysis for the project and is subject to change:

<b>Project Address:</b>	South East Corner of Hacienda Road and Harvard Road		
<b>Project Description:</b>	14 FP Gasoline/Service Station with Convenience Market		
<b>City:</b>	Unincorporated County of San Bernardino		
<b>Project Buildout Year:</b>	2017	<b>Ambient Growth Rate per Year:</b>	SBTAM
<b>Closest Intersection (Xtn) to the Project</b>			
<b>Xtn N/S Street Name:</b>	Harvard Road		
<b>Xtn E/W Street Name:</b>	Hacienda Road		
<b>Thomas Guide Pg+Grid:</b>	3504 F-6	<b>County Supervisorial District:</b>	1st

	Engineer	Developer
<b>Company:</b>	Kunzman Associates, Inc.	Newberry Springs Land Investment, LLC
<b>Name:</b>	Robert Kunzman	Iqbal Hussain
<b>Address:</b>	1111 Town & Country Rd., Ste. 34	738 Descartes Avenue
<b>City, State, Zip Code:</b>	Orange, CA 92868	Henderson, NV 89002
<b>Phone #:</b>	1-714-973-8383	1-702-845-9667
<b>Fax #:</b>	1-714-973-8821	
<b>Email:</b>	robert@traffic-engineer.com	qiret@hotmail.com

By: *Robert Kunzman*  
 Print Name: Robert Kunzman      4-6-2015  
 Consultant/Developer's      Date  
 Representative

Reviewed By: \_\_\_\_\_  
 Print Name: \_\_\_\_\_  
 Traffic Division Representative      Date



## SCOPE FOR TRAFFIC STUDY

<b>Project Name:</b>	Newberry Springs Service Station Project
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**1. Traffic Distribution:** Please insert or attach Figure(s) illustrating project trip distribution in percentages and volumes at the study intersections analyzed.

**2. Trip Credit:** Exact amount of credit subject to approval by Traffic Division.

<b>Transportation Demand Management (TDM)</b>	No	0
<b>Existing ActiveLand Use</b>	No	0
<b>Previous Land Use</b>	No	0
<b>Internal Trip Reduction</b>	No	0
<b>Pass-by Trip Reduction</b>	No	0

**3. Related Projects:** Consultant should check with Planning in the San Bernardino County Department of Land Use Services and planning departments of adjoining Cities. Documentation of the consultation from these agencies shall be included in the traffic study. Related projects list shall be submitted to Traffic Division for our review and approval before being incorporated in the study.

**4. Freeway Analysis:** The potential traffic impact on the following Freeway(s) must be considered.

The project does not contribute trips greater than the freeway threshold volume of 100 two-way peak hour

Maximum of 86 freeway trips on any single link.

The applicant shall consult with the State of California Department of Transportation (Caltrans) to determine the California Environmental Quality Act levels of significance with regard to traffic impacts on Caltrans' freeway facilities. This consultation shall also include a determination of Caltrans requirements for the study of traffic impacts to its facilities and the mitigation of any such impacts. This analysis must follow the most current Caltrans' Guide for the Preparation of Traffic Impact Studies (December 2002) and can be obtained from <http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tiguide.pdf>. If Caltrans finds that the project has a significant impact on the freeway, Caltrans shall be requested to include the basis for this finding in their response. If fees are proposed to mitigate the freeway impact, Caltrans shall be requested to identify the specific project to which the fees will apply. These written comments from Caltrans shall be included with the traffic study and submitted to Public Works for review and approval. If a documented good faith effort is made to consult with Caltrans and written comments cannot be obtained from within a reasonable amount of time, an analysis of the freeway impact shall be made using HCM procedures. Appendix A of the SANBAG CMP outlines allowable modifications to these procedures. The SANBAG CMP can be viewed online at: [http://www.sanbag.ca.gov/planning/subr\\_congestion.html](http://www.sanbag.ca.gov/planning/subr_congestion.html)



## SCOPE FOR TRAFFIC STUDY

<b>Project Name:</b>	Newberry Springs Service Station Project
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### 5. Trip Generation

<b>Trip Generation Rate(s) Source:</b> ITE Trip Generation		<b>I – Institute of Transportation Engineers; S – San Diego Traffic Generators; C – County; O – Other:</b>						<b>Edition:</b>		9th	
Land Use Code	Land Use	Rate Based on	Qty	*AVTE vs	ADT	Weekday a.m. peak		Weekday p.m. peak		Weekend peak hour	
						In	Out	In	Out	In	Out
945	Gasoline/Service Station with Convenience Market	I	14		2,279			95	95	95	95

\* - Average Vehicle Trip Ends.  
 For ITE Land Uses provide number and name of Land Use. e.g. LU 814 - Variety Store



## SCOPE FOR TRAFFIC STUDY

<b>Project Name:</b>	Newberry Springs Service Station Project
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**6. Study Intersections:** At minimum, the study shall include the following intersections. The list is subject to change after related projects, trip generation and distribution are determined. Consultant should check with adjoining Cities regarding their requirements in addition to the following County/City intersections. Documentation of the consultation from these agencies shall be included in the traffic study.

Xtn #	%County	Thomas Guide Page+Grid	NS/EW Street Name	City	Signalized	CMP
1	100%	3504F-6	Harvard Road (NS) at Hacienda Road (EW)	Newberry Springs	No	
2	0%	3504F-6	Harvard Road (NS) at I-15 FreewayWBRamps (EW)	CALTRANS	No	
3	0%	3504F-6	Harvard Road (NS) at I-15 Freeway EBRamps (EW)	CALTRANS	No	

Cites to be consulted: None



## SCOPE FOR TRAFFIC STUDY

<b>Project Name:</b>	Newberry Springs Service Station Project
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**7. Other:**

Traffic counts may be conducted immediately per the following:
<ul style="list-style-type: none"> <li style="color: red;">• <b>Must be taken on Tuesdays, Wednesdays or Thursdays (see below).</b></li> </ul>
<ul style="list-style-type: none"> <li>• Must exclude holidays, and the first weekdays before and after the holiday.</li> </ul>
<ul style="list-style-type: none"> <li>• Must be taken on days when local schools or colleges are in session.</li> </ul>
<ul style="list-style-type: none"> <li>• Must be taken on days of good weather, and avoid atypical conditions (e.g., road construction, detours, or major traffic incidents).</li> </ul>
<ul style="list-style-type: none"> <li>• Traffic counts used for other traffic studies in the area shall <b>NOT</b> be reused again, unless 25% of the counts conducted for that particular traffic study are validated with new counts. The difference in volumes between the old and new counts at each corresponding movement should not be more than 10%.</li> </ul>
<ul style="list-style-type: none"> <li>• New traffic counts shall be checked to ensure the difference in volumes at corresponding approaches, if applicable, between two adjacent intersections is no more than 10% unless the difference can be justified.</li> </ul>
<ul style="list-style-type: none"> <li>• For all proposed mitigation measures, a conceptual plan for the improvements shall be submitted to our Traffic Studies section for review and approval prior to the approval of the Traffic Impact Analysis. All proposed improvements shall be within the right-of-way.</li> </ul>
<ul style="list-style-type: none"> <li>• For all cumulative mitigation measures, a cost estimate for the improvement shall be submitted.</li> </ul>
Peak counts have been conducted on Friday from 4:00 PM to 6:00 PM and on Sunday from 12:00 PM to 3:00 PM. These are the analysis periods to be studied.
SBTAM Model used for forecasting of 2017 and 2035.
Study Scenarios: Existing, Existing Plus Project, Opening Year (2017) Without, Opening Year (2017) With Project, Year 2035 Without Project, and Year 2035 With Project.

This analysis must follow the most current Traffic Impact Study Guidelines for the County as stated in the County’s Road Planning and Design Standards.

**8. Fees**

The County charges on an actual cost basis for review of traffic studies. An initial deposit of \$3400 is required at the time that a land use application is filed with the Department of Land Use Services. If the review costs exceed the initial deposit, the applicant will be expected to provide additional funds and the review will be suspended until the additional funds are deposited.



## SCOPE FOR TRAFFIC STUDY

<b>Project Name:</b>	Newberry Springs Service Station Project
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### 9. Contact Information:

*Please submit a signed copy of this scope for approval by the Traffic Division. Draft scopes may be sent electronically. Final scope with signature should be submitted in person or by US Mail to:*

County of San Bernardino  
Dept. of Public Works, Traffic Division  
825 E. 3<sup>rd</sup> Street, Rm 115  
San Bernardino, CA 92415-0835

Phone: 909-387-8186

Fax: 909-387-7809

Email: [epetre@dpw.sbcounty.gov](mailto:epetre@dpw.sbcounty.gov) (Ed Petre)

**Table 1**  
**Project Trip Generation<sup>1</sup>**

Land Use	Quantity <sup>2</sup>	Units <sup>3</sup>	Friday Evening <sup>4</sup>			Saturday Afternoon <sup>4</sup>			Daily <sup>5</sup>
			Inbound	Outbound	Total	Inbound	Outbound	Total	
<u>Trip Generation Rates</u>									
Gasoline/Service Station with Convenience Market		FP	6.79	6.78	13.57	6.79	6.78	13.57	162.78
<u>Trips Generated</u>									
Gasoline/Service Station with Convenience Market	14	FP	95	95	190	95	95	190	2,279

<sup>1</sup> Source: Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012, Land Use Category 945.

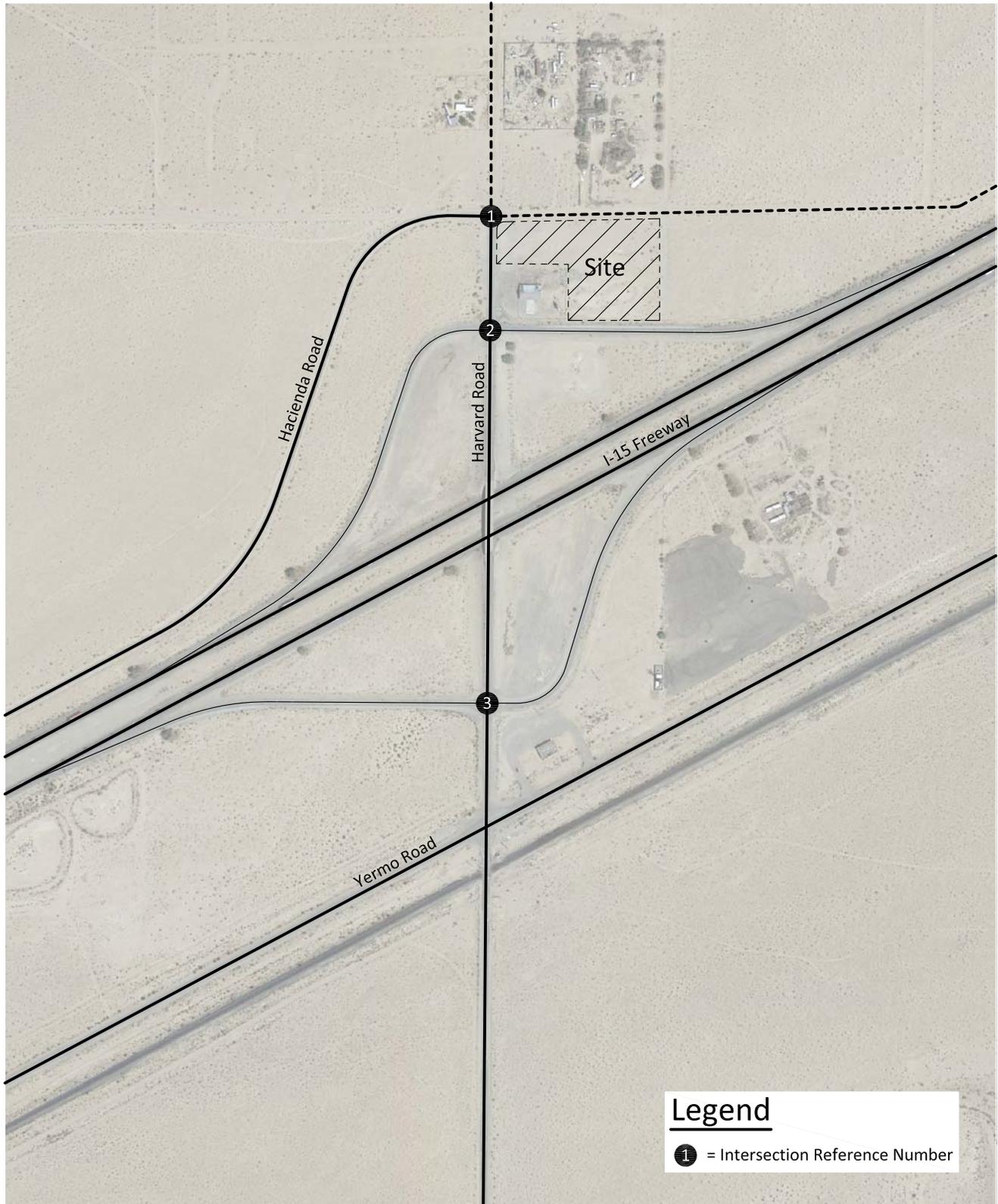
<sup>2</sup> The proposed service station is projected to consist of 12 passenger car fueling positions and 2 diesel truck fueling positions. To remain conservative, the 2 diesel truck fueling positions have been assumed to have the same trip generation as a passenger car fueling position.

<sup>3</sup> FP = Fueling Positions

<sup>4</sup> Peak hour trip generation rates for Friday evening and Saturday afternoon peak periods are not available. Weekday evening peak hour of generator trip generation has been used because it is the highest trip generating period for this land use.

<sup>5</sup> Weekday daily trip generation rates have been used.

Figure 1  
Project Location Map



**Legend**  
① = Intersection Reference Number

Figure 2  
Site Plan

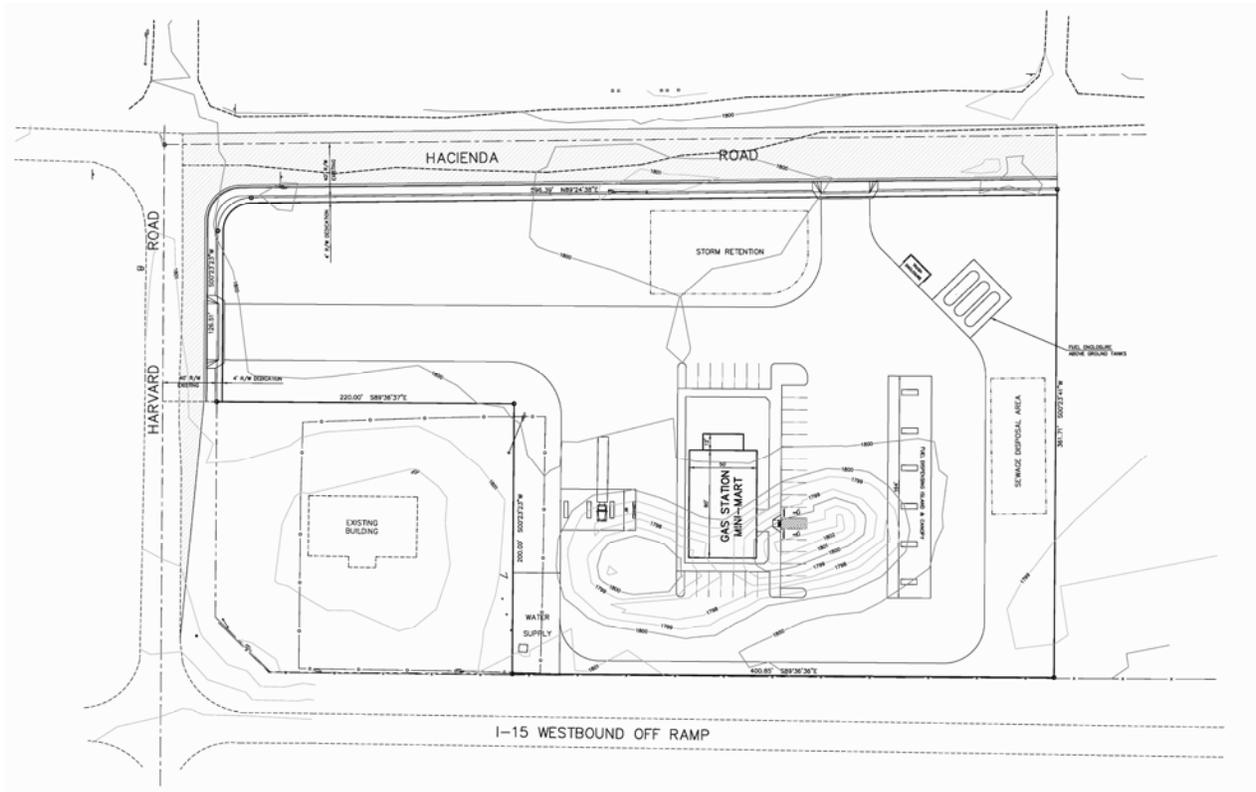


Figure 3  
Project Trip Distribution Outbound

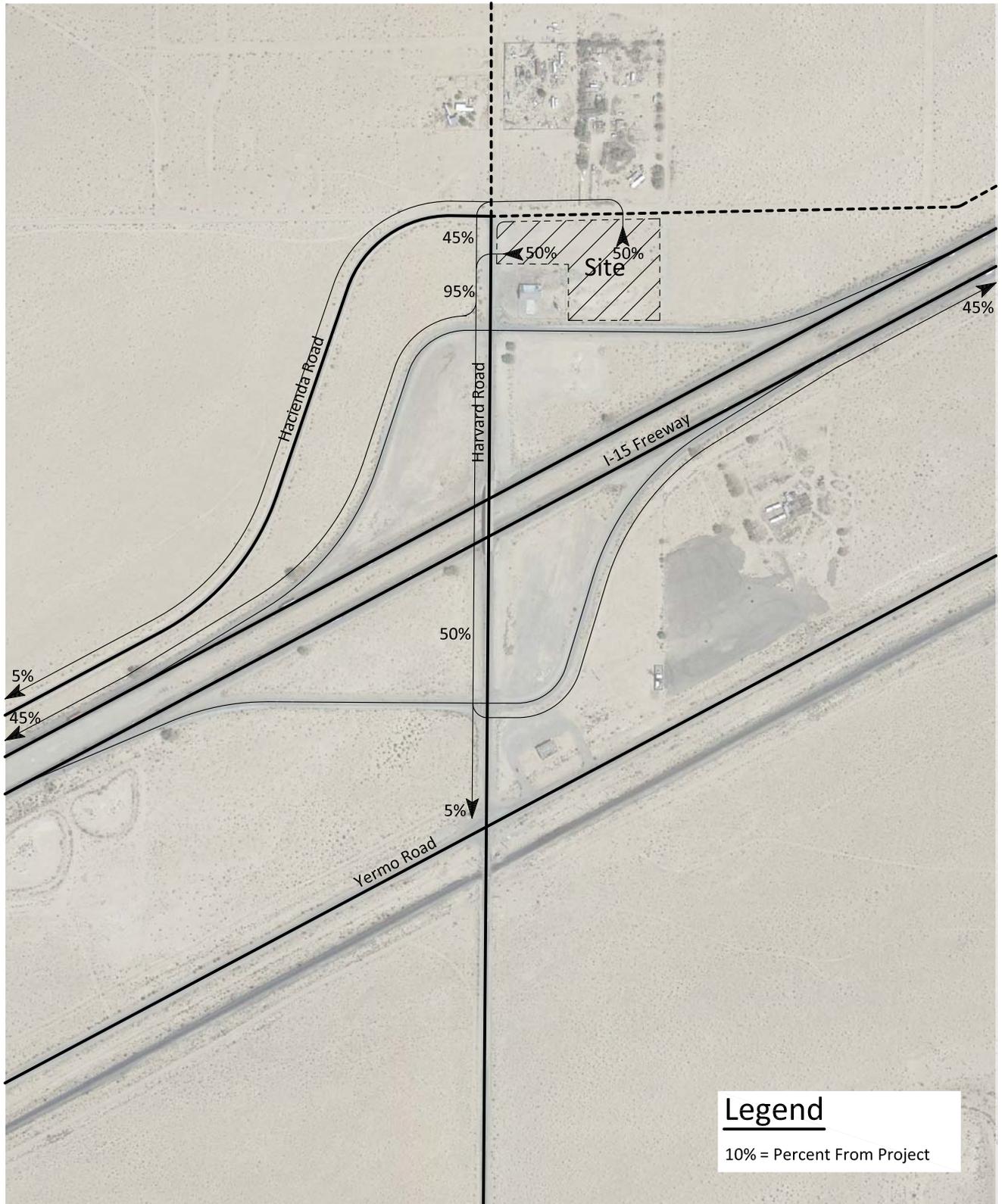
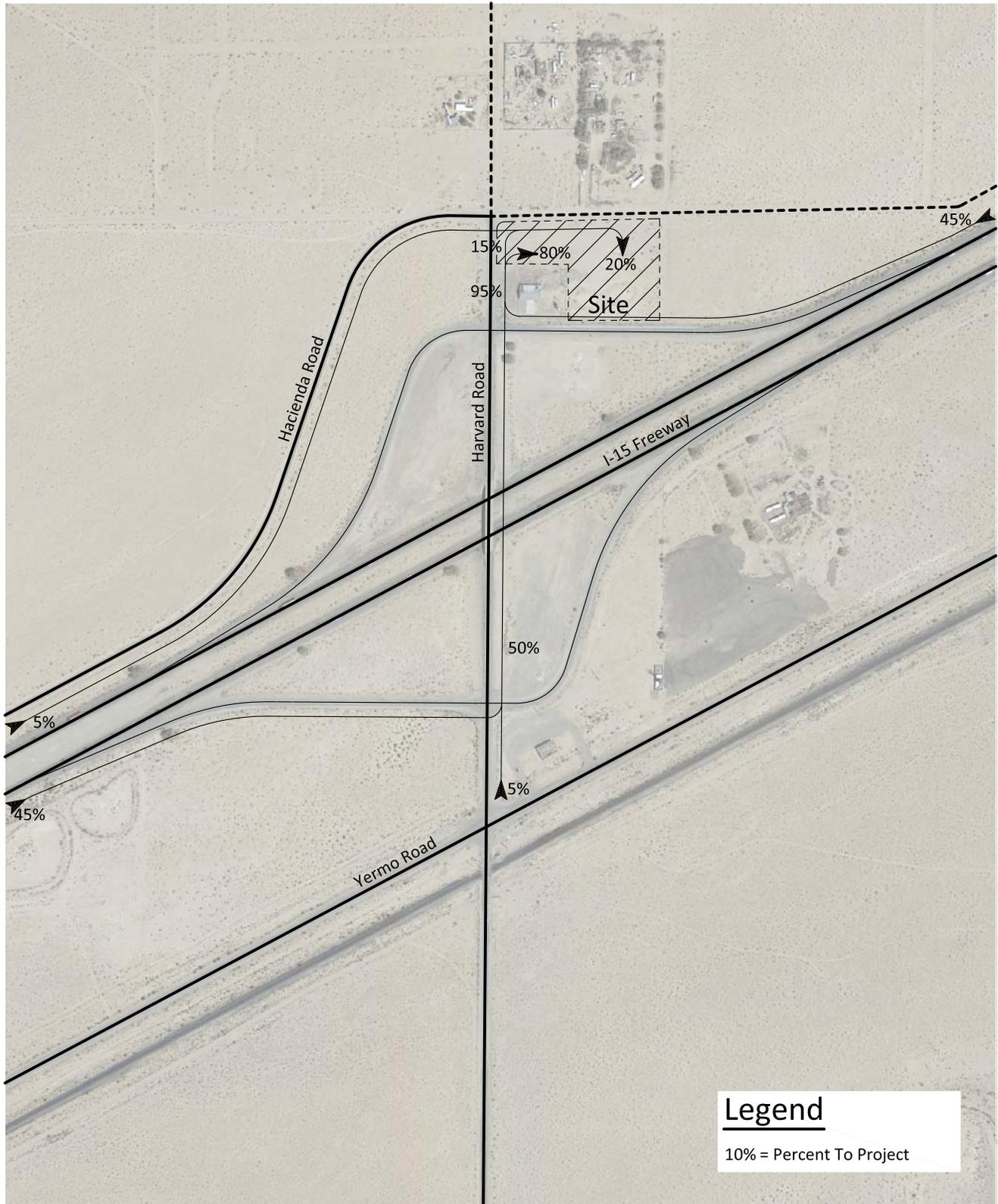


Figure 4  
Project Trip Distribution Inbound



## Robert Kunzman

---

**From:** Ruvalcaba, Eloy [eruvalcaba@dpw.sbcounty.gov]  
**Sent:** Tuesday, April 07, 2015 3:47 PM  
**To:** Robert Kunzman  
**Cc:** Petre, Ed  
**Subject:** RE: Newberry Springs  
**Attachments:** image002.png; image003.jpg; 6051scp\_6Apr2015.pdf

Robert,

The County DPW Traffic Division is OK with your scope (attached) pending Caltrans comments.

Thank you,



### Eloy Ruvalcaba

Department of Public Works  
Traffic Division

Phone: 909.387.8186 | Fax: 909.387.7809

[www.SBCounty.gov/dpw](http://www.SBCounty.gov/dpw)

*Our job is to create a county in which those who reside and invest can prosper and achieve well-being.*

---

**From:** Robert Kunzman [mailto:Robert@Traffic-Engineer.com]  
**Sent:** Monday, April 06, 2015 11:05 AM  
**To:** Ruvalcaba, Eloy  
**Subject:** Newberry Springs

Eloy,

I made the change. Thank you for catching it. I just ordered the Sunday counts.



**KUNZMAN ASSOCIATES, INC.**

OVER 35 YEARS OF EXCELLENT SERVICE

**Robert Kunzman** | Principal Associate

Kunzman Associates, Inc.

1111 Town & Country Road, Suite 34

Orange, California 92868

P: (714) 973-8383 x 204

C: (714) 321-4863

[robert@traffic-engineer.com](mailto:robert@traffic-engineer.com)

## Robert Kunzman

---

**From:** Tang, Rena@DOT [Rena.Tang@dot.ca.gov]  
**Sent:** Wednesday, April 15, 2015 3:55 PM  
**To:** Robert Kunzman; Petre, Ed; 'Ruvalcaba, Eloy'  
**Subject:** RE: Newberry Springs Service Station  
**Attachments:** image001.jpg; 08-SBD-15-PM R96.41 Newberry Springs Service Station.pdf

Apologies, here is the attachment.

---

**From:** Tang, Rena@DOT  
**Sent:** Wednesday, April 15, 2015 3:53 PM  
**To:** 'Robert Kunzman'; 'Petre, Ed'; 'Ruvalcaba, Eloy'  
**Subject:** RE: Newberry Springs Service Station

Attached are our comments. Ed, a hard copy addressed to you will follow in the mail.

Best regards,

**Rena Tang**  
**Transportation Planner**

Caltrans District 8  
Division of Planning - Community & Regional Planning  
464 West 4th Street, 6th Floor, MS 722  
San Bernardino, CA 92401-1400  
o: 909.806.3927  
e: [Rena.Tang@dot.ca.gov](mailto:Rena.Tang@dot.ca.gov)

---

**From:** Robert Kunzman [<mailto:Robert@Traffic-Engineer.com>]  
**Sent:** Tuesday, April 14, 2015 9:46 AM  
**To:** Tang, Rena@DOT  
**Cc:** 'Ruvalcaba, Eloy'  
**Subject:** RE: Newberry Springs Service Station

Rena,

Thank you very much. I completely understand how it is.



**KUNZMAN ASSOCIATES, INC.**

OVER 35 YEARS OF EXCELLENT SERVICE

**Robert Kunzman** | Principal Associate

Kunzman Associates, Inc.  
1111 Town & Country Road, Suite 34  
Orange, California 92868  
P: (714) 973-8383 x 204  
C: (714) 321-4863  
[robert@traffic-engineer.com](mailto:robert@traffic-engineer.com)

---

**From:** Tang, Rena@DOT [<mailto:Rena.Tang@dot.ca.gov>]  
**Sent:** Tuesday, April 14, 2015 9:30 AM  
**To:** Robert Kunzman  
**Cc:** 'Ruvalcaba, Eloy'  
**Subject:** RE: Newberry Springs Service Station

Hi Robert,

I understand your urgency. However, I am still waiting for comments from the Traffic Operations unit which has been really slammed lately. I will let you know as soon as I have their response.

**Rena Tang**  
**Transportation Planner**

Caltrans District 8  
Division of Planning - Community & Regional Planning  
464 West 4th Street, 6th Floor, MS 722  
San Bernardino, CA 92401-1400  
o: 909.806.3927  
e: [Rena.Tang@dot.ca.gov](mailto:Rena.Tang@dot.ca.gov)

---

**From:** Robert Kunzman [<mailto:Robert@Traffic-Engineer.com>]  
**Sent:** Tuesday, April 14, 2015 8:23 AM  
**To:** Tang, Rena@DOT  
**Cc:** 'Ruvalcaba, Eloy'  
**Subject:** FW: Newberry Springs Service Station

Rena,

I am hoping you can give me an update on this project. The client really needs me to finish it soon but I am still waiting on approval of the scoping agreement. Please call me if you have any questions. Once you approve it I can get back to the County and they can approve it. Thank you for your help.



**KUNZMAN ASSOCIATES, INC.**

OVER 35 YEARS OF EXCELLENT SERVICE

**Robert Kunzman** | Principal Associate  
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P: (714) 973-8383 x 204  
C: (714) 321-4863  
[robert@traffic-engineer.com](mailto:robert@traffic-engineer.com)

---

**From:** Robert Kunzman [<mailto:Robert@Traffic-Engineer.com>]  
**Sent:** Wednesday, April 08, 2015 8:03 AM  
**To:** 'Rena.Tang@dot.ca.gov'  
**Cc:** 'Ruvalcaba, Eloy'  
**Subject:** Newberry Springs Service Station

Rena,

I am working on a traffic impact analysis for a service station that is proposed to be located east of Harvard Road and north of the I-15 Freeway. I have prepared a scoping agreement with the County of San Bernardino and it is tentatively approved but they want CALTRANS to take a look at it before signing off on it. I have attached a PDF copy of the scoping agreement to this e-mail. I have already obtained the Friday counts and I am obtaining the Sunday counts in a few days. I also have already obtained the SBTAM for this study. As usual, the client needs me to finish this job in a week so I am on a tight schedule. Please review my scope and let me know if there are any required changes. Please call me if you have any questions. Thank you.



**KUNZMAN ASSOCIATES, INC.**

OVER 35 YEARS OF EXCELLENT SERVICE

**Robert Kunzman** | Principal Associate

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Orange, California 92868

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[robert@traffic-engineer.com](mailto:robert@traffic-engineer.com)

**DEPARTMENT OF TRANSPORTATION**

DISTRICT 8

PLANNING (MS 722)

464 WEST 4th STREET, 6<sup>th</sup> FLOOR

SAN BERNARDINO, CA 92401-1400

PHONE (909) 383-4557

FAX (909) 383-5936

TTY 711

www.dot.ca.gov/dist8



*Serious Drought.  
Help save water!*

April 15, 2015

**File: 08-SBd-15-PM R96.41**

Ed Petre, P.E.

County of San Bernardino

825 East Third Street

San Bernardino, CA 92415-0835

**Subject: Newberry Springs Service Station Project – Scope for Traffic Study**

Dear Mr. Petre:

The California Department of Transportation (Caltrans) has reviewed the Scope for Traffic Study dated April 6, 2014 for the Newberry Springs Service Station Project. The proposed project is located on the southeast corner of Harvard Road and Hacienda Road, north of the I-15, in the community of Newberry Springs in the County of San Bernardino. The project proposes to construct a gas station with convenience market, which will include a total of fourteen (14) service stations. We offer the following comments below for your consideration.

Please provide a traffic impact study that includes, but is not limited to, the following:

1. Traffic counts data
2. Turning movement volumes for all scenarios
3. Lane configurations for all scenarios
4. Traffic study analysis should include:
  - a. Existing Conditions
  - b. Opening Year Conditions (with and without Project)
  - c. Build Out Year Conditions (with and without Project)
5. Provide the determination of significant impacts; mitigation and project recommendations; cost estimate and cost sharing; and the conclusions
6. If applicable, please provide the Intersection Control Evaluation (ICE) for any new traffic intersections
7. Please consider any future developments or related projects within the project study area when conducting the traffic impact study

Thank you for providing the opportunity for our review. If you have any questions regarding this letter, please contact Rena Tang at (909) 806-3927 or myself at (909) 383-4557.

Mr. Petre  
April 15, 2015  
Page 2

Sincerely,

A handwritten signature in black ink that reads "Mark Roberts". The signature is written in a cursive, flowing style.

MARK ROBERTS  
Office Chief  
Intergovernmental Review, Community and Regional Planning

*c: Eloy Ruvalcaba – County of San Bernardino, Traffic Engineering  
Robert Kunzman – Kunzman Associates, Inc.*

## Robert Kunzman

---

**From:** Ruvalcaba, Eloy [eruvalcaba@dpw.sbcounty.gov]  
**Sent:** Thursday, April 16, 2015 8:14 AM  
**To:** Robert Kunzman  
**Cc:** Petre, Ed  
**Subject:** RE: Newberry Springs Service Station  
**Attachments:** image002.png; image003.jpg

Robert,

The Traffic Division is OK with the scope.

Thank you,



### Eloy Ruvalcaba

Department of Public Works  
Traffic Division

Phone: 909.387.8186 | Fax: 909.387.7809  
[www.SBCounty.gov/dpw](http://www.SBCounty.gov/dpw)

*Our job is to create a county in which those who reside and invest can prosper and achieve well-being.*

---

**From:** Robert Kunzman [mailto:Robert@Traffic-Engineer.com]  
**Sent:** Thursday, April 16, 2015 8:11 AM  
**To:** 'Tang, Rena@DOT'; Petre, Ed; Ruvalcaba, Eloy  
**Subject:** RE: Newberry Springs Service Station

Eloy & Ed,

I think we are good to go. Please let me know if you see any issues. Thank you for your help with this project.



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P: (714) 973-8383 x 204

C: (714) 321-4863

[robert@traffic-engineer.com](mailto:robert@traffic-engineer.com)

---

**From:** Tang, Rena@DOT [mailto:Rena.Tang@dot.ca.gov]  
**Sent:** Wednesday, April 15, 2015 3:55 PM  
**To:** Robert Kunzman; Petre, Ed; 'Ruvalcaba, Eloy'  
**Subject:** RE: Newberry Springs Service Station

Apologies, here is the attachment.

---

**From:** Tang, Rena@DOT  
**Sent:** Wednesday, April 15, 2015 3:53 PM  
**To:** 'Robert Kunzman'; 'Petre, Ed'; 'Ruvalcaba, Eloy'  
**Subject:** RE: Newberry Springs Service Station

Attached are our comments. Ed, a hard copy addressed to you will follow in the mail.

Best regards,

**Rena Tang**  
**Transportation Planner**

Caltrans District 8  
Division of Planning - Community & Regional Planning  
464 West 4th Street, 6th Floor, MS 722  
San Bernardino, CA 92401-1400  
o: 909.806.3927  
e: [Rena.Tang@dot.ca.gov](mailto:Rena.Tang@dot.ca.gov)

---

**From:** Robert Kunzman [<mailto:Robert@Traffic-Engineer.com>]  
**Sent:** Tuesday, April 14, 2015 9:46 AM  
**To:** Tang, Rena@DOT  
**Cc:** 'Ruvalcaba, Eloy'  
**Subject:** RE: Newberry Springs Service Station

Rena,

Thank you very much. I completely understand how it is.



**Robert Kunzman** | Principal Associate  
Kunzman Associates, Inc.  
1111 Town & Country Road, Suite 34  
Orange, California 92868  
P: (714) 973-8383 x 204  
C: (714) 321-4863  
[robert@traffic-engineer.com](mailto:robert@traffic-engineer.com)

---

**From:** Tang, Rena@DOT [<mailto:Rena.Tang@dot.ca.gov>]  
**Sent:** Tuesday, April 14, 2015 9:30 AM  
**To:** Robert Kunzman  
**Cc:** 'Ruvalcaba, Eloy'  
**Subject:** RE: Newberry Springs Service Station

Hi Robert,

I understand your urgency. However, I am still waiting for comments from the Traffic Operations unit which has been really slammed lately. I will let you know as soon as I have their response.

**Rena Tang**  
**Transportation Planner**

Caltrans District 8  
Division of Planning - Community & Regional Planning  
464 West 4th Street, 6th Floor, MS 722  
San Bernardino, CA 92401-1400  
o: 909.806.3927  
e: [Rena.Tang@dot.ca.gov](mailto:Rena.Tang@dot.ca.gov)

---

**From:** Robert Kunzman [<mailto:Robert@Traffic-Engineer.com>]  
**Sent:** Tuesday, April 14, 2015 8:23 AM  
**To:** Tang, Rena@DOT  
**Cc:** 'Ruvalcaba, Eloy'  
**Subject:** FW: Newberry Springs Service Station

Rena,

I am hoping you can give me an update on this project. The client really needs me to finish it soon but I am still waiting on approval of the scoping agreement. Please call me if you have any questions. Once you approve it I can get back to the County and they can approve it. Thank you for your help.



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**Subject:** Newberry Springs Service Station

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**APPENDIX C**

**TRAFFIC COUNT WORKSHEETS**

Counts Unlimited, Inc.  
 PO Box 1178  
 Corona, CA 92787  
 (951) 268-6268

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

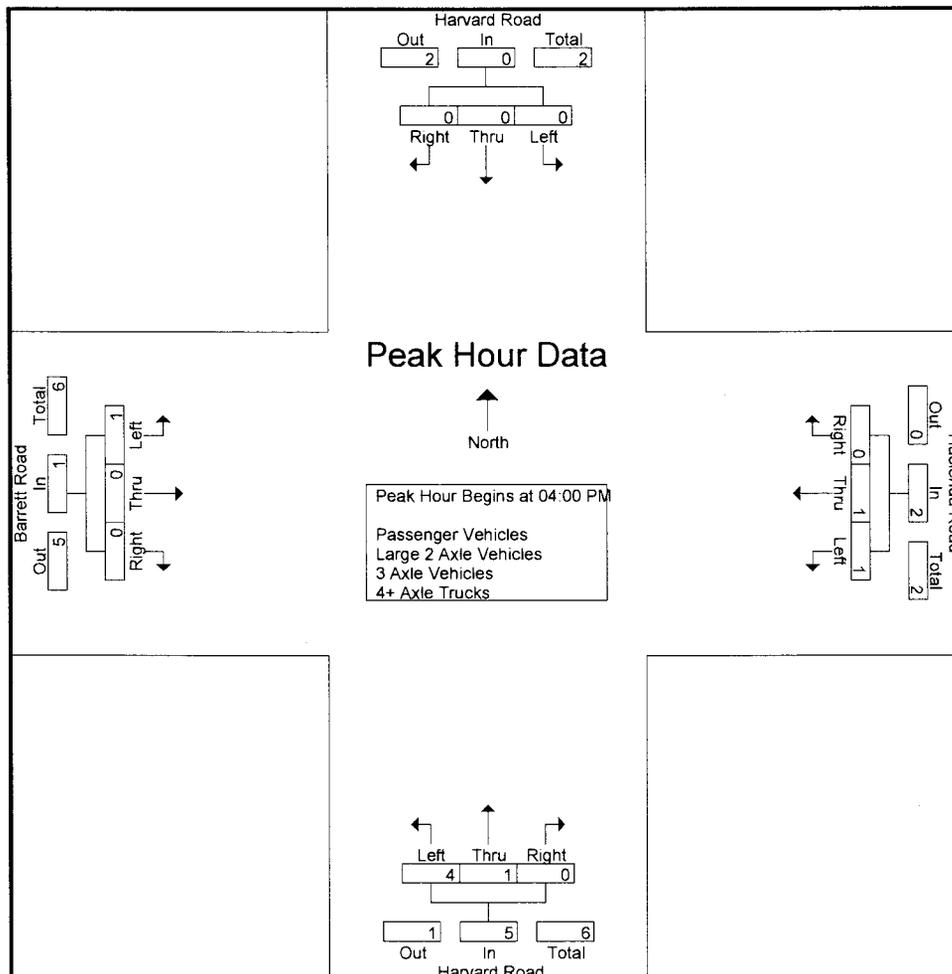
Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	1	3
04:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
04:30 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	2
04:45 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	2
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>8</b>
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>
<b>Grand Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>10</b>
Apprch %	0	0	0		50	50	0		83.3	16.7	0		50	50	0		
Total %	0	0	0	0	10	10	0	20	50	10	0	60	10	10	0	20	
Passenger Vehicles	0	0	0	0	1	1	0	2	5	1	0	6	1	1	0	2	10
% Passenger Vehicles	0	0	0	0	100	100	0	100	100	100	0	100	100	100	0	100	100
Large 2 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Large 2 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4+ Axle Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% 4+ Axle Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
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	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	1	3
04:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
04:30 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	2
04:45 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	2
<b>Total Volume</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>8</b>
% App. Total	0	0	0		50	50	0		80	20	0		100	0	0		
PHF	.000	.000	.000	.000	.250	.250	.000	.500	.500	.250	.000	.625	.250	.000	.000	.250	.667

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 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:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	1
+15 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
+30 mins.	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0
+45 mins.	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0
Total Volume	0	0	0	0	1	1	0	2	4	1	0	5	1	0	0	1
% App. Total	0	0	0	0	50	50	0	100	80	20	0	100	100	0	0	100
PHF	.000	.000	.000	.000	.250	.250	.000	.500	.500	.250	.000	.625	.250	.000	.000	.250

Counts Unlimited, Inc.  
 PO Box 1178  
 Corona, CA 92787  
 (951) 268-6268

County of San Bernardino  
 N/S: Harvard Road  
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File Name : CSBHABAPM  
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 Start Date : 6/10/2016  
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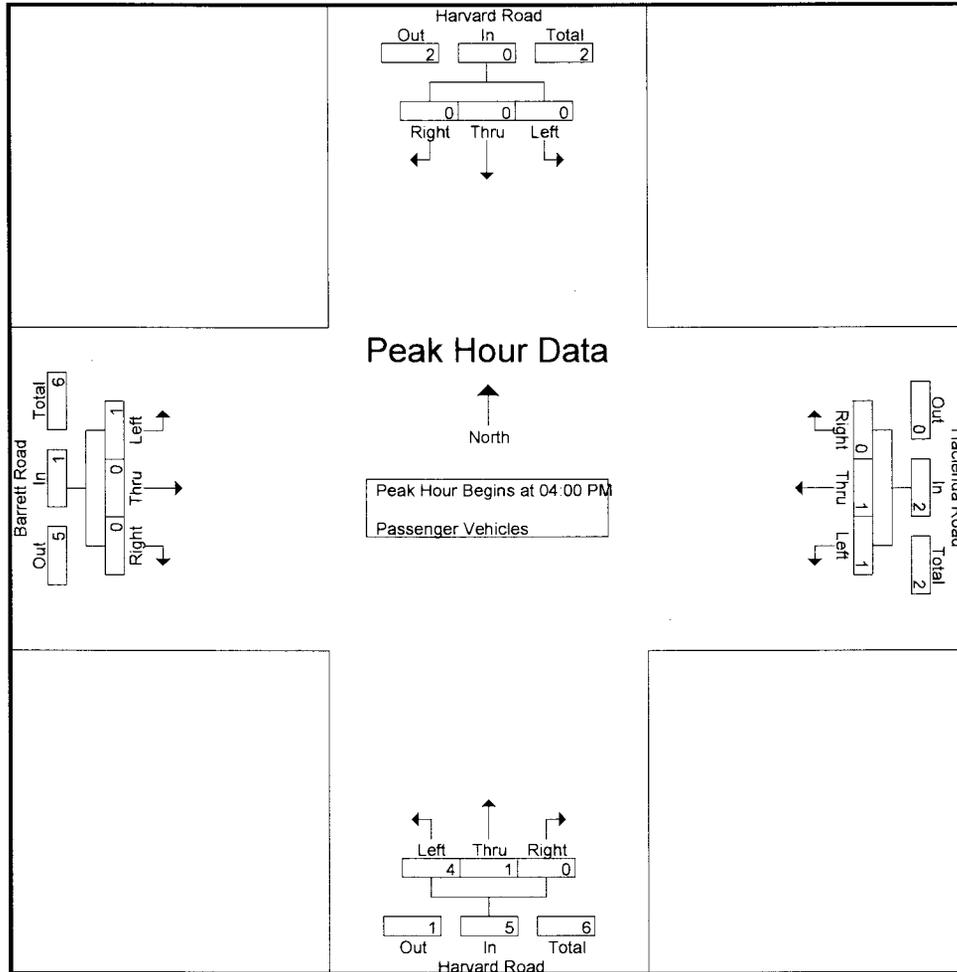
Groups Printed- Passenger Vehicles

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	1	3
04:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
04:30 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	2
04:45 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	2
Total	0	0	0	0	1	1	0	2	4	1	0	5	1	0	0	1	8
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
Total	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	2
Grand Total	0	0	0	0	1	1	0	2	5	1	0	6	1	1	0	2	10
Apprch %	0	0	0	0	50	50	0		83.3	16.7	0		50	50	0		
Total %	0	0	0	0	10	10	0	20	50	10	0	60	10	10	0	20	

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
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04:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
04:30 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	2
04:45 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	2
Total Volume	0	0	0	0	1	1	0	2	4	1	0	5	1	0	0	1	8
% App. Total	0	0	0	0	50	50	0		80	20	0		100	0	0		
PHF	.000	.000	.000	.000	.250	.250	.000	.500	.500	.250	.000	.625	.250	.000	.000	.250	.667

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 N/S: Harvard Road  
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File Name : CSBHABAPM  
 Site Code : 07516358  
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Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	1
+15 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
+30 mins.	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0
+45 mins.	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0
Total Volume	0	0	0	0	1	1	0	2	4	1	0	5	1	0	0	1
% App. Total	0	0	0	0	50	50	0	100	80	20	0	100	100	0	0	100
PHF	.000	.000	.000	.000	.250	.250	.000	.500	.500	.250	.000	.625	.250	.000	.000	.250

Counts Unlimited, Inc.  
 PO Box 1178  
 Corona, CA 92787  
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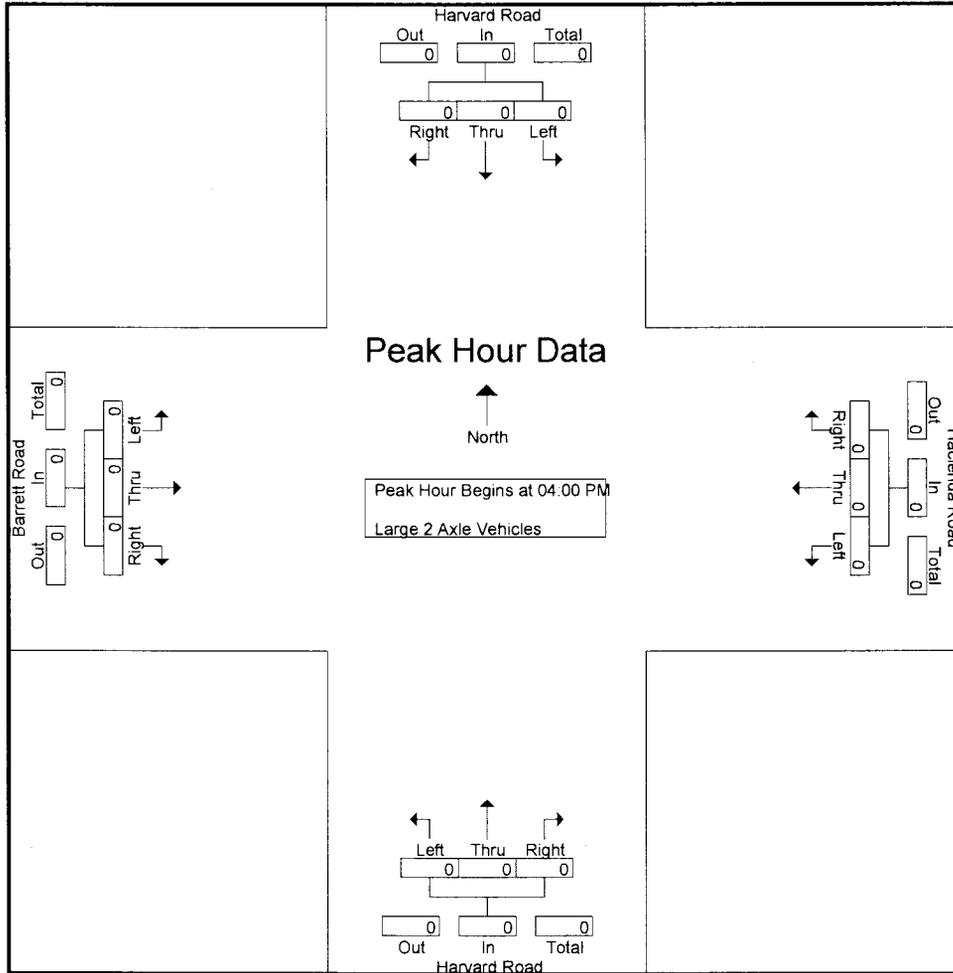
County of San Bernardino  
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Groups Printed- Large 2 Axle Vehicles

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0		
Total %																	

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



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

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

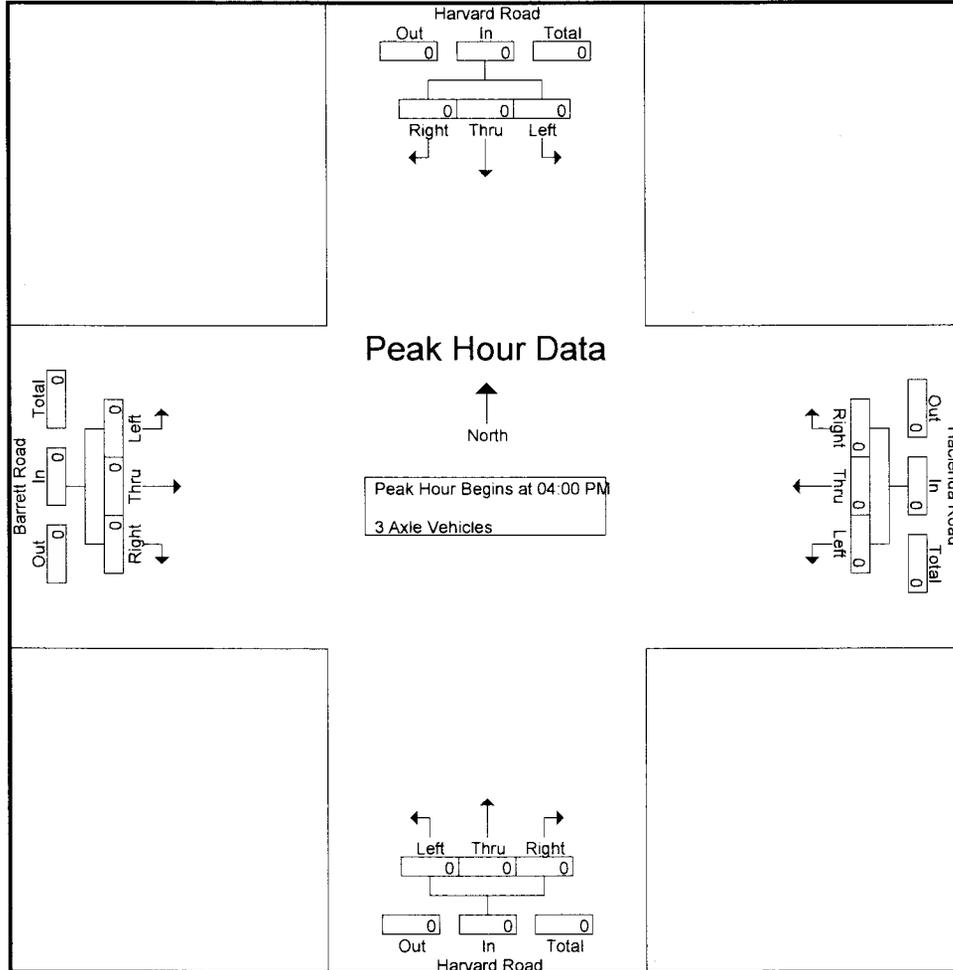
Groups Printed- 3 Axle Vehicles

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0		
Total %																	

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 2



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

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

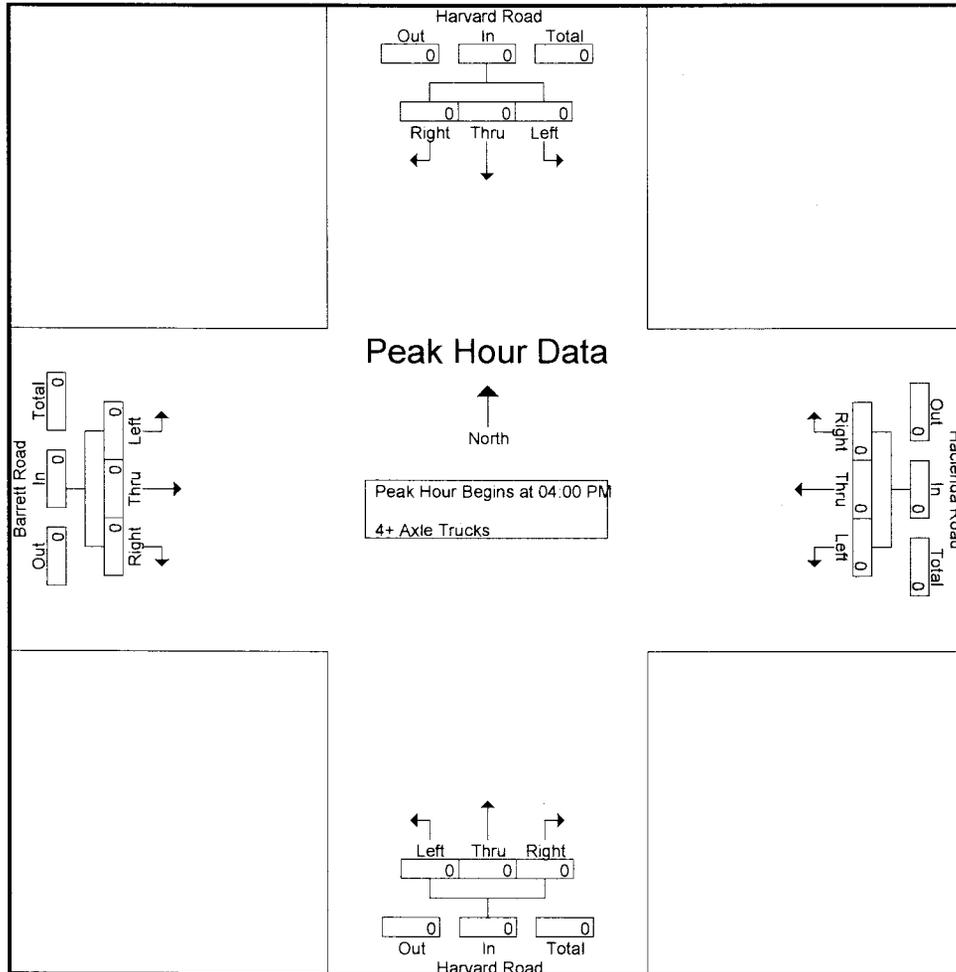
Groups Printed- 4+ Axle Trucks

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0		
Total %																	

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 2



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

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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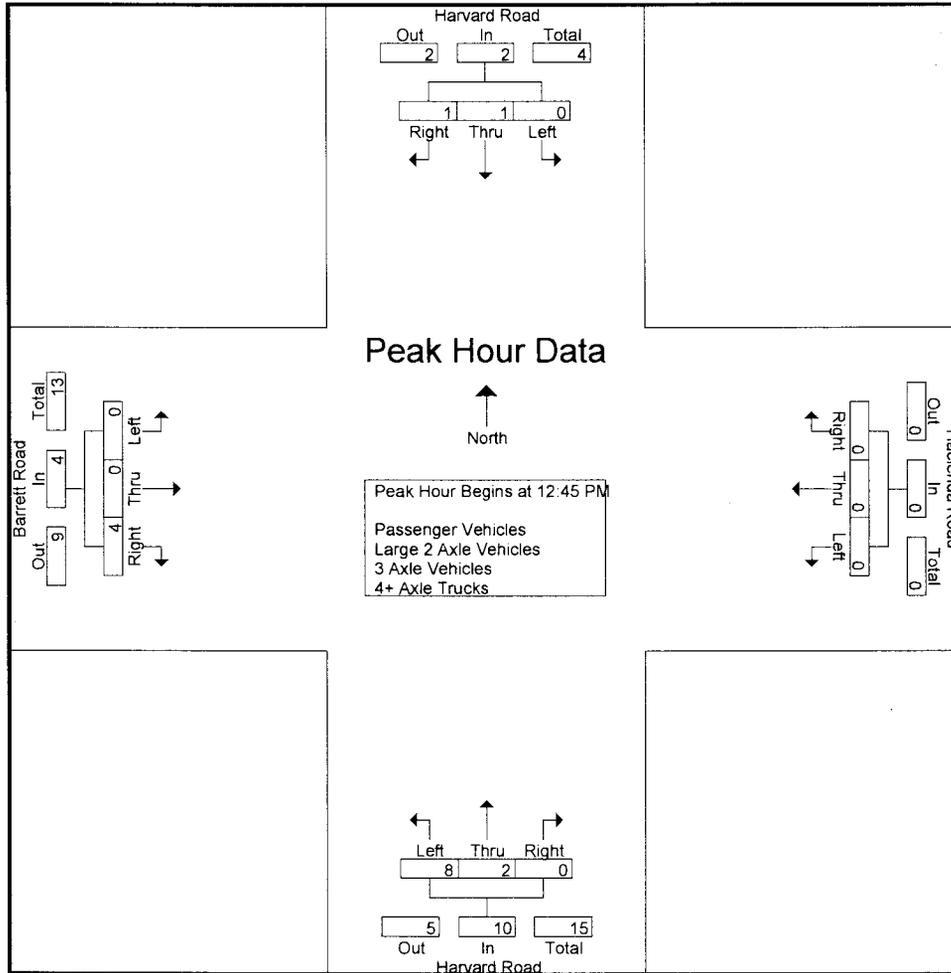
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

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

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	2
12:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	2
12:30 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
12:45 PM	0	1	0	1	0	0	0	0	3	1	0	4	0	0	1	1	6
Total	0	1	0	1	0	0	0	0	7	1	0	8	1	0	2	3	12
01:00 PM	0	0	1	1	0	0	0	0	2	1	0	3	0	0	0	0	4
01:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	3
01:30 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	1	1	3
01:45 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	3	3	5
Total	0	0	1	1	0	0	0	0	7	1	0	8	0	0	6	6	15
02:00 PM	0	0	0	0	0	1	0	1	3	0	0	3	0	0	1	1	5
02:15 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
02:30 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	2
02:45 PM	0	0	0	0	0	0	0	0	4	0	1	5	1	0	0	1	6
Total	0	0	0	0	0	1	0	1	10	0	1	11	1	0	2	3	15
Grand Total	0	1	1	2	0	1	0	1	24	2	1	27	2	0	10	12	42
Apprch %	0	50	50		0	100	0		88.9	7.4	3.7		16.7	0	83.3		
Total %	0	2.4	2.4	4.8	0	2.4	0	2.4	57.1	4.8	2.4	64.3	4.8	0	23.8	28.6	
Passenger Vehicles	0	1	1	2	0	0	0	0	24	2	0	26	2	0	9	11	39
% Passenger Vehicles	0	100	100	100	0	0	0	0	100	100	0	96.3	100	0	90	91.7	92.9
Large 2 Axle Vehicles	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
% Large 2 Axle Vehicles	0	0	0	0	0	100	0	100	0	0	0	0	0	0	10	8.3	4.8
3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4+ Axle Trucks	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
% 4+ Axle Trucks	0	0	0	0	0	0	0	0	0	0	100	3.7	0	0	0	0	2.4

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	0	1	0	1	0	0	0	0	3	1	0	4	0	0	1	1	6
01:00 PM	0	0	1	1	0	0	0	0	2	1	0	3	0	0	0	0	4
01:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	3
01:30 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	1	1	3
Total Volume	0	1	1	2	0	0	0	0	8	2	0	10	0	0	4	4	16
% App. Total	0	50	50		0	0	0		80	20	0		0	0	100		
PHF	.000	.250	.250	.500	.000	.000	.000	.000	.667	.500	.000	.625	.000	.000	.500	.500	.667



Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	12:15 PM				01:15 PM				02:00 PM				01:15 PM			
+0 mins.	0	0	0	0	0	0	0	0	3	0	0	3	0	0	2	2
+15 mins.	0	0	0	0	0	0	0	0	2	0	0	2	0	0	1	1
+30 mins.	0	1	0	1	0	0	0	0	1	0	0	1	0	0	3	3
+45 mins.	0	0	1	1	0	1	0	1	4	0	1	5	0	0	1	1
Total Volume	0	1	1	2	0	1	0	1	10	0	1	11	0	0	7	7
% App. Total	0	50	50		0	100	0		90.9	0	9.1		0	0	100	
PHF	.000	.250	.250	.500	.000	.250	.000	.250	.625	.000	.250	.550	.000	.000	.583	.583

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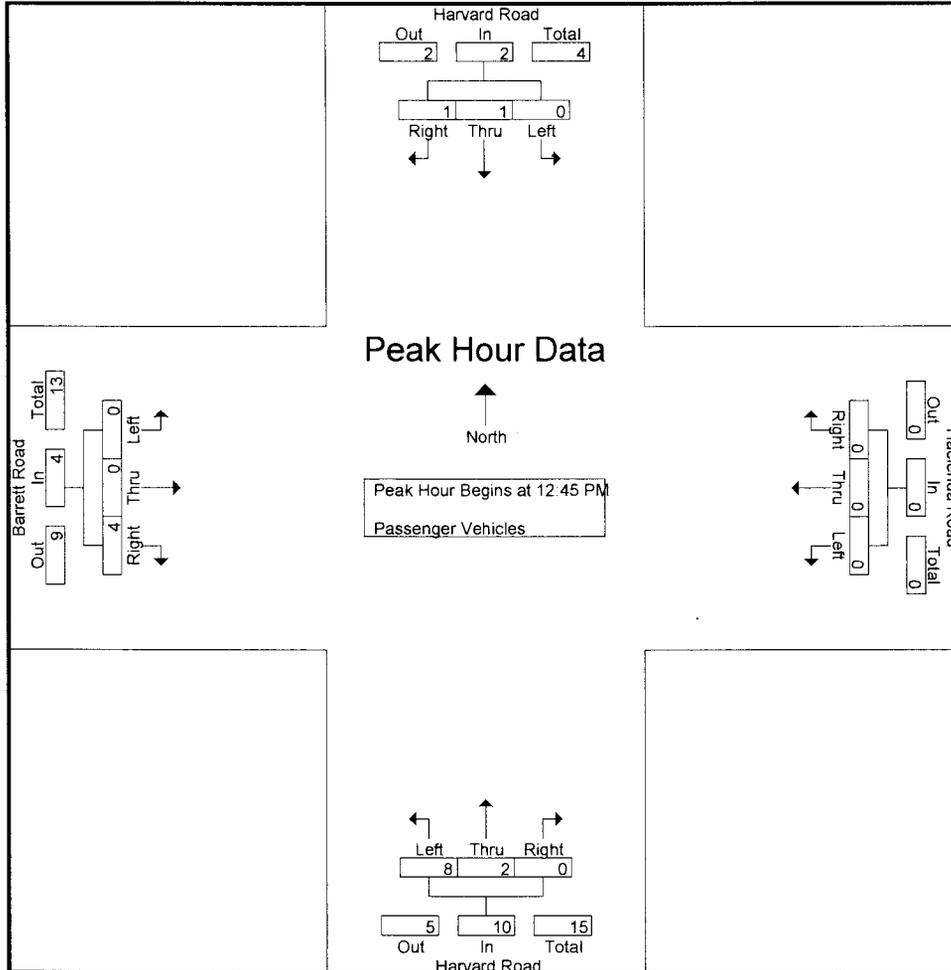
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

Groups Printed- Passenger Vehicles

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	2
12:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	2
12:30 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
12:45 PM	0	1	0	1	0	0	0	0	3	1	0	4	0	0	1	1	6
Total	0	1	0	1	0	0	0	0	7	1	0	8	1	0	2	3	12
01:00 PM	0	0	1	1	0	0	0	0	2	1	0	3	0	0	0	0	4
01:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	3
01:30 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	1	1	3
01:45 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	3	3	5
Total	0	0	1	1	0	0	0	0	7	1	0	8	0	0	6	6	15
02:00 PM	0	0	0	0	0	0	0	0	3	0	0	3	0	0	1	1	4
02:15 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
02:30 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
02:45 PM	0	0	0	0	0	0	0	0	4	0	0	4	1	0	0	1	5
Total	0	0	0	0	0	0	0	0	10	0	0	10	1	0	1	2	12
Grand Total	0	1	1	2	0	0	0	0	24	2	0	26	2	0	9	11	39
Apprch %	0	50	50		0	0	0		92.3	7.7	0		18.2	0	81.8		
Total %	0	2.6	2.6	5.1	0	0	0	0	61.5	5.1	0	66.7	5.1	0	23.1	28.2	

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 12:45 PM to 01:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	0	1	0	1	0	0	0	0	3	1	0	4	0	0	1	1	6
01:00 PM	0	0	1	1	0	0	0	0	2	1	0	3	0	0	0	0	4
01:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	3
01:30 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	1	1	3
Total Volume	0	1	1	2	0	0	0	0	8	2	0	10	0	0	4	4	16
% App. Total	0	50	50		0	0	0		80	20	0		0	0	100		
PHF	.000	.250	.250	.500	.000	.000	.000	.000	.667	.500	.000	.625	.000	.000	.500	.500	.667



Peak Hour Analysis From 12:45 PM to 01:30 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	12.45 PM				12.45 PM				12.45 PM				12.45 PM			
+0 mins.	0	1	0	1	0	0	0	0	3	1	0	4	0	0	1	1
+15 mins.	0	0	1	1	0	0	0	0	2	1	0	3	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2
+45 mins.	0	0	0	0	0	0	0	0	2	0	0	2	0	0	1	1
Total Volume	0	1	1	2	0	0	0	0	8	2	0	10	0	0	4	4
% App. Total	0	50	50		0	0	0		80	20	0		0	0	100	
PHF	.000	.250	.250	.500	.000	.000	.000	.000	.667	.500	.000	.625	.000	.000	.500	.500

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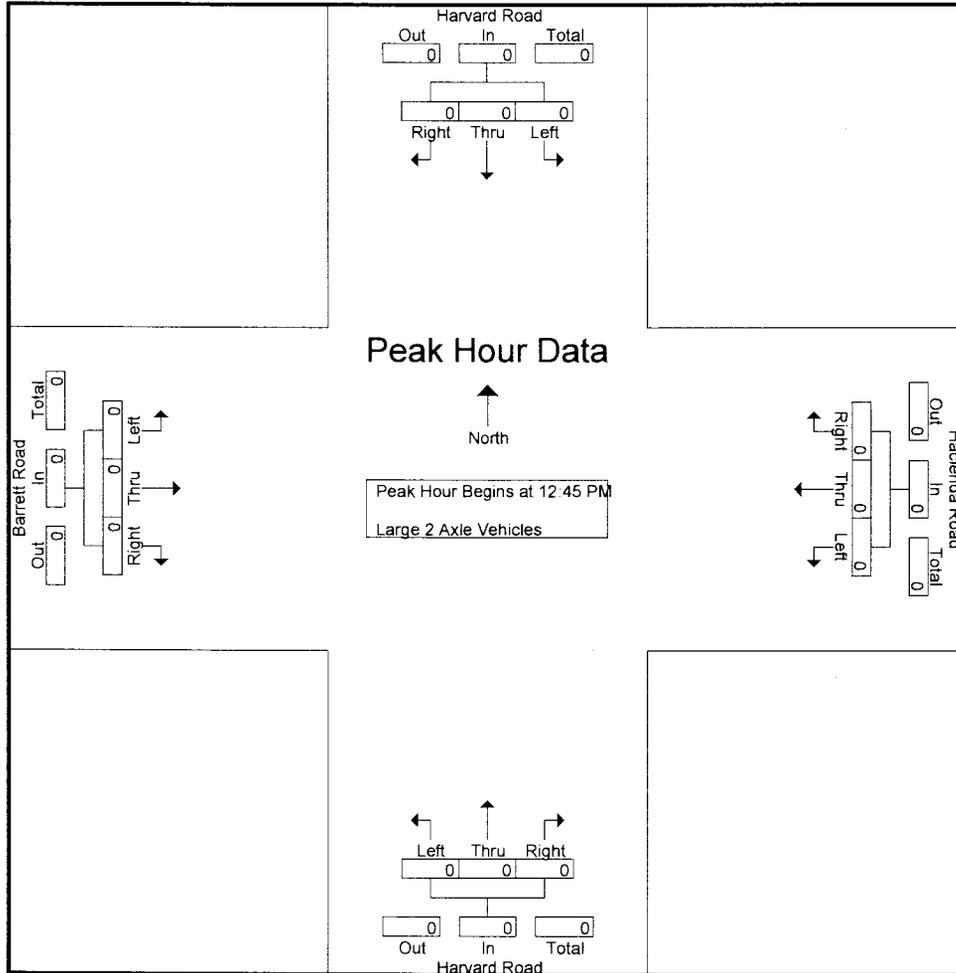
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

Groups Printed- Large 2 Axle Vehicles

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
Grand Total	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
Apprch %	0	0	0		0	100	0		0	0	0		0	0	100		
Total %	0	0	0		0	50	0	50	0	0	0		0	0	50	50	

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 12:45 PM to 01:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Peak Hour Analysis From 12:45 PM to 01:30 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	12:45 PM				12:45 PM				12:45 PM				12:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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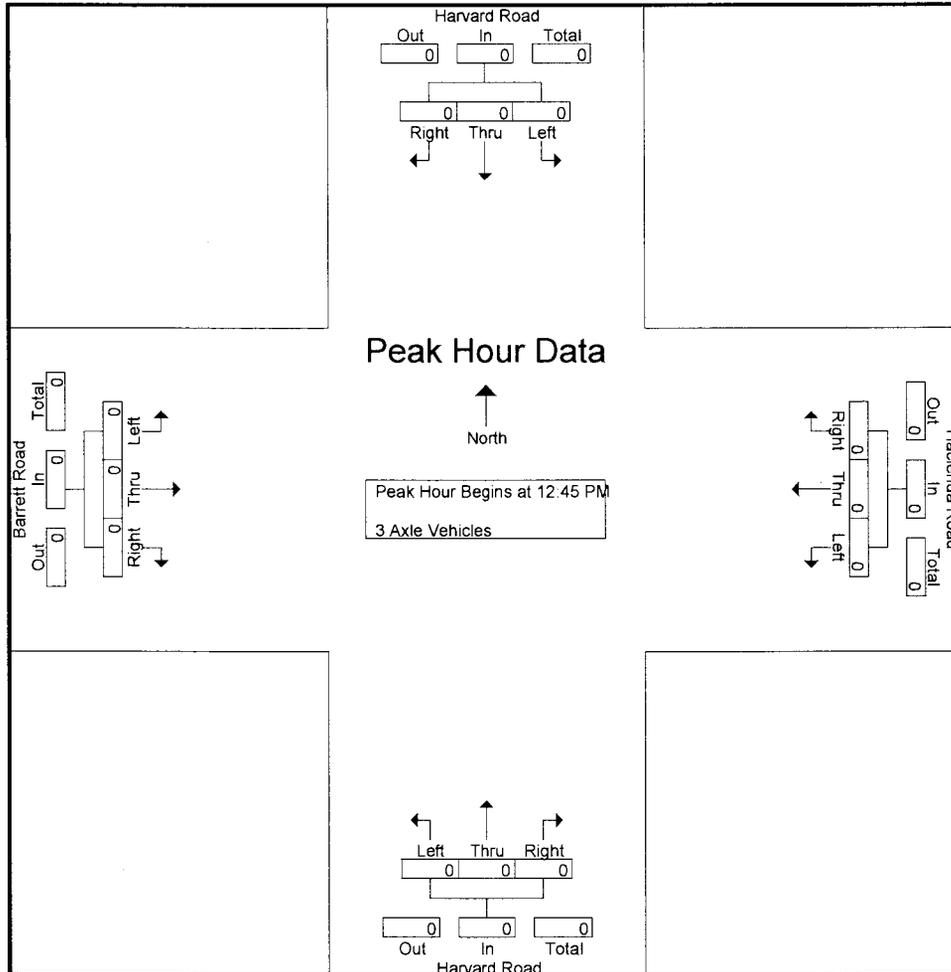
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

Groups Printed- 3 Axle Vehicles

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0		
Total %																	

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 12:45 PM to 01:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Peak Hour Analysis From 12:45 PM to 01:30 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	12:45 PM				12:45 PM				12:45 PM				12:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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County of San Bernardino  
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 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

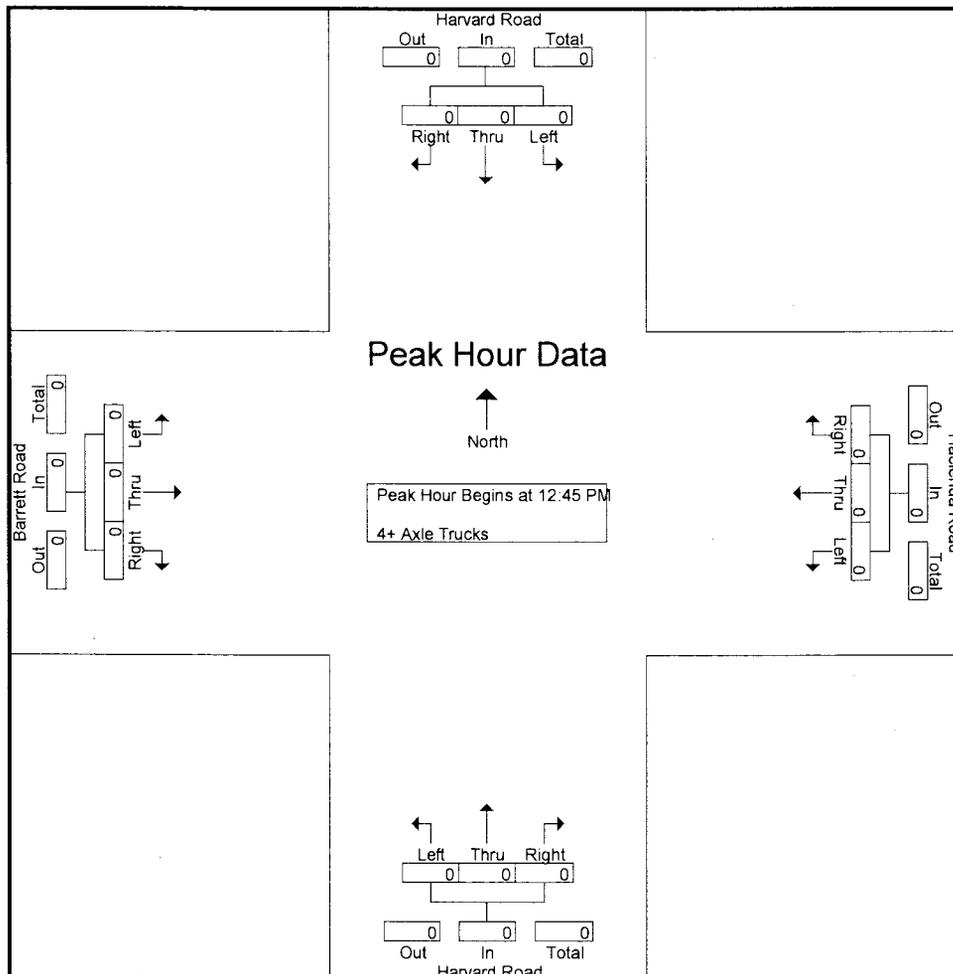
Groups Printed- 4+ Axle Trucks

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Grand Total	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Apprch %	0	0	0		0	0	0		0	0	100		0	0	0		
Total %	0	0	0		0	0	0		0	0	100	100	0	0	0		

Start Time	Harvard Road Southbound				Hacienda Road Westbound				Harvard Road Northbound				Barrett Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 12:45 PM to 01:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Barrett Road / Hacienda Road  
 Weather: Clear

File Name : CSBHABAMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 2



Peak Hour Analysis From 12:45 PM to 01:30 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	12:45 PM				12:45 PM				12:45 PM				12:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

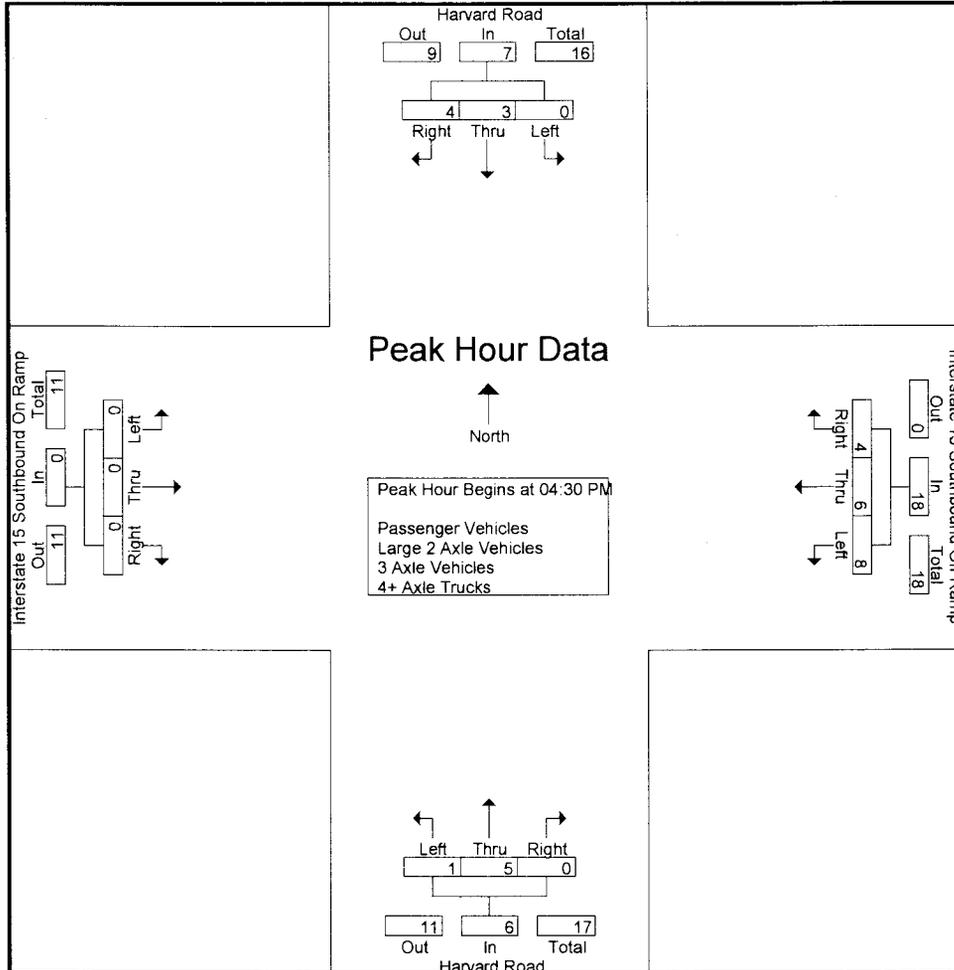
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Southbound Ramps  
 Weather: Clear

File Name : CSBHA15SPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

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

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	1	0	1	0	2	0	2	0	0	0	0	3
04:15 PM	0	0	0	0	0	2	1	3	0	0	0	0	0	0	0	0	3
04:30 PM	0	1	0	1	3	2	1	6	0	1	0	1	0	0	0	0	8
04:45 PM	0	0	0	0	2	1	1	4	0	2	0	2	0	0	0	0	6
Total	0	1	0	1	5	6	3	14	0	5	0	5	0	0	0	0	20
05:00 PM	0	2	3	5	1	2	2	5	0	1	0	1	0	0	0	0	11
05:15 PM	0	0	1	1	2	1	0	3	1	1	0	2	0	0	0	0	6
05:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	3	0	3	1	1	0	2	0	0	0	0	5
Total	0	2	4	6	3	7	2	12	2	3	0	5	0	0	0	0	23
Grand Total	0	3	4	7	8	13	5	26	2	8	0	10	0	0	0	0	43
Apprch %	0	42.9	57.1		30.8	50	19.2		20	80	0		0	0	0		
Total %	0	7	9.3	16.3	18.6	30.2	11.6	60.5	4.7	18.6	0	23.3	0	0	0	0	
Passenger Vehicles	0	3	4	7	6	9	5	20	2	8	0	10	0	0	0	0	37
% Passenger Vehicles	0	100	100	100	75	69.2	100	76.9	100	100	0	100	0	0	0	0	86
Large 2 Axle Vehicles	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2
% Large 2 Axle Vehicles	0	0	0	0	25	0	0	7.7	0	0	0	0	0	0	0	0	4.7
3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4+ Axle Trucks	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	4
% 4+ Axle Trucks	0	0	0	0	0	30.8	0	15.4	0	0	0	0	0	0	0	0	9.3

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	1	0	1	3	2	1	6	0	1	0	1	0	0	0	0	8
04:45 PM	0	0	0	0	2	1	1	4	0	2	0	2	0	0	0	0	6
05:00 PM	0	2	3	5	1	2	2	5	0	1	0	1	0	0	0	0	11
05:15 PM	0	0	1	1	2	1	0	3	1	1	0	2	0	0	0	0	6
Total Volume	0	3	4	7	8	6	4	18	1	5	0	6	0	0	0	0	31
% App. Total	0	42.9	57.1		44.4	33.3	22.2		16.7	83.3	0		0	0	0		
PHF	.000	.375	.333	.350	.667	.750	.500	.750	.250	.625	.000	.750	.000	.000	.000	.000	.705



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

	04:30 PM				04:15 PM				04:30 PM				04:00 PM			
+0 mins.	0	1	0	1	0	2	1	3	0	1	0	1	0	0	0	0
+15 mins.	0	0	0	0	3	2	1	6	0	2	0	2	0	0	0	0
+30 mins.	0	2	3	5	2	1	1	4	0	1	0	1	0	0	0	0
+45 mins.	0	0	1	1	1	2	2	5	1	1	0	2	0	0	0	0
Total Volume	0	3	4	7	6	7	5	18	1	5	0	6	0	0	0	0
% App. Total	0	42.9	57.1		33.3	38.9	27.8		16.7	83.3	0		0	0	0	
PHF	.000	.375	.333	.350	.500	.875	.625	.750	.250	.625	.000	.750	.000	.000	.000	.000

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County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Southbound Ramps  
 Weather: Clear

File Name : CSBHA15SPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

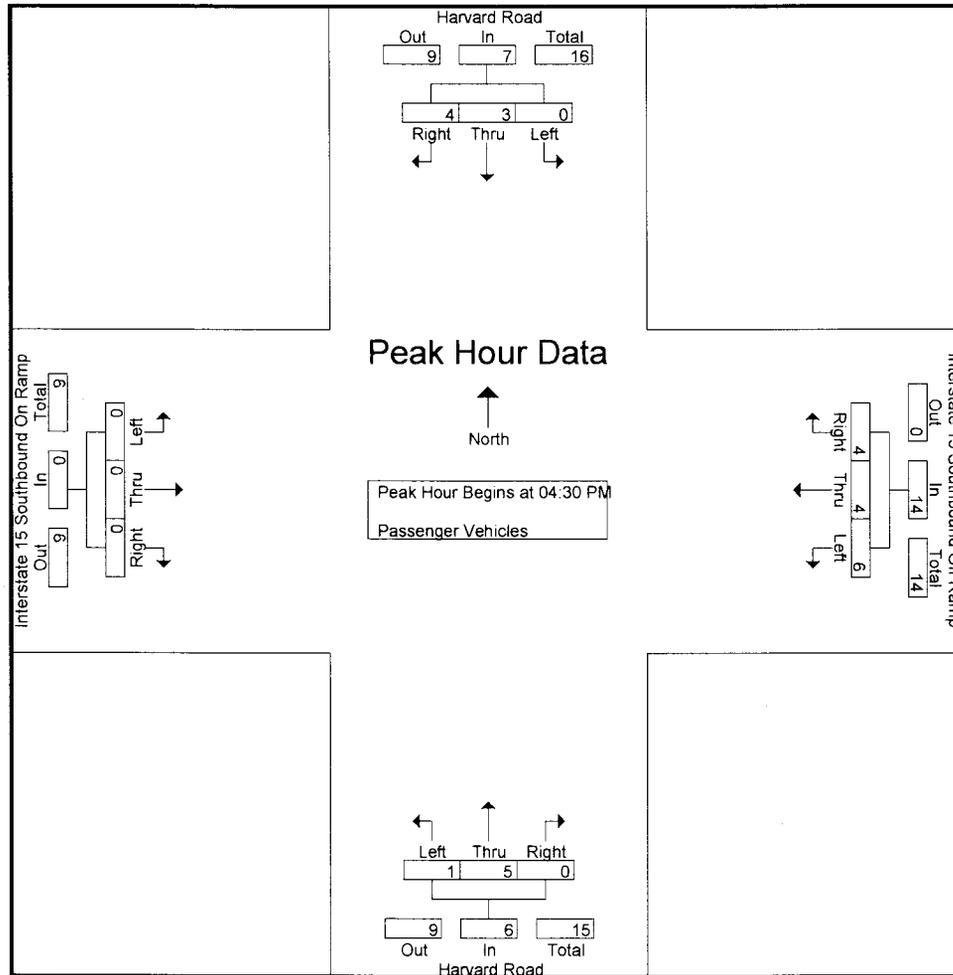
Groups Printed- Passenger Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
04:15 PM	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	2
04:30 PM	0	1	0	1	2	1	1	4	0	1	0	1	0	0	0	0	6
04:45 PM	0	0	0	0	2	1	1	4	0	2	0	2	0	0	0	0	6
Total	0	1	0	1	4	3	3	10	0	5	0	5	0	0	0	0	16
05:00 PM	0	2	3	5	1	1	2	4	0	1	0	1	0	0	0	0	10
05:15 PM	0	0	1	1	1	1	0	2	1	1	0	2	0	0	0	0	5
05:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	3	0	3	1	1	0	2	0	0	0	0	5
Total	0	2	4	6	2	6	2	10	2	3	0	5	0	0	0	0	21
Grand Total	0	3	4	7	6	9	5	20	2	8	0	10	0	0	0	0	37
Apprch %	0	42.9	57.1		30	45	25		20	80	0		0	0	0		
Total %	0	8.1	10.8	18.9	16.2	24.3	13.5	54.1	5.4	21.6	0	27	0	0	0	0	

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:30 PM	0	1	0	1	2	1	1	4	0	1	0	1	0	0	0	0	6
04:45 PM	0	0	0	0	2	1	1	4	0	2	0	2	0	0	0	0	6
05:00 PM	0	2	3	5	1	1	2	4	0	1	0	1	0	0	0	0	10
05:15 PM	0	0	1	1	1	1	0	2	1	1	0	2	0	0	0	0	5
Total Volume	0	3	4	7	6	4	4	14	1	5	0	6	0	0	0	0	27
% App. Total	0	42.9	57.1		42.9	28.6	28.6		16.7	83.3	0		0	0	0		
PHF	.000	.375	.333	.350	.750	1.00	.500	.875	.250	.625	.000	.750	.000	.000	.000	.000	.675

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



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

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	1	0	1	2	1	1	4	0	1	0	1	0	0	0	0
+15 mins.	0	0	0	0	2	1	1	4	0	2	0	2	0	0	0	0
+30 mins.	0	2	3	5	1	1	2	4	0	1	0	1	0	0	0	0
+45 mins.	0	0	1	1	1	1	0	2	1	1	0	2	0	0	0	0
Total Volume	0	3	4	7	6	4	4	14	1	5	0	6	0	0	0	0
% App. Total	0	42.9	57.1		42.9	28.6	28.6		16.7	83.3	0		0	0	0	
PHF	.000	.375	.333	.350	.750	1.000	.500	.875	.250	.625	.000	.750	.000	.000	.000	.000

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County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Southbound Ramps  
 Weather: Clear

File Name : CSBHA15SPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

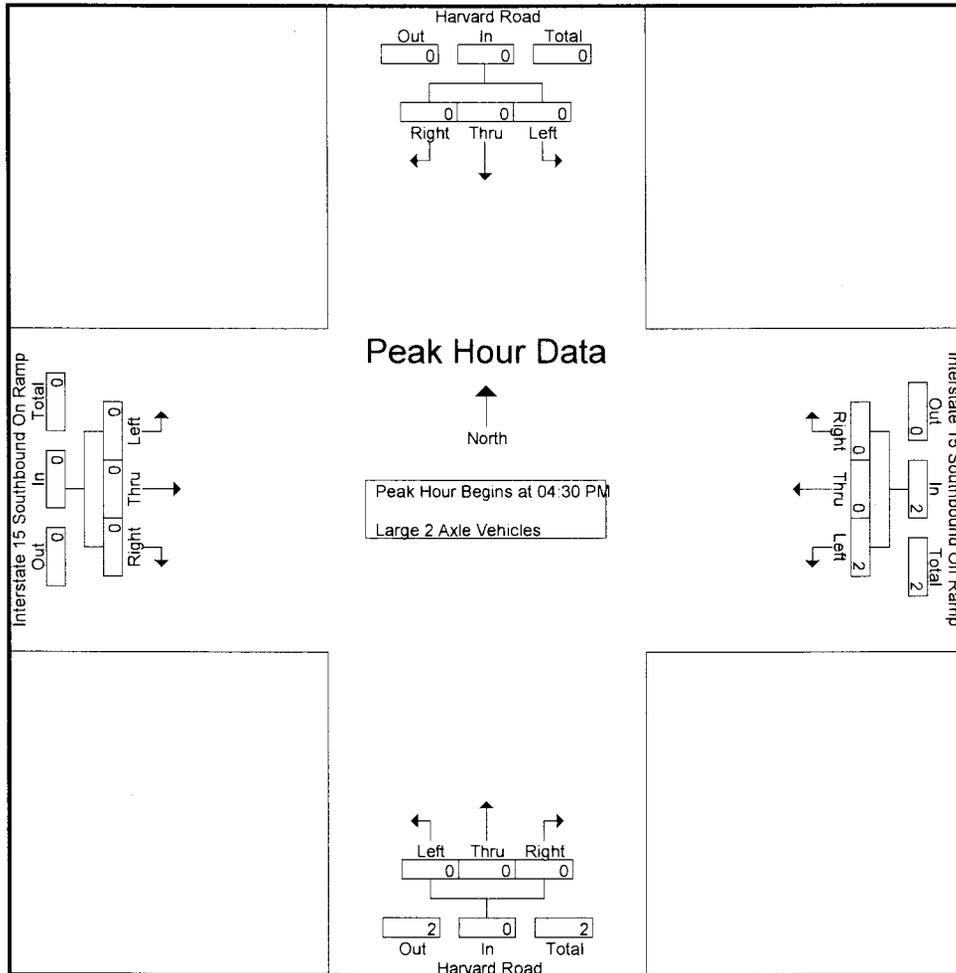
Groups Printed- Large 2 Axle Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
Grand Total	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2
Apprch %	0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	
Total %	0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2
% App. Total	0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.500

County of San Bernardino  
 N/S: Harvard Road  
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 Weather: Clear

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 Page No : 2



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

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000

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County of San Bernardino  
 N/S: Harvard Road  
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 Weather: Clear

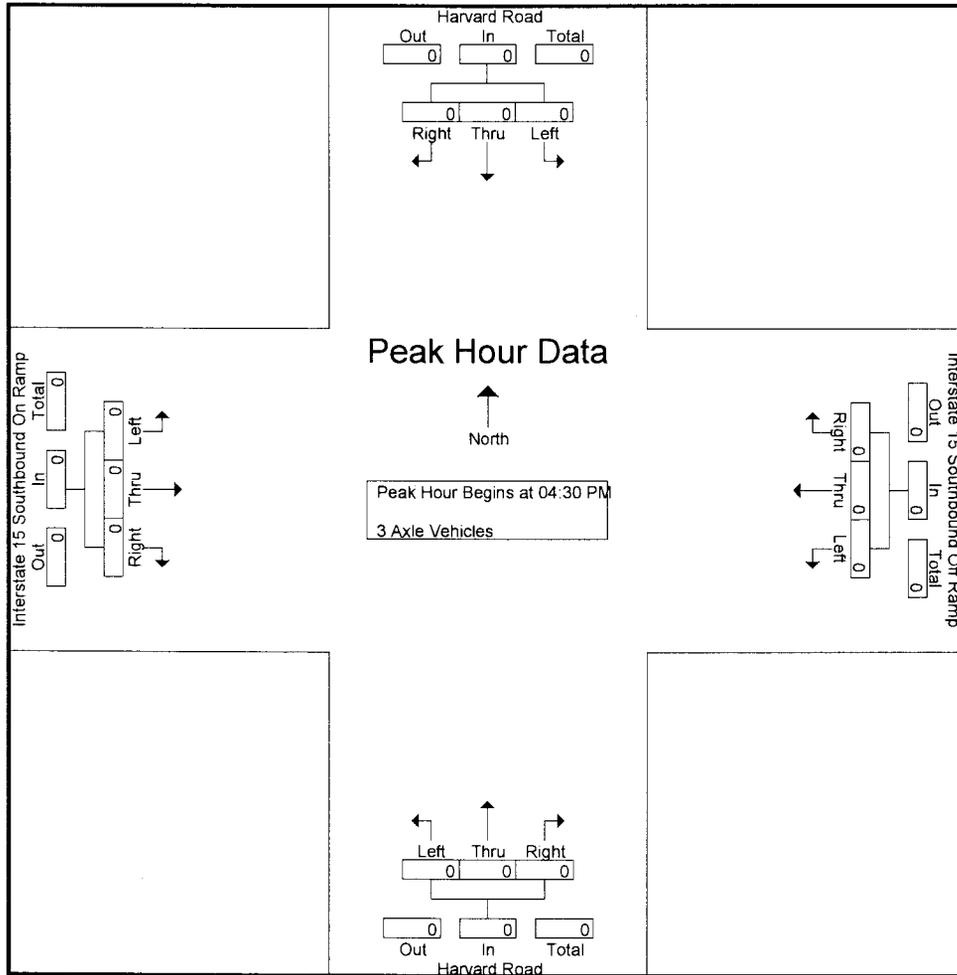
File Name : CSBHA15SPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

Groups Printed- 3 Axle Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0		
Total %																	

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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



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

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

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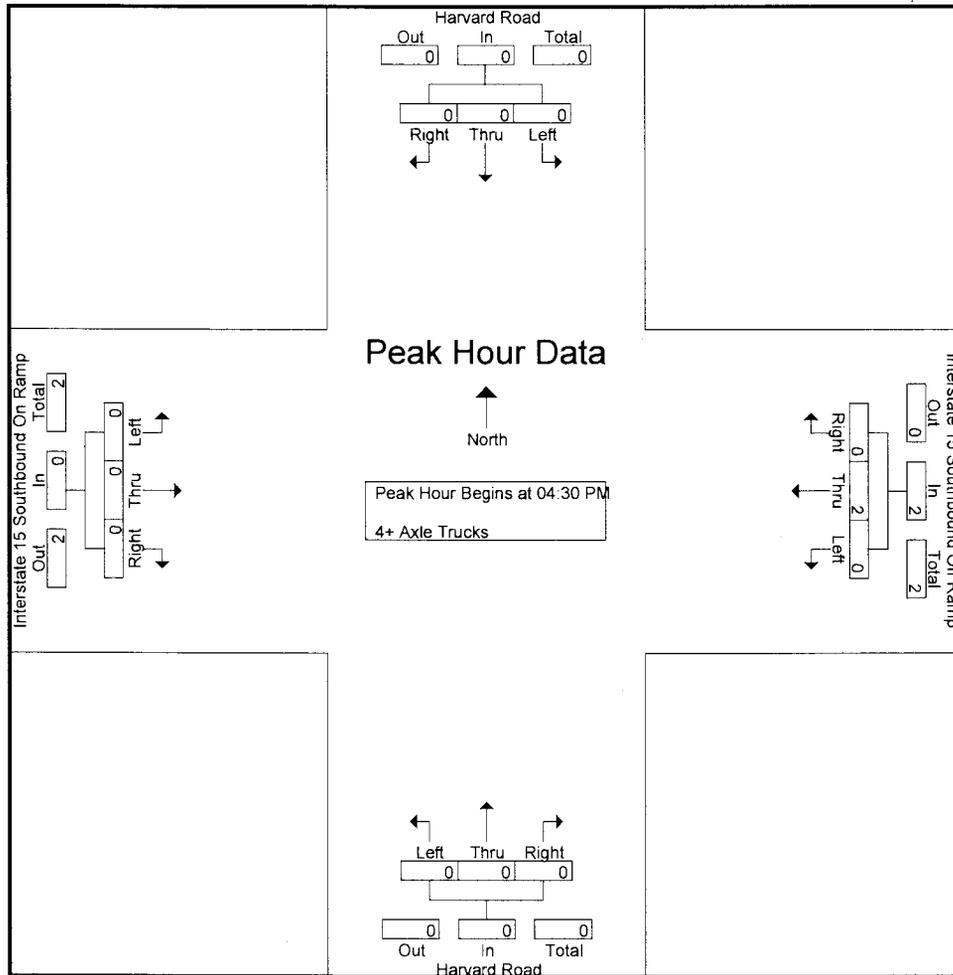
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Southbound Ramps  
 Weather: Clear

File Name : CSBHA15SPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

Groups Printed- 4+ Axle Trucks

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
05:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Grand Total	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	4
Apprch %	0	0	0	0	0	100	0	100	0	0	0	0	0	0	0	0	
Total %	0	0	0	0	0	100	0	100	0	0	0	0	0	0	0	0	

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
% App. Total	0	0	0	0	0	100	0	100	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.500



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

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000

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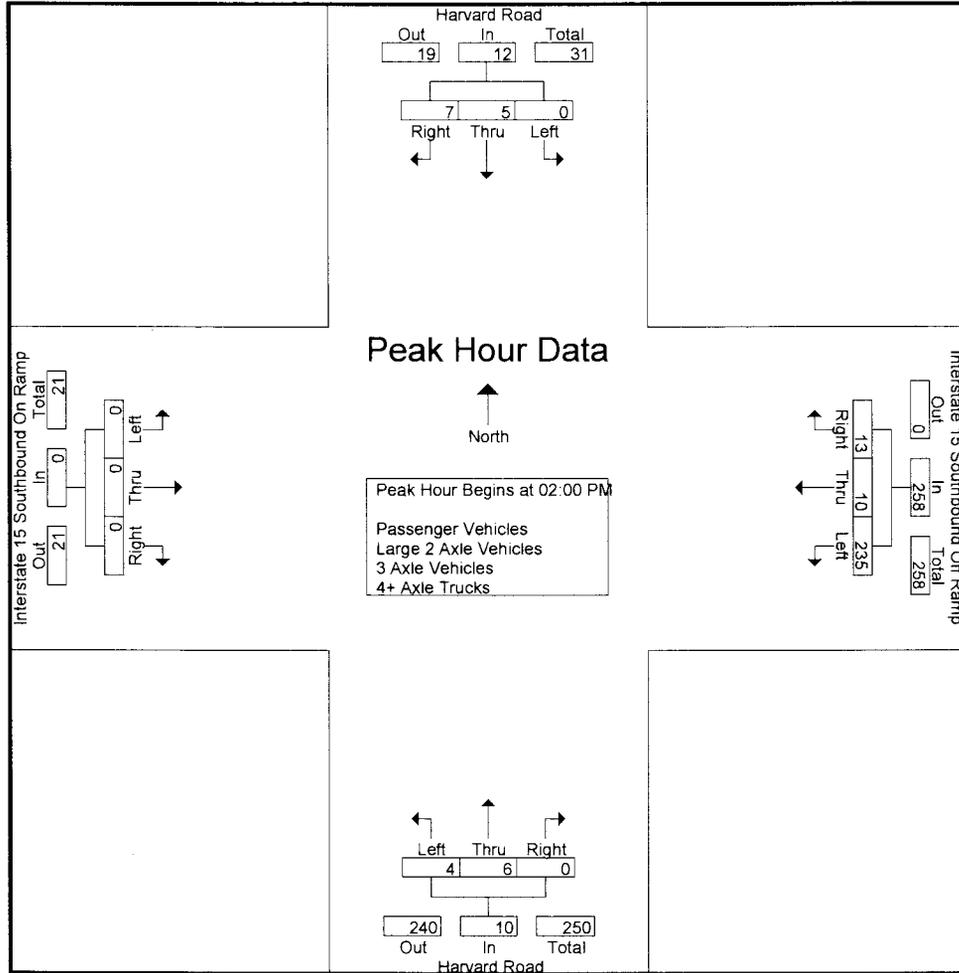
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Southbound Ramps  
 Weather: Clear

File Name : CSBHA15SMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

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

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	1	1	23	6	1	30	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	2	2	39	3	4	46	0	0	0	0	0	0	0	0	0
12:30 PM	0	2	2	4	23	3	1	27	0	1	0	1	0	0	0	0	0
12:45 PM	0	2	3	5	41	4	6	51	0	3	0	3	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>4</b>	<b>8</b>	<b>12</b>	<b>126</b>	<b>16</b>	<b>12</b>	<b>154</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>170</b>
01:00 PM	0	0	0	0	48	3	1	52	1	1	0	2	0	0	0	0	0
01:15 PM	0	1	1	2	39	3	3	45	2	1	0	3	0	0	0	0	0
01:30 PM	0	1	4	5	54	3	2	59	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	2	2	51	1	1	53	1	1	0	2	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>2</b>	<b>7</b>	<b>9</b>	<b>192</b>	<b>10</b>	<b>7</b>	<b>209</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>225</b>
02:00 PM	0	0	2	2	46	2	4	52	3	1	0	4	0	0	0	0	0
02:15 PM	0	2	1	3	40	4	3	47	1	0	0	1	0	0	0	0	0
02:30 PM	0	2	1	3	75	1	3	79	0	1	0	1	0	0	0	0	0
02:45 PM	0	1	3	4	74	3	3	80	0	4	0	4	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>5</b>	<b>7</b>	<b>12</b>	<b>235</b>	<b>10</b>	<b>13</b>	<b>258</b>	<b>4</b>	<b>6</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>280</b>
<b>Grand Total</b>	<b>0</b>	<b>11</b>	<b>22</b>	<b>33</b>	<b>553</b>	<b>36</b>	<b>32</b>	<b>621</b>	<b>8</b>	<b>13</b>	<b>0</b>	<b>21</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>675</b>
Apprch %	0	33.3	66.7		89	5.8	5.2		38.1	61.9	0		0	0	0		
Total %	0	1.6	3.3	4.9	81.9	5.3	4.7	9.2	1.2	1.9	0	3.1	0	0	0	0	
Passenger Vehicles	0	9	19	28	528	25	29	582	8	12	0	20	0	0	0	0	630
% Passenger Vehicles	0	81.8	86.4	84.8	95.5	69.4	90.6	93.7	100	92.3	0	95.2	0	0	0	0	93.3
Large 2 Axle Vehicles	0	1	0	1	5	4	1	10	0	0	0	0	0	0	0	0	11
% Large 2 Axle Vehicles	0	9.1	0	3	0.9	11.1	3.1	1.6	0	0	0	0	0	0	0	0	1.6
3 Axle Vehicles	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
% 3 Axle Vehicles	0	0	0	0	0	8.3	0	0.5	0	0	0	0	0	0	0	0	0.4
4+ Axle Trucks	0	1	3	4	20	4	2	26	0	1	0	1	0	0	0	0	31
% 4+ Axle Trucks	0	9.1	13.6	12.1	3.6	11.1	6.2	4.2	0	7.7	0	4.8	0	0	0	0	4.6

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	0	2	2	46	2	4	52	3	1	0	4	0	0	0	0	58
02:15 PM	0	2	1	3	40	4	3	47	1	0	0	1	0	0	0	0	51
02:30 PM	0	2	1	3	75	1	3	79	0	1	0	1	0	0	0	0	83
02:45 PM	0	1	3	4	74	3	3	80	0	4	0	4	0	0	0	0	88
<b>Total Volume</b>	<b>0</b>	<b>5</b>	<b>7</b>	<b>12</b>	<b>235</b>	<b>10</b>	<b>13</b>	<b>258</b>	<b>4</b>	<b>6</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>280</b>
% App. Total	0	41.7	58.3		91.1	3.9	5		40	60	0		0	0	0		
PHF	.000	.625	.583	.750	.783	.625	.813	.806	.333	.375	.000	.625	.000	.000	.000	.000	.795



Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	12:00 PM				02:00 PM				02:00 PM				12:00 PM			
+0 mins.	0	0	1	1	46	2	4	52	3	1	0	4	0	0	0	0
+15 mins.	0	0	2	2	40	4	3	47	1	0	0	1	0	0	0	0
+30 mins.	0	2	2	4	75	1	3	79	0	1	0	1	0	0	0	0
+45 mins.	0	2	3	5	74	3	3	80	0	4	0	4	0	0	0	0
Total Volume	0	4	8	12	235	10	13	258	4	6	0	10	0	0	0	0
% App. Total	0	33.3	66.7		91.1	3.9	5		40	60	0		0	0	0	
PHF	.000	.500	.667	.600	.783	.625	.813	.806	.333	.375	.000	.625	.000	.000	.000	.000

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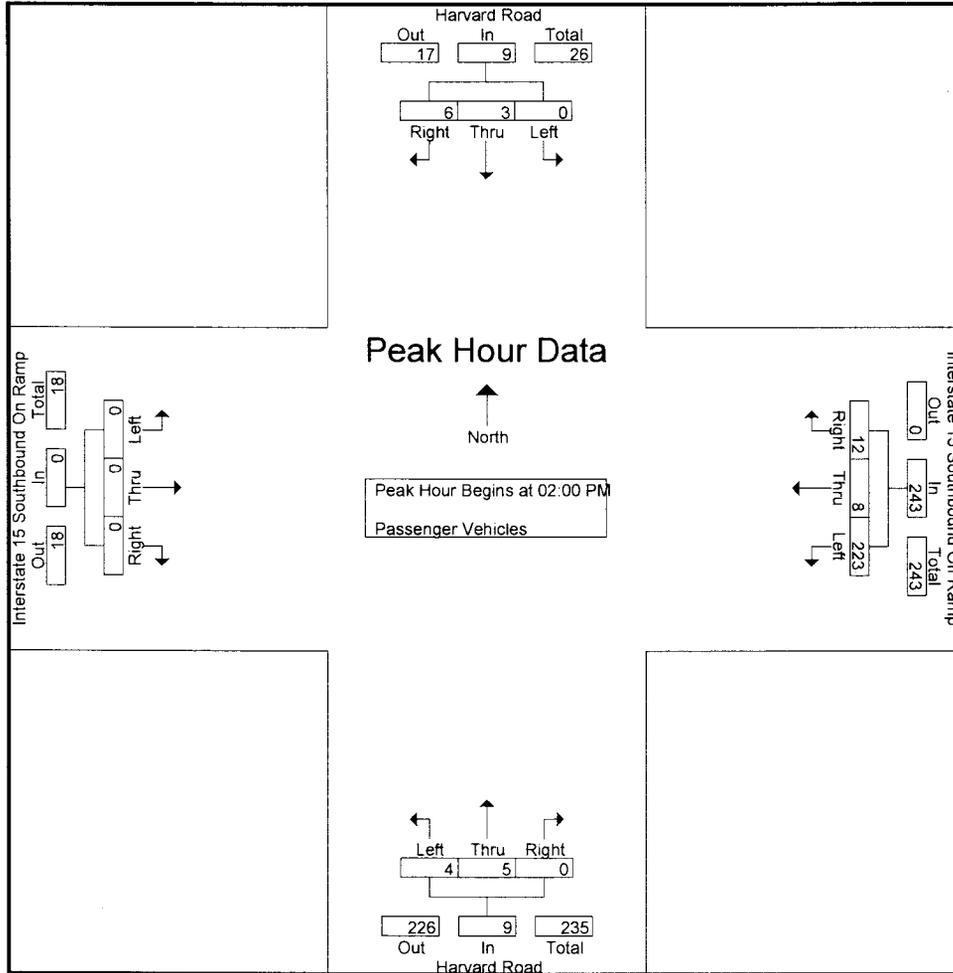
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Southbound Ramps  
 Weather: Clear

File Name : CSBHA15SMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

Groups Printed- Passenger Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	1	1	22	3	1	26	0	0	0	0	0	0	0	0	27
12:15 PM	0	0	2	2	39	3	4	46	0	0	0	0	0	0	0	0	48
12:30 PM	0	2	2	4	23	1	1	25	0	1	0	1	0	0	0	0	30
12:45 PM	0	2	3	5	41	4	5	50	0	3	0	3	0	0	0	0	58
Total	0	4	8	12	125	11	11	147	0	4	0	4	0	0	0	0	163
01:00 PM	0	0	0	0	42	2	1	45	1	1	0	2	0	0	0	0	47
01:15 PM	0	1	1	2	37	2	2	41	2	1	0	3	0	0	0	0	46
01:30 PM	0	1	2	3	53	2	2	57	0	0	0	0	0	0	0	0	60
01:45 PM	0	0	2	2	48	0	1	49	1	1	0	2	0	0	0	0	53
Total	0	2	5	7	180	6	6	192	4	3	0	7	0	0	0	0	206
02:00 PM	0	0	2	2	46	2	3	51	3	1	0	4	0	0	0	0	57
02:15 PM	0	2	1	3	38	2	3	43	1	0	0	1	0	0	0	0	47
02:30 PM	0	1	1	2	72	1	3	76	0	1	0	1	0	0	0	0	79
02:45 PM	0	0	2	2	67	3	3	73	0	3	0	3	0	0	0	0	78
Total	0	3	6	9	223	8	12	243	4	5	0	9	0	0	0	0	261
Grand Total	0	9	19	28	528	25	29	582	8	12	0	20	0	0	0	0	630
Apprch %	0	32.1	67.9		90.7	4.3	5		40	60	0		0	0	0		
Total %	0	1.4	3	4.4	83.8	4	4.6	92.4	1.3	1.9	0	3.2	0	0	0	0	

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	0	2	2	46	2	3	51	3	1	0	4	0	0	0	0	57
02:15 PM	0	2	1	3	38	2	3	43	1	0	0	1	0	0	0	0	47
02:30 PM	0	1	1	2	72	1	3	76	0	1	0	1	0	0	0	0	79
02:45 PM	0	0	2	2	67	3	3	73	0	3	0	3	0	0	0	0	78
Total Volume	0	3	6	9	223	8	12	243	4	5	0	9	0	0	0	0	261
% App. Total	0	33.3	66.7		91.8	3.3	4.9		44.4	55.6	0		0	0	0		
PHF	.000	.375	.750	.750	.774	.667	1.00	.799	.333	.417	.000	.563	.000	.000	.000	.000	.826



Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	02:00 PM				02:00 PM				02:00 PM				02:00 PM			
+0 mins.	0	0	2	2	46	2	3	51	3	1	0	4	0	0	0	0
+15 mins.	0	2	1	3	38	2	3	43	1	0	0	1	0	0	0	0
+30 mins.	0	1	1	2	72	1	3	76	0	1	0	1	0	0	0	0
+45 mins.	0	0	2	2	67	3	3	73	0	3	0	3	0	0	0	0
Total Volume	0	3	6	9	223	8	12	243	4	5	0	9	0	0	0	0
% App. Total	0	33.3	66.7		91.8	3.3	4.9		44.4	55.6	0		0	0	0	
PHF	.000	.375	.750	.750	.774	.667	1.000	.799	.333	.417	.000	.563	.000	.000	.000	.000

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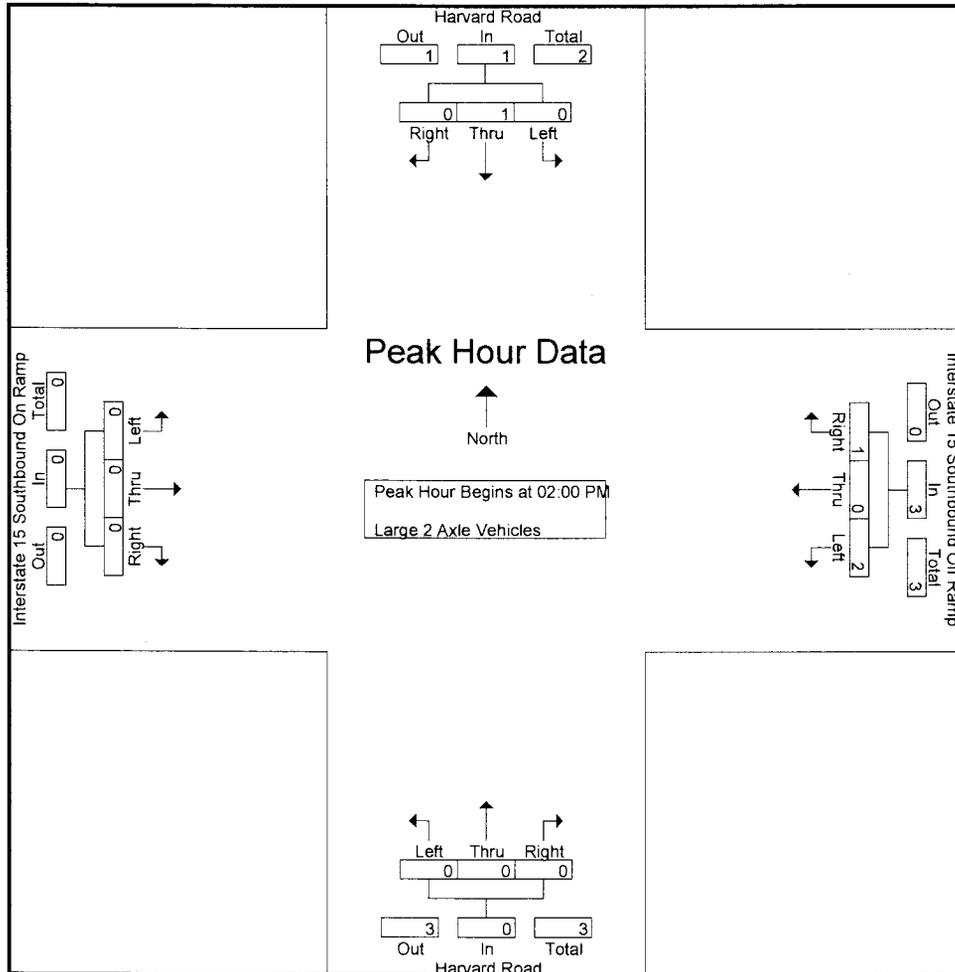
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Southbound Ramps  
 Weather: Clear

File Name : CSBHA15SMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

Groups Printed- Large 2 Axle Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	3
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	3
01:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
01:45 PM	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	2
Total	0	0	0	0	2	2	0	4	0	0	0	0	0	0	0	0	4
02:00 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
02:45 PM	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2
Total	0	1	0	1	2	0	1	3	0	0	0	0	0	0	0	0	4
Grand Total	0	1	0	1	5	4	1	10	0	0	0	0	0	0	0	0	11
Apprch %	0	100	0		50	40	10		0	0	0		0	0	0		
Total %	0	9.1	0	9.1	45.5	36.4	9.1	90.9	0	0	0	0	0	0	0	0	

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
02:45 PM	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2
Total Volume	0	1	0	1	2	0	1	3	0	0	0	0	0	0	0	0	4
% App. Total	0	100	0		66.7	0	33.3		0	0	0		0	0	0		
PHF	.000	.250	.000	.250	.250	.000	.250	.375	.000	.000	.000	.000	.000	.000	.000	.000	.500



Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	02:00 PM				02:00 PM				02:00 PM				02:00 PM			
+0 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0
Total Volume	0	1	0	1	2	0	1	3	0	0	0	0	0	0	0	0
% App. Total	0	100	0		66.7	0	33.3		0	0	0		0	0	0	
PHF	.000	.250	.000	.250	.250	.000	.250	.375	.000	.000	.000	.000	.000	.000	.000	.000

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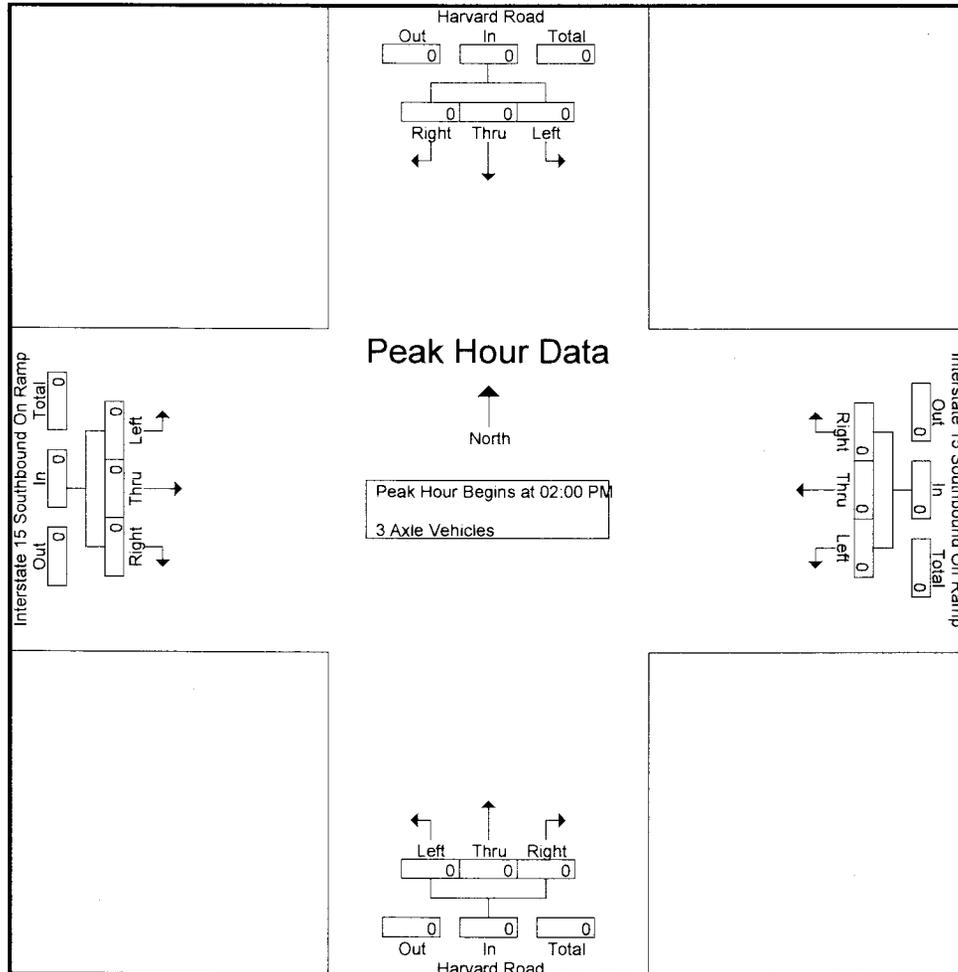
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Southbound Ramps  
 Weather: Clear

File Name : CSBHA15SMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

Groups Printed- 3 Axle Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
01:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
01:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
Apprch %	0	0	0		0	100	0		0	0	0		0	0	0		
Total %	0	0	0		0	100	0	100	0	0	0		0	0	0		

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	02:00 PM				02:00 PM				02:00 PM				02:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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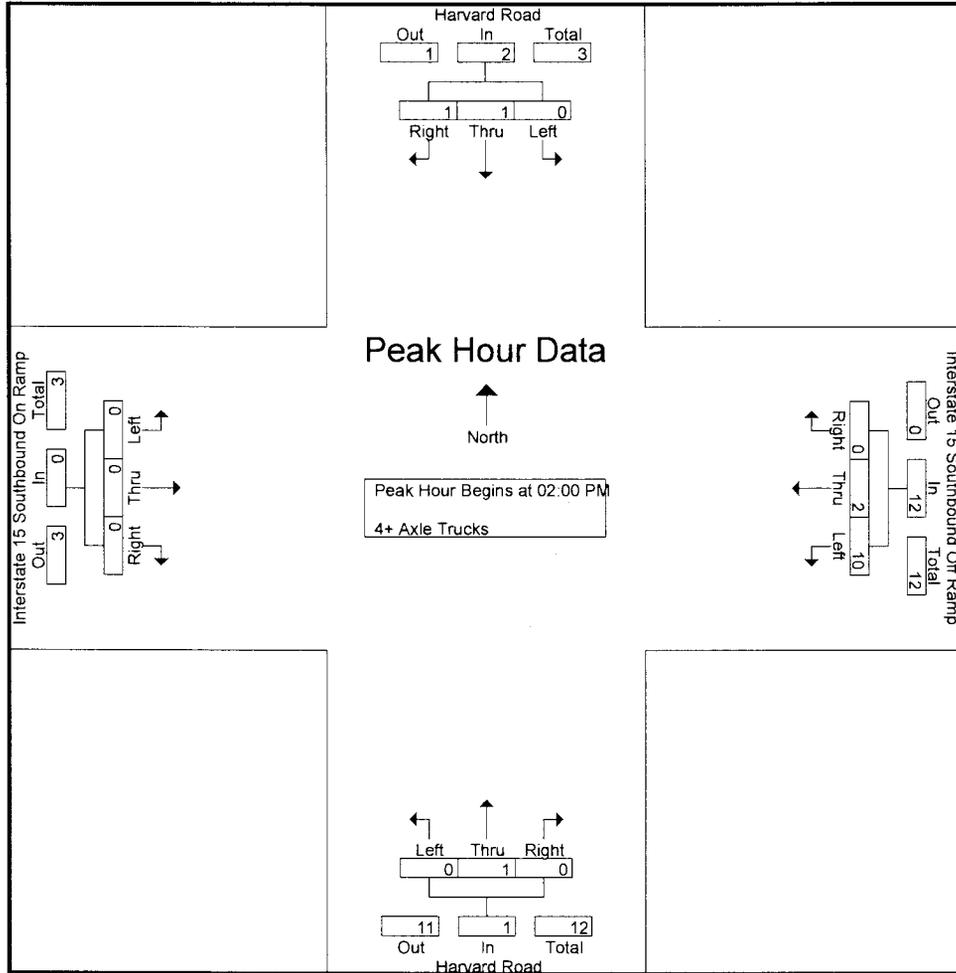
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Southbound Ramps  
 Weather: Clear

File Name : CSBHA15SMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

Groups Printed- 4+ Axle Trucks

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	2	1	3	0	0	0	0	0	0	0	0	3
01:00 PM	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	5
01:15 PM	0	0	0	0	2	0	1	3	0	0	0	0	0	0	0	0	3
01:30 PM	0	0	2	2	1	0	0	1	0	0	0	0	0	0	0	0	3
01:45 PM	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2
Total	0	0	2	2	10	0	1	11	0	0	0	0	0	0	0	0	13
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	2	2	0	4	0	0	0	0	0	0	0	0	4
02:30 PM	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	3
02:45 PM	0	1	1	2	5	0	0	5	0	1	0	1	0	0	0	0	8
Total	0	1	1	2	10	2	0	12	0	1	0	1	0	0	0	0	15
Grand Total	0	1	3	4	20	4	2	26	0	1	0	1	0	0	0	0	31
Apprch %	0	25	75		76.9	15.4	7.7		0	100	0		0	0	0		
Total %	0	3.2	9.7	12.9	64.5	12.9	6.5	83.9	0	3.2	0	3.2	0	0	0	0	

Start Time	Harvard Road Southbound				Interstate 15 Southbound Off Ramp Westbound				Harvard Road Northbound				Interstate 15 Southbound On Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	2	2	0	4	0	0	0	0	0	0	0	0	4
02:30 PM	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	3
02:45 PM	0	1	1	2	5	0	0	5	0	1	0	1	0	0	0	0	8
Total Volume	0	1	1	2	10	2	0	12	0	1	0	1	0	0	0	0	15
% App. Total	0	50	50		83.3	16.7	0		0	100	0		0	0	0		
PHF	.000	.250	.250	.250	.500	.250	.000	.600	.000	.250	.000	.250	.000	.000	.000	.000	.469



Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	02:00 PM				02:00 PM				02:00 PM				02:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	2	2	0	4	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0
+45 mins.	0	1	1	2	5	0	0	5	0	1	0	1	0	0	0	0
Total Volume	0	1	1	2	10	2	0	12	0	1	0	1	0	0	0	0
% App. Total	0	50	50		83.3	16.7	0		0	100	0		0	0	0	
PHF	.000	.250	.250	.250	.500	.250	.000	.600	.000	.250	.000	.250	.000	.000	.000	.000

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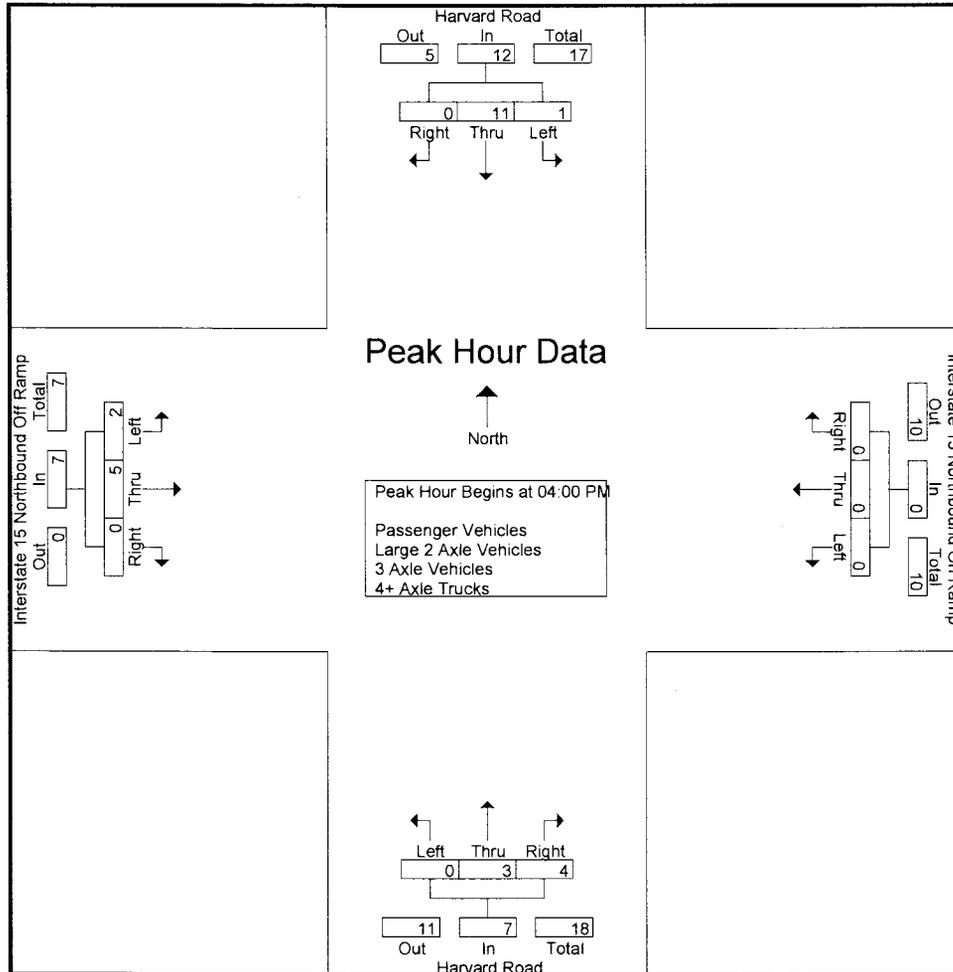
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

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

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	6	0	6	0	0	0	0	0	2	2	4	0	2	0	2	12
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	2	3
04:30 PM	1	3	0	4	0	0	0	0	0	0	0	0	1	0	0	1	5
04:45 PM	0	2	0	2	0	0	0	0	0	1	1	2	1	1	0	2	6
Total	1	11	0	12	0	0	0	0	0	3	4	7	2	5	0	7	26
05:00 PM	3	0	0	3	0	0	0	0	0	0	0	0	1	1	1	3	6
05:15 PM	0	2	0	2	0	0	0	0	0	1	0	1	1	1	2	4	7
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	1	1	2	1	3	1	5	7
Total	3	2	0	5	0	0	0	0	0	2	1	3	3	6	4	13	21
Grand Total	4	13	0	17	0	0	0	0	0	5	5	10	5	11	4	20	47
Apprch %	23.5	76.5	0		0	0	0		0	50	50		25	55	20		
Total %	8.5	27.7	0	36.2	0	0	0	0	0	10.6	10.6	21.3	10.6	23.4	8.5	42.6	
Passenger Vehicles	4	6	0	10	0	0	0	0	0	5	5	10	5	8	4	17	37
% Passenger Vehicles	100	46.2	0	58.8	0	0	0	0	0	100	100	100	100	72.7	100	85	78.7
Large 2 Axle Vehicles	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
% Large 2 Axle Vehicles	0	15.4	0	11.8	0	0	0	0	0	0	0	0	0	0	0	0	4.3
3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4+ Axle Trucks	0	5	0	5	0	0	0	0	0	0	0	0	0	3	0	3	8
% 4+ Axle Trucks	0	38.5	0	29.4	0	0	0	0	0	0	0	0	0	27.3	0	15	17

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
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	0	6	0	6	0	0	0	0	0	2	2	4	0	2	0	2	12
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	2	3
04:30 PM	1	3	0	4	0	0	0	0	0	0	0	0	1	0	0	1	5
04:45 PM	0	2	0	2	0	0	0	0	0	1	1	2	1	1	0	2	6
Total Volume	1	11	0	12	0	0	0	0	0	3	4	7	2	5	0	7	26
% App. Total	8.3	91.7	0		0	0	0		0	42.9	57.1		28.6	71.4	0		
PHF	.250	.458	.000	.500	.000	.000	.000	.000	.000	.375	.500	.438	.500	.625	.000	.875	.542



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

	04:00 PM				04:00 PM				04:00 PM				05:00 PM			
+0 mins.	0	6	0	6	0	0	0	0	0	2	2	4	1	1	1	3
+15 mins.	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	4
+30 mins.	1	3	0	4	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	2	0	2	0	0	0	0	0	1	1	2	1	3	1	5
Total Volume	1	11	0	12	0	0	0	0	0	3	4	7	3	6	4	13
% App. Total	8.3	91.7	0		0	0	0		0	42.9	57.1		23.1	46.2	30.8	
PHF	.250	.458	.000	.500	.000	.000	.000	.000	.000	.375	.500	.438	.750	.500	.500	.650

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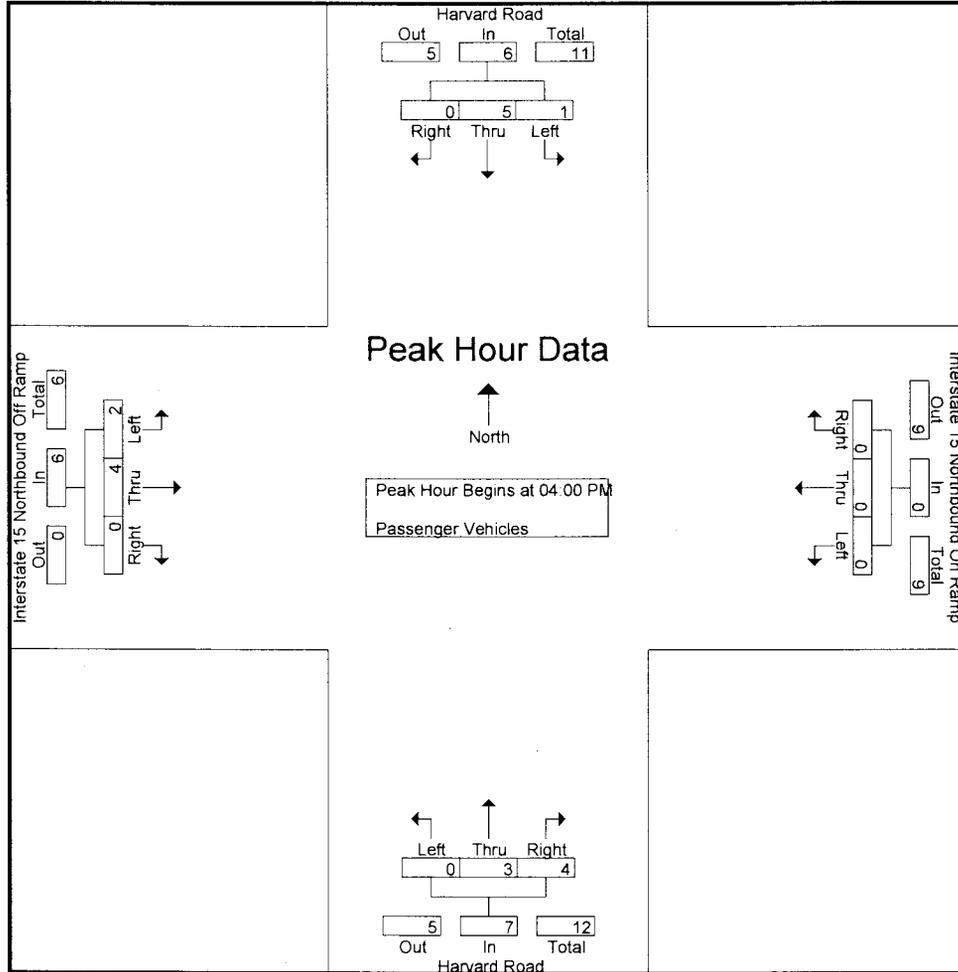
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

Groups Printed- Passenger Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	1	0	1	0	0	0	0	0	2	2	4	0	2	0	2	7
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	2	3
04:30 PM	1	2	0	3	0	0	0	0	0	0	0	0	1	0	0	1	4
04:45 PM	0	2	0	2	0	0	0	0	0	1	1	2	1	0	0	1	5
Total	1	5	0	6	0	0	0	0	0	3	4	7	2	4	0	6	19
05:00 PM	3	0	0	3	0	0	0	0	0	0	0	0	1	1	1	3	6
05:15 PM	0	1	0	1	0	0	0	0	0	1	0	1	1	1	2	4	6
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	1	1	2	1	2	1	4	6
Total	3	1	0	4	0	0	0	0	0	2	1	3	3	4	4	11	18
Grand Total	4	6	0	10	0	0	0	0	0	5	5	10	5	8	4	17	37
Apprch %	40	60	0		0	0	0		0	50	50		29.4	47.1	23.5		
Total %	10.8	16.2	0	27	0	0	0	0	0	13.5	13.5	27	13.5	21.6	10.8	45.9	

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
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	0	1	0	1	0	0	0	0	0	2	2	4	0	2	0	2	7
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	2	3
04:30 PM	1	2	0	3	0	0	0	0	0	0	0	0	1	0	0	1	4
04:45 PM	0	2	0	2	0	0	0	0	0	1	1	2	1	0	0	1	5
Total Volume	1	5	0	6	0	0	0	0	0	3	4	7	2	4	0	6	19
% App. Total	16.7	83.3	0		0	0	0		0	42.9	57.1		33.3	66.7	0		
PHF	.250	.625	.000	.500	.000	.000	.000	.000	.000	.375	.500	.438	.500	.500	.000	.750	.679



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

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	1	0	1	0	0	0	0	0	2	2	4	0	2	0	2
+15 mins.	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	2
+30 mins.	1	2	0	3	0	0	0	0	0	0	0	0	1	0	0	1
+45 mins.	0	2	0	2	0	0	0	0	0	1	1	2	1	0	0	1
Total Volume	1	5	0	6	0	0	0	0	0	3	4	7	2	4	0	6
% App. Total	16.7	83.3	0		0	0	0		0	42.9	57.1		33.3	66.7	0	
PHF	.250	.625	.000	.500	.000	.000	.000	.000	.000	.375	.500	.438	.500	.500	.000	.750

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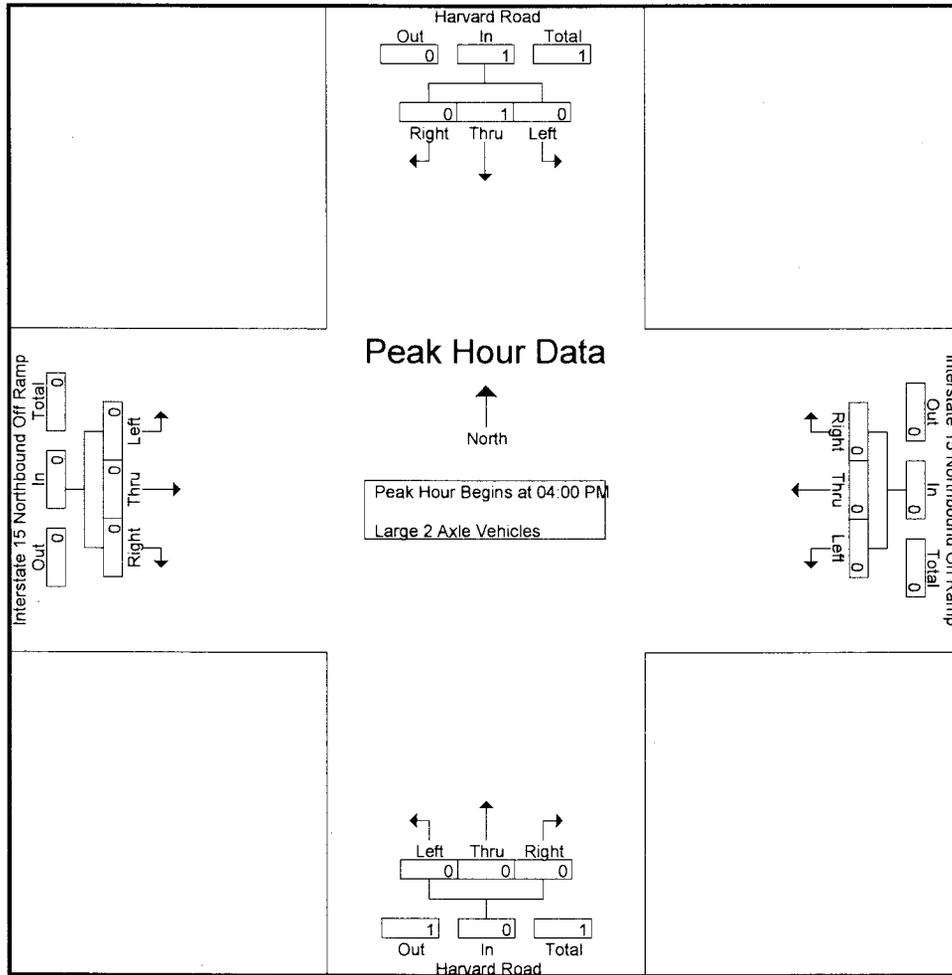
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

Groups Printed- Large 2 Axle Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Apprch %	0	100	0		0	0	0		0	0	0		0	0	0		
Total %	0	100	0	100	0	0	0	0	0	0	0	0	0	0	0	0	

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% App. Total	0	100	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250



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

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

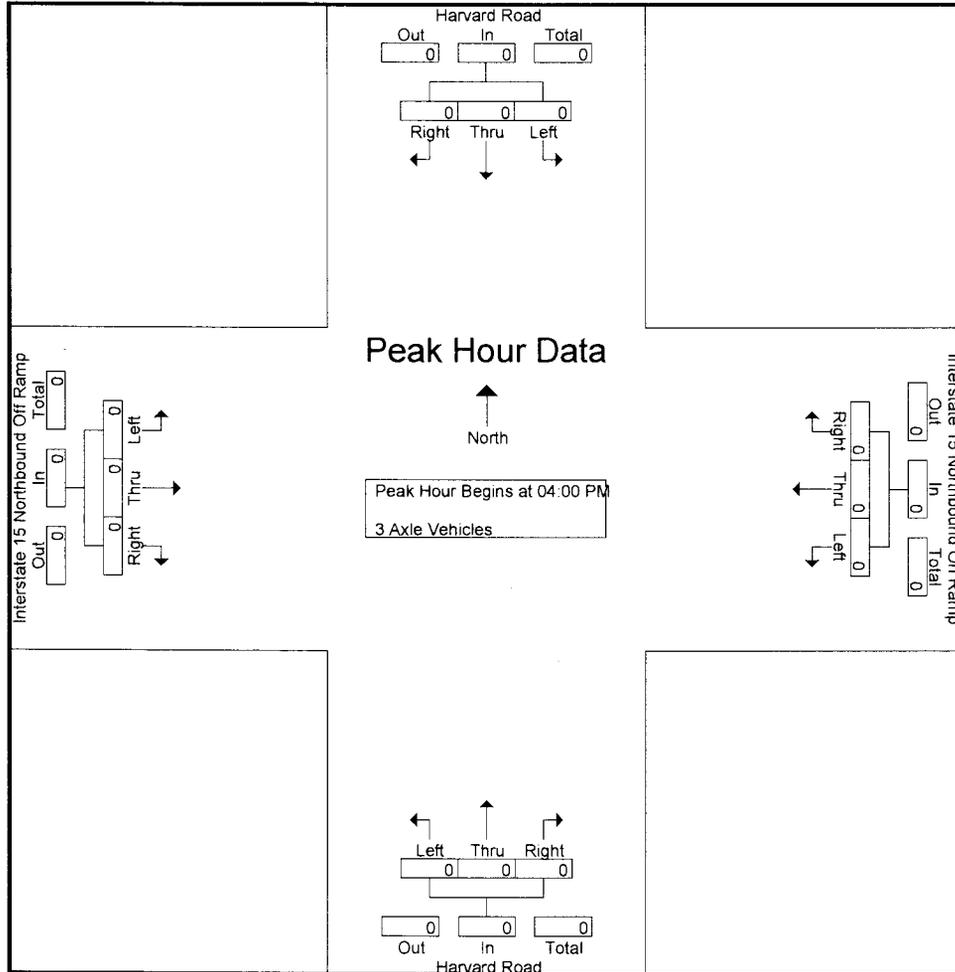
Groups Printed- 3 Axle Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0		
Total %																	

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 2



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

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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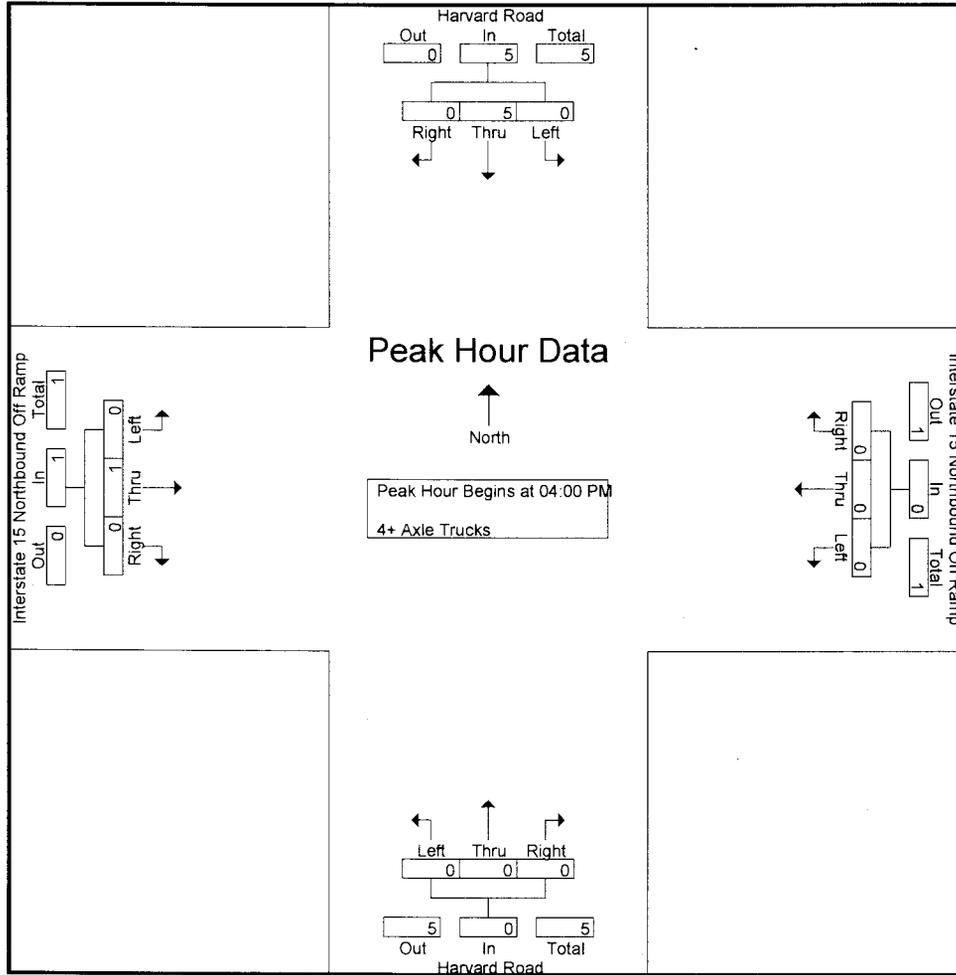
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NPM  
 Site Code : 07516358  
 Start Date : 6/10/2016  
 Page No : 1

Groups Printed- 4+ Axle Trucks

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
04:00 PM	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	5	0	5	0	0	0	0	0	0	0	0	0	1	0	0	1	6
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
Grand Total	0	5	0	5	0	0	0	0	0	0	0	0	0	3	0	0	3	8
Apprch %	0	100	0		0	0	0		0	0	0		0	100	0			
Total %	0	62.5	0	62.5	0	0	0	0	0	0	0	0	0	37.5	0	37.5		

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
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	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total Volume	0	5	0	5	0	0	0	0	0	0	0	0	0	1	0	0	1	6
% App. Total	0	100	0		0	0	0		0	0	0		0	100	0			
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.300	



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

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total Volume	0	5	0	5	0	0	0	0	0	0	0	0	0	1	0	1
% App. Total	0	100	0		0	0	0		0	0	0		0	100	0	
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250

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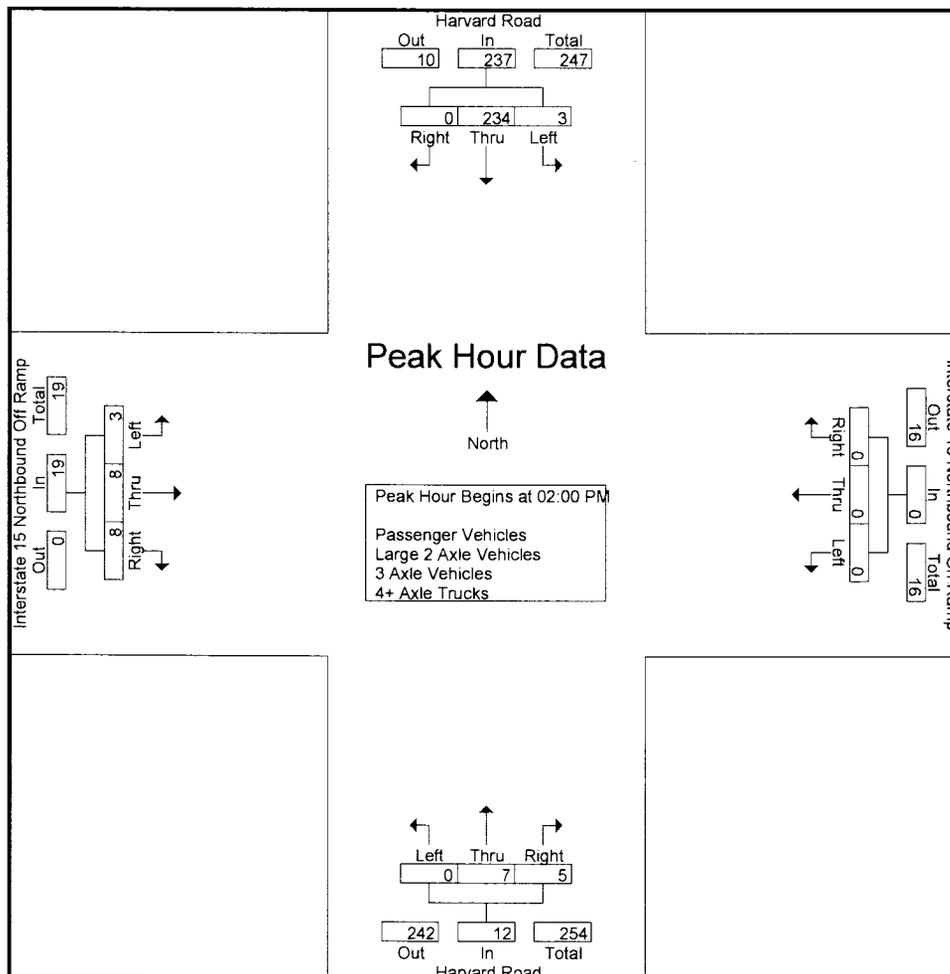
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

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

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	1	22	0	23	0	0	0	0	0	0	1	1	0	3	1	4	28
12:15 PM	0	40	0	40	0	0	0	0	0	0	1	1	0	2	1	3	44
12:30 PM	1	28	0	29	0	0	0	0	0	0	2	2	1	0	2	3	34
12:45 PM	1	40	0	41	0	0	0	0	0	2	0	2	1	1	1	3	46
<b>Total</b>	<b>3</b>	<b>130</b>	<b>0</b>	<b>133</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>2</b>	<b>6</b>	<b>5</b>	<b>13</b>	<b>152</b>
01:00 PM	0	50	0	50	0	0	0	0	0	2	1	3	0	1	0	1	54
01:15 PM	1	41	0	42	0	0	0	0	0	1	3	4	1	3	0	4	50
01:30 PM	1	45	0	46	0	0	0	0	0	0	1	1	0	3	1	4	51
01:45 PM	0	49	0	49	0	0	0	0	0	1	0	1	2	2	1	5	55
<b>Total</b>	<b>2</b>	<b>185</b>	<b>0</b>	<b>187</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>5</b>	<b>9</b>	<b>3</b>	<b>9</b>	<b>2</b>	<b>14</b>	<b>210</b>
02:00 PM	0	50	0	50	0	0	0	0	0	1	0	1	1	2	0	3	54
02:15 PM	1	42	0	43	0	0	0	0	0	2	2	4	0	3	2	5	52
02:30 PM	1	67	0	68	0	0	0	0	0	2	3	5	0	2	3	5	78
02:45 PM	1	75	0	76	0	0	0	0	0	2	0	2	2	1	3	6	84
<b>Total</b>	<b>3</b>	<b>234</b>	<b>0</b>	<b>237</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>5</b>	<b>12</b>	<b>3</b>	<b>8</b>	<b>8</b>	<b>19</b>	<b>268</b>
<b>Grand Total</b>	<b>8</b>	<b>549</b>	<b>0</b>	<b>557</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>14</b>	<b>27</b>	<b>8</b>	<b>23</b>	<b>15</b>	<b>46</b>	<b>630</b>
Apprch %	1.4	98.6	0		0	0	0		0	48.1	51.9		17.4	50	32.6		
Total %	1.3	87.1	0	88.4	0	0	0	0	0	2.1	2.2	4.3	1.3	3.7	2.4	7.3	
Passenger Vehicles	7	520	0	527	0	0	0	0	0	13	14	27	7	19	14	40	594
% Passenger Vehicles	87.5	94.7	0	94.6	0	0	0	0	0	100	100	100	87.5	82.6	93.3	87	94.3
Large 2 Axle Vehicles	0	9	0	9	0	0	0	0	0	0	0	0	0	1	0	1	10
% Large 2 Axle Vehicles	0	1.6	0	1.6	0	0	0	0	0	0	0	0	0	4.3	0	2.2	1.6
3 Axle Vehicles	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% 3 Axle Vehicles	0	0.2	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0.2
4+ Axle Trucks	1	19	0	20	0	0	0	0	0	0	0	0	1	3	1	5	25
% 4+ Axle Trucks	12.5	3.5	0	3.6	0	0	0	0	0	0	0	0	12.5	13	6.7	10.9	4

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	50	0	50	0	0	0	0	0	1	0	1	1	2	0	3	54
02:15 PM	1	42	0	43	0	0	0	0	0	2	2	4	0	3	2	5	52
02:30 PM	1	67	0	68	0	0	0	0	0	2	3	5	0	2	3	5	78
02:45 PM	1	75	0	76	0	0	0	0	0	2	0	2	2	1	3	6	84
<b>Total Volume</b>	<b>3</b>	<b>234</b>	<b>0</b>	<b>237</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>5</b>	<b>12</b>	<b>3</b>	<b>8</b>	<b>8</b>	<b>19</b>	<b>268</b>
% App. Total	1.3	98.7	0		0	0	0		0	58.3	41.7		15.8	42.1	42.1		
PHF	.750	.780	.000	.780	.000	.000	.000	.000	.000	.875	.417	.600	.375	.667	.667	.792	.798



Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	02:00 PM				12:00 PM				02:00 PM				02:00 PM			
+0 mins.	0	50	0	50	0	0	0	0	0	1	0	1	1	2	0	3
+15 mins.	1	42	0	43	0	0	0	0	0	2	2	4	0	3	2	5
+30 mins.	1	67	0	68	0	0	0	0	0	2	3	5	0	2	3	5
+45 mins.	1	75	0	76	0	0	0	0	0	2	0	2	2	1	3	6
Total Volume	3	234	0	237	0	0	0	0	0	7	5	12	3	8	8	19
% App. Total	1.3	98.7	0		0	0	0		0	58.3	41.7		15.8	42.1	42.1	
PHF	.750	.780	.000	.780	.000	.000	.000	.000	.000	.875	.417	.600	.375	.667	.667	.792

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

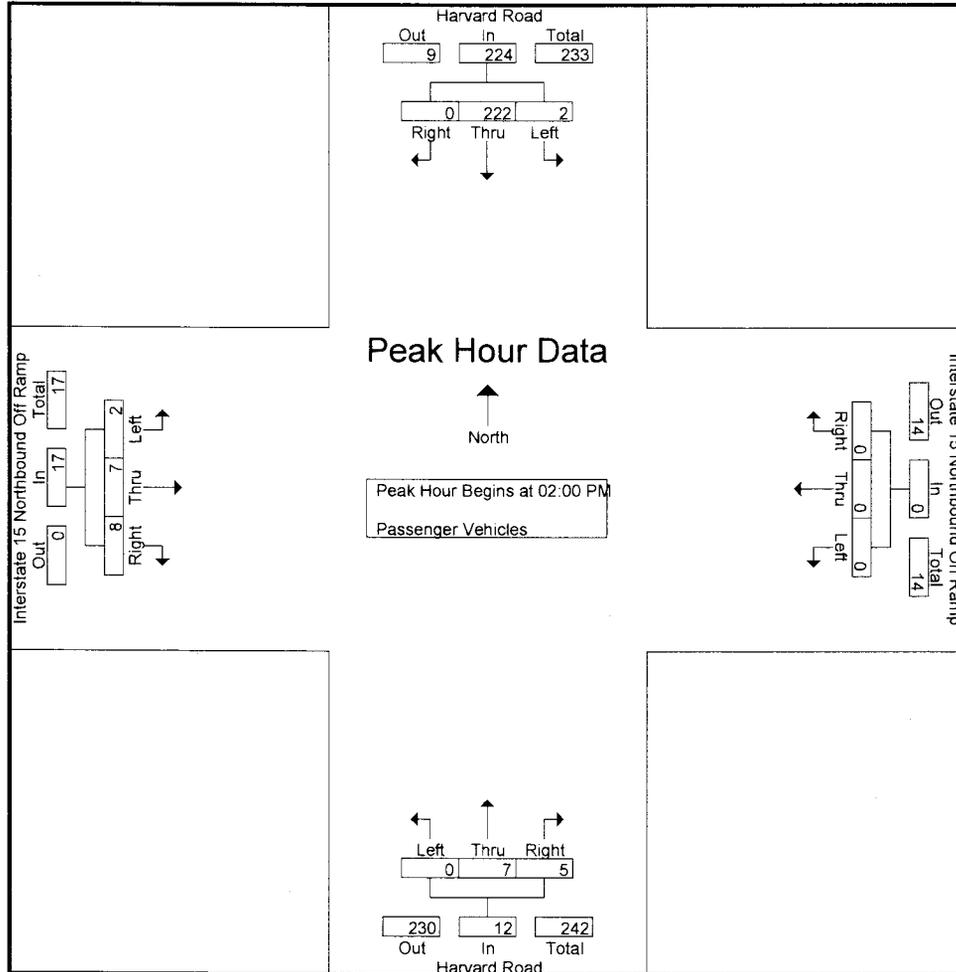
Groups Printed- Passenger Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	1	21	0	22	0	0	0	0	0	0	1	1	0	2	1	3	26
12:15 PM	0	40	0	40	0	0	0	0	0	0	1	1	0	2	1	3	44
12:30 PM	1	27	0	28	0	0	0	0	0	0	2	2	1	0	2	3	33
12:45 PM	1	40	0	41	0	0	0	0	0	2	0	2	1	1	0	2	45
Total	3	128	0	131	0	0	0	0	0	2	4	6	2	5	4	11	148
01:00 PM	0	43	0	43	0	0	0	0	0	2	1	3	0	1	0	1	47
01:15 PM	1	38	0	39	0	0	0	0	0	1	3	4	1	3	0	4	47
01:30 PM	1	44	0	45	0	0	0	0	0	0	1	1	0	2	1	3	49
01:45 PM	0	45	0	45	0	0	0	0	0	1	0	1	2	1	1	4	50
Total	2	170	0	172	0	0	0	0	0	4	5	9	3	7	2	12	193
02:00 PM	0	50	0	50	0	0	0	0	0	1	0	1	1	2	0	3	54
02:15 PM	1	40	0	41	0	0	0	0	0	2	2	4	0	2	2	4	49
02:30 PM	1	63	0	64	0	0	0	0	0	2	3	5	0	2	3	5	74
02:45 PM	0	69	0	69	0	0	0	0	0	2	0	2	1	1	3	5	76
Total	2	222	0	224	0	0	0	0	0	7	5	12	2	7	8	17	253
Grand Total	7	520	0	527	0	0	0	0	0	13	14	27	7	19	14	40	594
Apprch %	1.3	98.7	0		0	0	0		0	48.1	51.9		17.5	47.5	35		
Total %	1.2	87.5	0	88.7	0	0	0	0	0	2.2	2.4	4.5	1.2	3.2	2.4	6.7	

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	50	0	50	0	0	0	0	0	1	0	1	1	2	0	3	54
02:15 PM	1	40	0	41	0	0	0	0	0	2	2	4	0	2	2	4	49
02:30 PM	1	63	0	64	0	0	0	0	0	2	3	5	0	2	3	5	74
02:45 PM	0	69	0	69	0	0	0	0	0	2	0	2	1	1	3	5	76
Total Volume	2	222	0	224	0	0	0	0	0	7	5	12	2	7	8	17	253
% App. Total	0.9	99.1	0		0	0	0		0	58.3	41.7		11.8	41.2	47.1		
PHF	.500	.804	.000	.812	.000	.000	.000	.000	.000	.875	.417	.600	.500	.875	.667	.850	.832

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

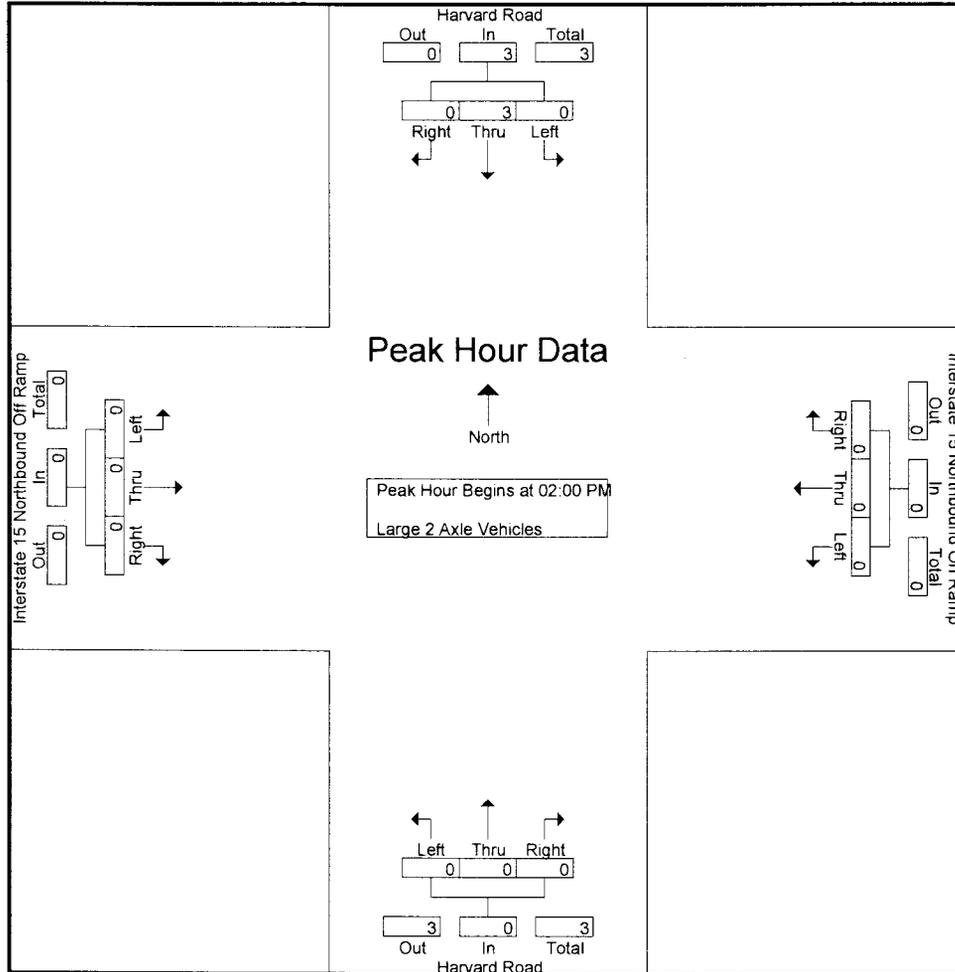
File Name : CSBHA15NMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 2



Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	02:00 PM				02:00 PM				02:00 PM				02:00 PM			
+0 mins.	0	50	0	50	0	0	0	0	0	1	0	1	1	2	0	3
+15 mins.	1	40	0	41	0	0	0	0	0	2	2	4	0	2	2	4
+30 mins.	1	63	0	64	0	0	0	0	0	2	3	5	0	2	3	5
+45 mins.	0	69	0	69	0	0	0	0	0	2	0	2	1	1	3	5
Total Volume	2	222	0	224	0	0	0	0	0	7	5	12	2	7	8	17
% App. Total	0.9	99.1	0		0	0	0		0	58.3	41.7		11.8	41.2	47.1	
PHF	.500	.804	.000	.812	.000	.000	.000	.000	.000	.875	.417	.600	.500	.875	.667	.850





Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	02:00 PM				02:00 PM				02:00 PM				02:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	2	0	2	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	0	0
% App. Total	0	100	0		0	0	0		0	0	0		0	0	0	
PHF	.000	.375	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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 Corona, CA 92787  
 (951) 268-6268

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

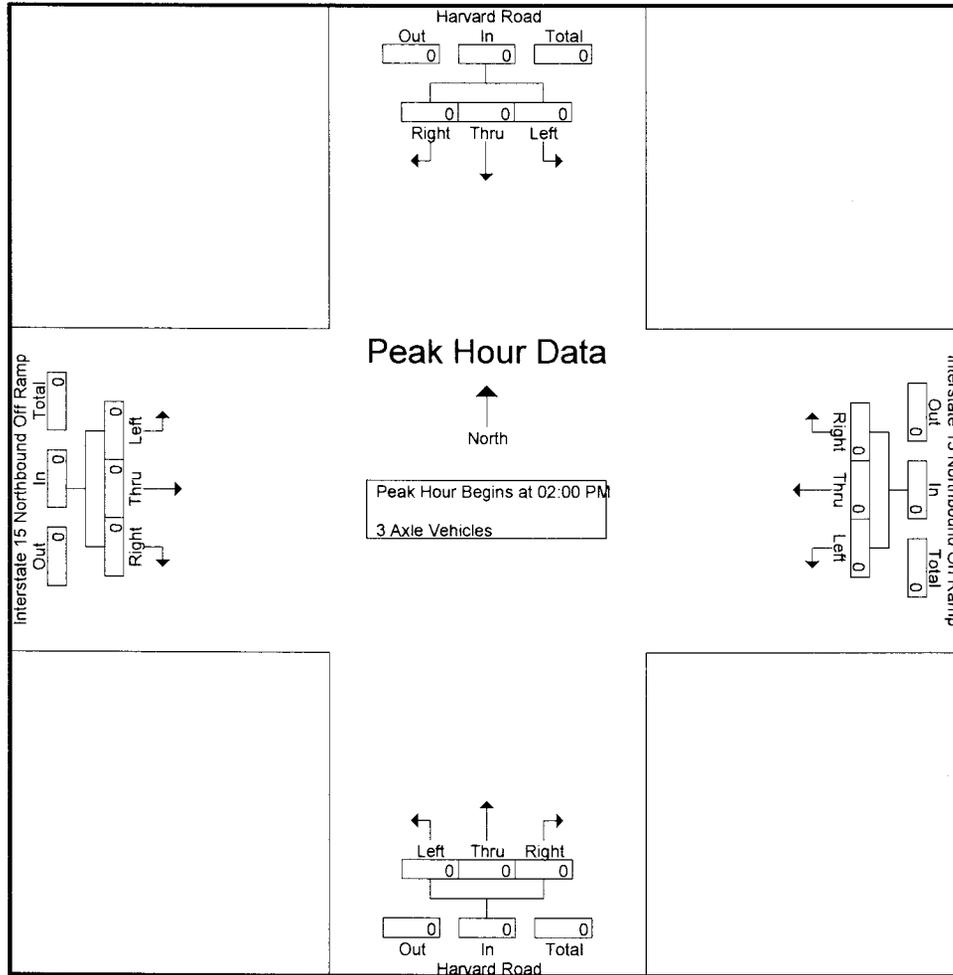
Groups Printed- 3 Axle Vehicles

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Apprch %	0	100	0		0	0	0		0	0	0		0	0	0		
Total %	0	100	0	100	0	0	0	0	0	0	0	0	0	0	0	0	

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 2



Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	02:00 PM				02:00 PM				02:00 PM				02:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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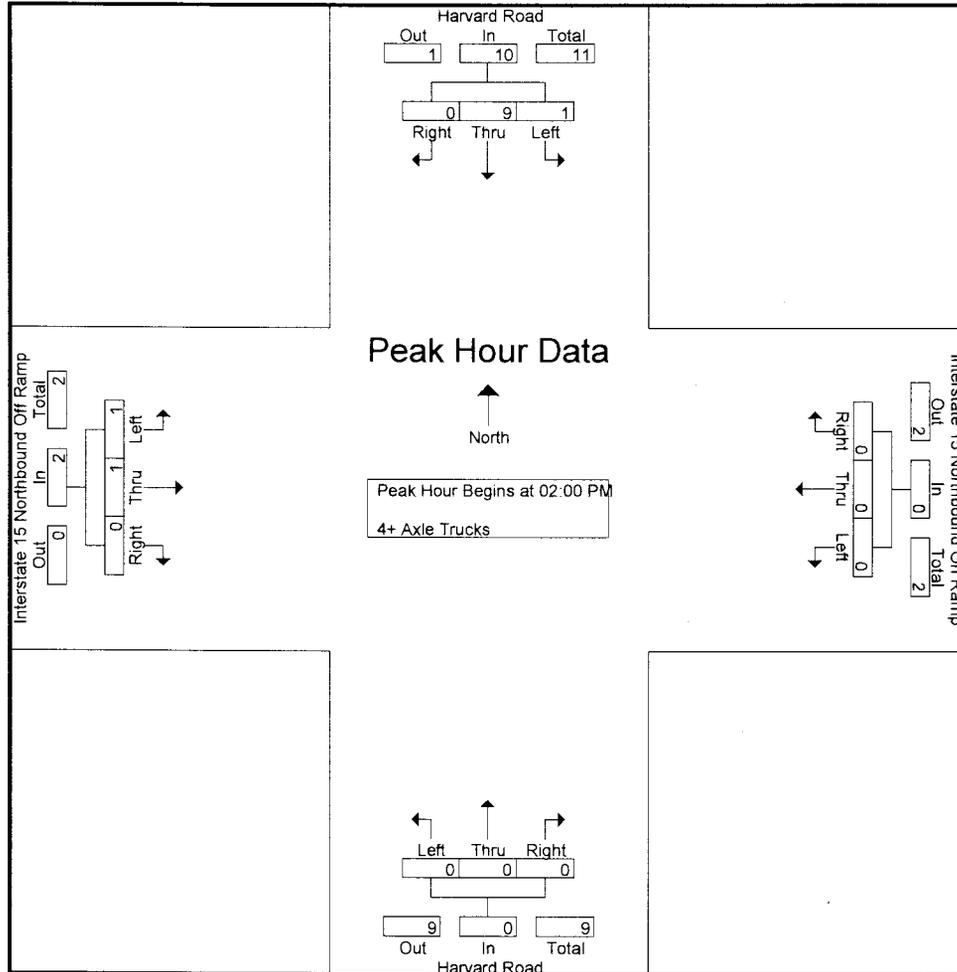
County of San Bernardino  
 N/S: Harvard Road  
 E/W: Interstate 15 Northbound Ramps  
 Weather: Clear

File Name : CSBHA15NMD  
 Site Code : 07516358  
 Start Date : 6/12/2016  
 Page No : 1

Groups Printed- 4+ Axle Trucks

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2
01:00 PM	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
01:15 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
01:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
01:45 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	1	0	1	3
Total	0	10	0	10	0	0	0	0	0	0	0	0	0	1	0	1	11
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	1	0	1	3
02:30 PM	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
02:45 PM	1	4	0	5	0	0	0	0	0	0	0	0	1	0	0	1	6
Total	1	9	0	10	0	0	0	0	0	0	0	0	1	1	0	2	12
Grand Total	1	19	0	20	0	0	0	0	0	0	0	0	1	3	1	5	25
Apprch %	5	95	0		0	0	0		0	0	0		20	60	20		
Total %	4	76	0	80	0	0	0	0	0	0	0	0	4	12	4	20	

Start Time	Harvard Road Southbound				Interstate 15 Northbound On Ramp Westbound				Harvard Road Northbound				Interstate 15 Northbound Off Ramp Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	1	0	1	3
02:30 PM	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
02:45 PM	1	4	0	5	0	0	0	0	0	0	0	0	1	0	0	1	6
Total Volume	1	9	0	10	0	0	0	0	0	0	0	0	1	1	0	2	12
% App. Total	10	90	0		0	0	0		0	0	0		50	50	0		
PHF	.250	.563	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.500	.500



Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1  
 Peak Hour for Each Approach Begins at:

	02:00 PM				02:00 PM				02:00 PM				02:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	2	0	2	0	0	0	0	0	0	0	0	0	1	0	1
+30 mins.	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	1	4	0	5	0	0	0	0	0	0	0	0	1	0	0	1
Total Volume	1	9	0	10	0	0	0	0	0	0	0	0	1	1	0	2
% App. Total	10	90	0		0	0	0		0	0	0		50	50	0	
PHF	.250	.563	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.500

**APPENDIX D**

**SBTAM MODEL PLOTS**

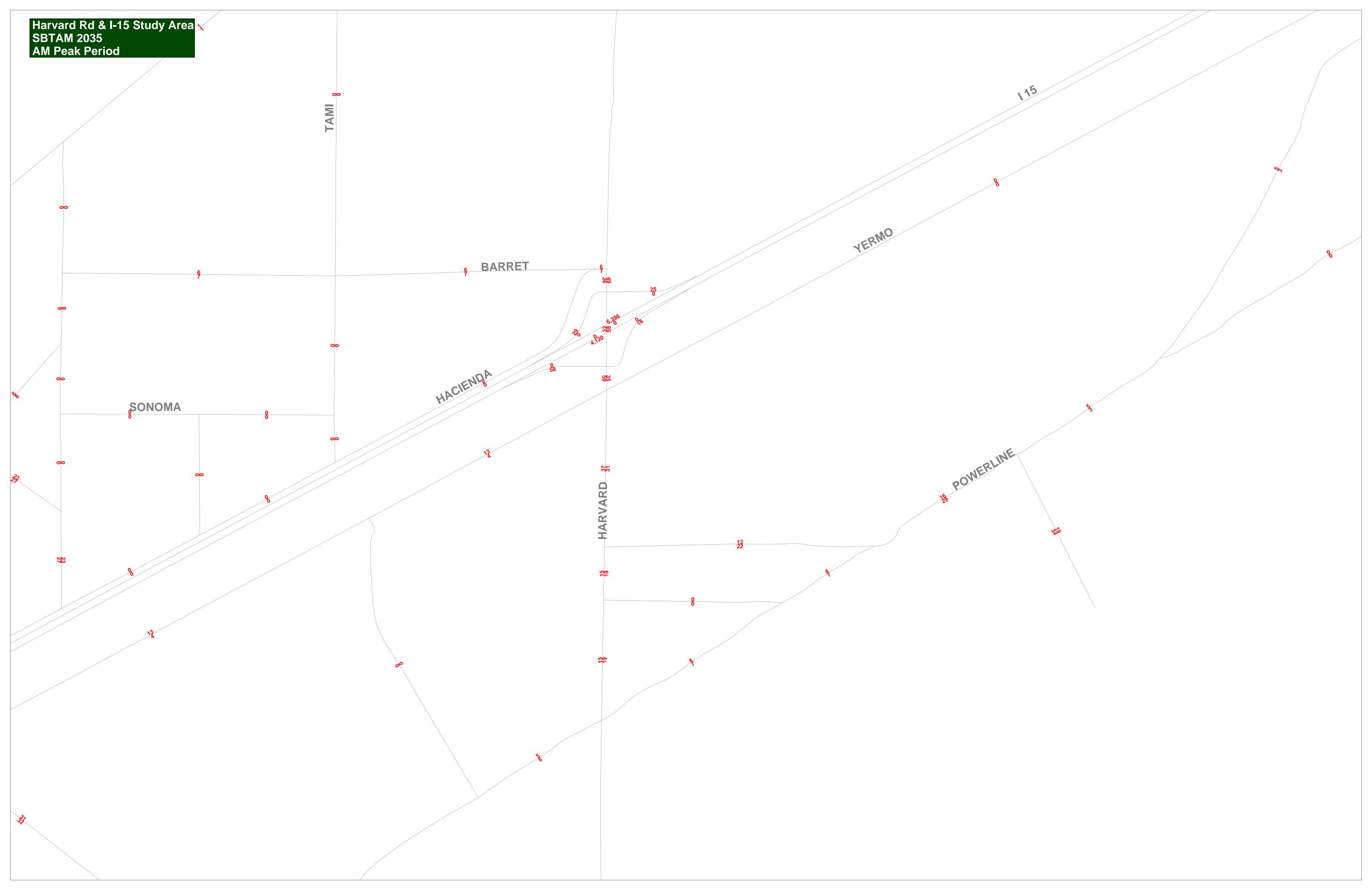




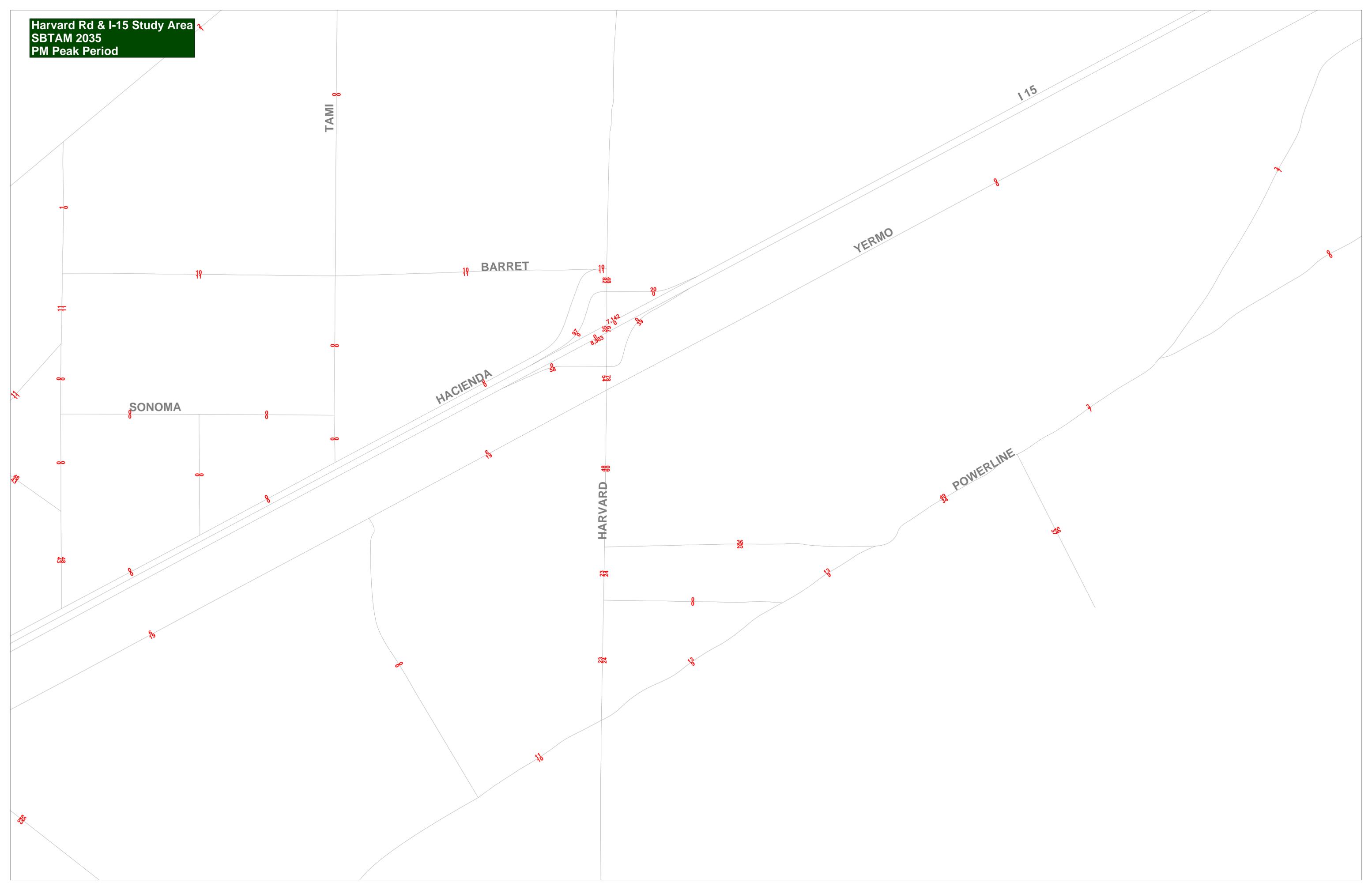




Harvard Rd & I-15 Study Area  
SBTAM 2035  
AM Peak Period



Harvard Rd & I-15 Study Area  
SBTAM 2035  
PM Peak Period



**APPENDIX E**

**FUTURE GROWTH INCREMENT CALCULATION WORKSHEETS**

MORNING PEAK HOUR				EVENING PEAK HOUR			
EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (AUTOS): 2016				EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (AUTOS): 2016			
	0	0	0		1	1	0
	<	v	>		<	v	>
1	^		^ 0	0	^		^ 0
0	>		< 1	0	>		< 0
0	v		v 1	4	v		v 0
	4	1	0		8	2	0
EXISTING PEAK HOUR COUNT YEAR (AUTOS): 2016				EXISTING PEAK HOUR COUNT YEAR (AUTOS): 2016			
		0	2			2	2
		v	^			v	^
5	<	IN =	8 < 2	9	<	IN =	16 < 0
1	>	OUT =	8 > 0	4	>	OUT =	16 > 0
		v	^			v	^
		1	5			5	10
EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (TRUCKS IN PCES):				EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (TRUCKS IN PCES):			
	0	0	0		0	0	0
	<	v	>		<	v	>
0	^		^ 0	0	^		^ 0
0	>		< 0	0	>		< 0
0	v		v 0	0	v		v 0
PCE FACTORS BY AXLE: 2: 1.5 3: 2.0 4+: 3.0				PCE FACTORS BY AXLE: 2: 1.5 3: 2 4+: 3.0			
	0	0	0		0	0	0
TOTAL EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (PCES): 2016				TOTAL EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (PCES): 2016			
	0	0	0		1	1	0
	<	v	>		<	v	>
1	^		^ 0	0	^		^ 0
0	>		< 1	0	>		< 0
0	v		v 1	4	v		v 0
	4	1	0		8	2	0
EXISTING PEAK PERIOD MODEL YEAR (AUTO): 2008				EXISTING PEAK PERIOD MODEL YEAR (AUTO): 2008			
		1	5			1	5
		v	^			v	^
12	<	IN =	39 < 1	12	<	IN =	39 < 1
7	>	OUT =	39 > 1	7	>	OUT =	39 > 1
		v	^			v	^
		21	30			21	30
EXISTING PEAK PERIOD MODEL YEAR (TRUCKS IN PCES): 2008				EXISTING PEAK PERIOD MODEL YEAR (TRUCKS IN PCES): 2008			
	0	0	0		0	0	0
	<	v	>		<	v	>
0	<	IN =	0 < 0	0	<	IN =	0 < 0
0	>	OUT =	0 > 0	0	>	OUT =	0 > 0
		v	^			v	^
		0	0			0	0
EXISTING PEAK HOUR MODEL YEAR (PCES): PHF FOR CARS: 0.38 PHF FOR TRUCKS: 0.333				EXISTING PEAK HOUR MODEL YEAR (PCES): PHF FOR CARS: 0.28 PHF FOR TRUCKS: 0.25			
	0	2			0	1	
	v	^			v	^	
5	<	IN =	15 < 0	3	<	IN =	11 < 0
3	>	OUT =	15 > 0	2	>	OUT =	11 > 0
		v	^			v	^
		8	11			6	8
FUTURE PEAK PERIOD MODEL YEAR (AUTO): 2035				FUTURE PEAK PERIOD MODEL YEAR (AUTO): 2035			
		35	1			35	1
		v	^			v	^
10	<	IN =	95 < 1	10	<	IN =	95 < 1
11	>	OUT =	94 > 1	11	>	OUT =	94 > 1
		v	^			v	^
		82	48			82	48
FUTURE PEAK PERIOD MODEL YEAR (TRUCKS IN PCES): 2035				FUTURE PEAK PERIOD MODEL YEAR (TRUCKS IN PCES): 2035			
	0	0	0		0	0	0
	<	v	>		<	v	>
0	<	IN =	0 < 0	0	<	IN =	0 < 0
0	>	OUT =	0 > 0	0	>	OUT =	0 > 0
		v	^			v	^
		0	0			0	0
FUTURE PEAK HOUR MODEL YEAR (PCES): PHF FOR CARS: 0.38 PHF FOR TRUCKS: 0.333				FUTURE PEAK HOUR MODEL YEAR (PCES): PHF FOR CARS: 0.28 PHF FOR TRUCKS: 0.25			
	13	0			10	0	
	v	^			v	^	
4	<	IN =	36 < 0	3	<	IN =	27 < 0
4	>	OUT =	36 > 0	3	>	OUT =	26 > 0
		v	^			v	^
		31	18			23	13
RAW GROWTH (PCES): 2008 TO 2035 CONVERSION OF TRUCKS TO: FACTOR = 1.00				RAW GROWTH (PCES): 2008 TO 2035 CONVERSION OF TRUCKS TO: FACTOR = 1.00			
		13	-2			10	-1
		v	^			v	^
-1	<		< 0	-1	<		< 0
2	>		> 0	1	>		> 0
		v	^			v	^
		23	7			17	5
ADJUSTED GROWTH (PCES): 2008 TO 2035 10 MINIMUM GROWTH %				ADJUSTED GROWTH (PCES): 2008 TO 2035 10 MINIMUM GROWTH %			
		10	0			10	0
		v	^			v	^
0	<	IN =	20 < 0	0	<	IN =	20 < 0
0	>	OUT =	20 > 0	0	>	OUT =	20 > 0
		v	^			v	^
		20	10			20	10
PRORATED GROWTH (PCES): 2016 TO 2035 19 YEARS				PRORATED GROWTH (PCES): 2016 TO 2035 19 YEARS			
		10	0			10	0
		v	^			v	^
0	<		< 0	0	<		< 0
0	>		> 0	0	>		> 0
		v	^			v	^
		10	10			10	10
NEW PROJECTED VOLUMES (PCES): 2035				NEW PROJECTED VOLUMES (PCES): 2035			
		10	0			10	0
		v	^			v	^
10	<		< 0	10	<		< 0
0	>		> 0	0	>		> 0
		v	^			v	^
		10	20			20	20
YEAR 2017 GROWTH: 2016 TO 2017 1 YEARS				YEAR 2017 GROWTH: 2016 TO 2017 1 YEARS			
		0	0			0	0
		v	^			v	^
0	<		< 0	0	<		< 0
0	>		> 0	0	>		> 0
		v	^			v	^
		0	0			0	0
INITIAL YEAR 2017 VOLUMES: 2017				INITIAL YEAR 2017 VOLUMES: 2017			
		0	0			0	0
		v	^			v	^
10	<	IN =	10 < 0	10	<	IN =	10 < 0
0	>	OUT =	10 > 0	0	>	OUT =	20 > 0
		v	^			v	^
		0	10			10	10
BALANCED YEAR 2017 VOLUMES: 2017				BALANCED YEAR 2017 VOLUMES: 2017			
		0	0			0	0
		v	^			v	^
10	<	IN =	10 < 0	10	<	IN =	20 < 0
0	>	OUT =	10 > 0	0	>	OUT =	20 > 0
		v	^			v	^
		0	10			10	20

**Harvard Road (NS) / Hacienda Road (EW) - #1**  
**FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES**  
**NCHRP 255**

YEAR 2017 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR INPUT DATA					SATURDAY MID-DAY PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2017 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2017 TOTAL
NORTH BOUND	LEFT	4	SOUTH LEG		NORTH BOUND	LEFT	8	SOUTH LEG	
	THRU	1	IN ...	10	NORTH BOUND	THRU	2	IN ...	20
	RIGHT	0	OUT ...	0	NORTH BOUND	RIGHT	0	OUT ...	10
SOUTH BOUND	LEFT	0	NORTH LEG		SOUTH BOUND	LEFT	0	NORTH LEG	
	THRU	0	IN ...	0	SOUTH BOUND	THRU	1	IN ...	0
	RIGHT	0	OUT ...	0	SOUTH BOUND	RIGHT	1	OUT ...	0
EAST BOUND	LEFT	1	WEST LEG		EAST BOUND	LEFT	0	WEST LEG	
	THRU	0	IN ...	0	EAST BOUND	THRU	0	IN ...	0
	RIGHT	0	OUT ...	10	EAST BOUND	RIGHT	4	OUT ...	10
WEST BOUND	LEFT	1	EAST LEG		WEST BOUND	LEFT	0	EAST LEG	
	THRU	1	IN ...	0	WEST BOUND	THRU	0	IN ...	0
	RIGHT	0	OUT ...	0	WEST BOUND	RIGHT	0	OUT ...	0

YEAR 2017 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR RESULTS					SATURDAY MID-DAY PEAK HOUR RESULTS				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2017 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2017 FORECAST	PEAK - DAILY RELATIONSHIP
NORTH BOUND	LEFT	4	10	NORTH LEG	NORTH BOUND	LEFT	8	10	NORTH LEG
	THRU	1	1	RATIO 2.0%		THRU	2	2	RATIO -
	RIGHT	0	0	ADT 100		RIGHT	0	0	ADT 0
SOUTH BOUND	LEFT	0	0	SOUTH LEG	SOUTH BOUND	LEFT	0	0	SOUTH LEG
	THRU	0	0	RATIO 6.0%		THRU	1	1	RATIO -
	RIGHT	0	0	ADT 200		RIGHT	1	1	ADT 0
EAST BOUND	LEFT	1	1	EAST LEG	EAST BOUND	LEFT	0	0	EAST LEG
	THRU	0	0	RATIO 2.0%		THRU	0	0	RATIO -
	RIGHT	0	0	ADT 100		RIGHT	4	4	ADT 0
WEST BOUND	LEFT	1	1	WEST LEG	WEST BOUND	LEFT	0	0	WEST LEG
	THRU	1	1	RATIO 12.0%		THRU	0	0	RATIO -
	RIGHT	0	0	ADT 100		RIGHT	0	0	ADT 0

**Harvard Road (NS) / Hacienda Road (EW) - #1**  
**FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES**  
**NCHRP 255**

YEAR 2035 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR INPUT DATA					SUNDAY MID-DAY PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2035 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2035 TOTAL
NORTH BOUND	LEFT	4	SOUTH LEG		NORTH BOUND	LEFT	8	SOUTH LEG	
	THRU	1	IN ...	20		THRU	2	IN ...	20
	RIGHT	0	OUT ...	10		RIGHT	0	OUT ...	20
SOUTH BOUND	LEFT	0	NORTH LEG		SOUTH BOUND	LEFT	0	NORTH LEG	
	THRU	0	IN ...	10		THRU	1	IN ...	10
	RIGHT	0	OUT ...	0		RIGHT	1	OUT ...	0
EAST BOUND	LEFT	1	WEST LEG		EAST BOUND	LEFT	0	WEST LEG	
	THRU	0	IN ...	0		THRU	0	IN ...	0
	RIGHT	0	OUT ...	10		RIGHT	4	OUT ...	10
WEST BOUND	LEFT	1	EAST LEG		WEST BOUND	LEFT	0	EAST LEG	
	THRU	1	IN ...	0		THRU	0	IN ...	0
	RIGHT	0	OUT ...	0		RIGHT	0	OUT ...	0

YEAR 2035 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR RESULTS					SUNDAY MID-DAY PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2035 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2035 FORECAST	PEAK - DAILY RELATIONSHIP
NORTH BOUND	LEFT	4	10	NORTH LEG	NORTH BOUND	LEFT	8	10	NORTH LEG
	THRU	1	1	RATIO 2.0%		THRU	2	2	RATIO -
	RIGHT	0	0	ADT 100		RIGHT	0	0	ADT 0
SOUTH BOUND	LEFT	0	0	SOUTH LEG	SOUTH BOUND	LEFT	0	0	SOUTH LEG
	THRU	0	0	RATIO 6.0%		THRU	1	20	RATIO -
	RIGHT	0	0	ADT 200		RIGHT	1	1	ADT 0
EAST BOUND	LEFT	1	1	EAST LEG	EAST BOUND	LEFT	0	0	EAST LEG
	THRU	0	0	RATIO 2.0%		THRU	0	0	RATIO -
	RIGHT	0	0	ADT 100		RIGHT	4	4	ADT 0
WEST BOUND	LEFT	1	1	WEST LEG	WEST BOUND	LEFT	0	0	WEST LEG
	THRU	1	1	RATIO 12.0%		THRU	0	0	RATIO -
	RIGHT	0	0	ADT 100		RIGHT	0	0	ADT 0

Harvard Road (NS) / I-15 Freeway SB Ramps (EW) - #2									
MORNING PEAK HOUR					EVENING PEAK HOUR				
EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (AUTOS):					EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (AUTOS):				
2016					2016				
	4	3	0		6	3	0		
	<	v	>		<	v	>		
0	^			^	4			12	
0	>			<	4			8	
0	v			v	6			223	
	1	5	0		3	6	0		
EXISTING PEAK HOUR COUNT YEAR (AUTOS):					EXISTING PEAK HOUR COUNT YEAR (AUTOS):				
2016					2016				
		7	9			9	18		
		v	^			v	^		
9	<	IN =	27	<	14	17	<	IN =	261
0	>	OUT =	27	>	0	0	>	OUT =	261
		9	6			226	9		
EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (TRUCKS IN PCES):					EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (TRUCKS IN PCES):				
2016					2016				
	0	0	0		3	5	0		
	<	v	>		<	v	>		
0	^			^	0			2	
0	>			<	6			6	
0	v			v	3			33	
PCE FACTORS BY AXLE:					PCE FACTORS BY AXLE:				
2:	1.5	3:	2.0	4+:	3.0	2:	1.5	3:	2
		0	0		0	3	0		
TOTAL EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (PCES):					TOTAL EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (PCES):				
2016					2016				
	4	3	0		9	8	0		
	<	v	>		<	v	>		
0	^			^	4			14	
0	>			<	10			14	
0	v			v	9			256	
		1	5	0		3	9	0	
EXISTING PEAK PERIOD MODEL YEAR (AUTO):					EXISTING PEAK PERIOD MODEL YEAR (AUTO):				
2008					2008				
		21	30			21	30		
		v	^			v	^		
18	<	IN =	77	<	26	18	<	IN =	77
0	>	OUT =	77	>	0	0	>	OUT =	77
		29	30			29	30		
EXISTING PEAK PERIOD MODEL YEAR (TRUCKS IN PCES):					EXISTING PEAK PERIOD MODEL YEAR (TRUCKS IN PCES):				
2008					2008				
	0	0	0		0	0	0		
	<	v	>		<	v	>		
0	<	IN =	0	<	0	0	<	IN =	0
0	>	OUT =	0	>	0	0	>	OUT =	0
		0	0			0	0		
EXISTING PEAK HOUR MODEL YEAR (PCES):					EXISTING PEAK HOUR MODEL YEAR (PCES):				
PHF FOR CARS: 0.38					PHF FOR CARS: 0.28				
PHF FOR TRUCKS: 0.333					PHF FOR TRUCKS: 0.25				
	8	11			6	8			
	v	^			v	^			
7	<	IN =	29	<	10	5	<	IN =	22
0	>	OUT =	29	>	0	0	>	OUT =	22
		11	11			8	8		
FUTURE PEAK PERIOD MODEL YEAR (AUTO):					FUTURE PEAK PERIOD MODEL YEAR (AUTO):				
2035					2035				
	82	48			82	48			
	v	^			v	^			
97	<	IN =	181	<	20	97	<	IN =	181
0	>	OUT =	180	>	0	0	>	OUT =	180
		35	79			35	79		
FUTURE PEAK PERIOD MODEL YEAR (TRUCKS IN PCES):					FUTURE PEAK PERIOD MODEL YEAR (TRUCKS IN PCES):				
2035					2035				
	0	0	0		0	0	0		
	<	v	>		<	v	>		
0	<	IN =	0	<	0	0	<	IN =	0
0	>	OUT =	0	>	0	0	>	OUT =	0
		0	0			0	0		
FUTURE PEAK HOUR MODEL YEAR (PCES):					FUTURE PEAK HOUR MODEL YEAR (PCES):				
PHF FOR CARS: 0.38					PHF FOR CARS: 0.28				
PHF FOR TRUCKS: 0.333					PHF FOR TRUCKS: 0.25				
	31	18			23	13			
	v	^			v	^			
37	<	IN =	69	<	8	27	<	IN =	51
0	>	OUT =	68	>	0	0	>	OUT =	50
		13	30			10	22		
RAW GROWTH (PCES): 2008 TO 2035					RAW GROWTH (PCES): 2008 TO 2035				
CONVERSION OF TRUCKS TO: 2035					CONVERSION OF TRUCKS TO: 2035				
FACTOR = 1.00					FACTOR = 1.00				
	23	7			17	5			
	v	^			v	^			
30	<			<	-2	22	<		
0	>			>	0	0	>		
		2	19			2	14		
ADJUSTED GROWTH (PCES): 2008 TO 2035					ADJUSTED GROWTH (PCES): 2008 TO 2035				
10 MINIMUM GROWTH %					10 MINIMUM GROWTH %				
	20	10			20	10			
	v	^			v	^			
30	<	IN =	40	<	0	20	<	IN =	60
0	>	OUT =	40	>	0	0	>	OUT =	30
		0	20			0	10		
PRORATED GROWTH (PCES): 2016 TO 2035					PRORATED GROWTH (PCES): 2016 TO 2035				
19 YEARS					19 YEARS				
	10	10			10	10			
	v	^			v	^			
20	<			<	0	10	<		
0	>			>	0	0	>		
		0	10			0	10		
NEW PROJECTED VOLUMES (PCES): 2035					NEW PROJECTED VOLUMES (PCES): 2035				
	20	20			30	30			
	v	^			v	^			
40	<			<	300	40	<		
0	>			>	0	0	>		
		10	20			260	20		
YEAR 2017 GROWTH: 2016 TO 2017					YEAR 2017 GROWTH: 2016 TO 2017				
1 YEARS					1 YEARS				
	0	0			0	0			
	v	^			v	^			
0	<			<	0	0	<		
0	>			>	0	0	>		
		0	0			0	0		
INITIAL YEAR 2017 VOLUMES: 2017					INITIAL YEAR 2017 VOLUMES: 2017				
	10	10			20	20			
	v	^			v	^			
20	<	IN =	40	<	280	30	<	IN =	310
0	>	OUT =	40	>	0	0	>	OUT =	310
		10	10			260	10		
BALANCED YEAR 2017 VOLUMES: 2017					BALANCED YEAR 2017 VOLUMES: 2017				
	10	10			20	20			
	v	^			v	^			
20	<	IN =	40	<	280	30	<	IN =	310
0	>	OUT =	40	>	0	0	>	OUT =	310
		10	10			260	10		

**Harvard Road (NS) / I-15 Freeway SB Ramps (EW) - #2**  
**FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES**  
**NCHRP 255**

YEAR 2017 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR INPUT DATA					SATURDAY MID-DAY PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2017 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2017 TOTAL
NORTH BOUND	LEFT	1	SOUTH LEG		NORTH BOUND	LEFT	3	SOUTH LEG	
	THRU	5	IN ...	10	NORTH BOUND	THRU	9	IN ...	10
	RIGHT	0	OUT ...	10	NORTH BOUND	RIGHT	0	OUT ...	260
SOUTH BOUND	LEFT	0	NORTH LEG		SOUTH BOUND	LEFT	0	NORTH LEG	
	THRU	3	IN ...	10	SOUTH BOUND	THRU	8	IN ...	20
	RIGHT	4	OUT ...	10	SOUTH BOUND	RIGHT	9	OUT ...	20
EAST BOUND	LEFT	0	WEST LEG		EAST BOUND	LEFT	0	WEST LEG	
	THRU	0	IN ...	0	EAST BOUND	THRU	0	IN ...	0
	RIGHT	0	OUT ...	20	EAST BOUND	RIGHT	0	OUT ...	30
WEST BOUND	LEFT	9	EAST LEG		WEST BOUND	LEFT	256	EAST LEG	
	THRU	10	IN ...	20	WEST BOUND	THRU	14	IN ...	280
	RIGHT	4	OUT ...	0	WEST BOUND	RIGHT	14	OUT ...	0

YEAR 2017 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR RESULTS					SATURDAY MID-DAY PEAK HOUR RESULTS				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2017 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2017 FORECAST	PEAK - DAILY RELATIONSHIP
NORTH BOUND	LEFT	1	3	NORTH LEG	NORTH BOUND	LEFT	3	3	NORTH LEG
	THRU	5	7	RATIO 7.0%		THRU	9	9	RATIO -
	RIGHT	0	0	ADT 300		RIGHT	0	0	ADT 0
SOUTH BOUND	LEFT	0	0	SOUTH LEG	SOUTH BOUND	LEFT	0	0	SOUTH LEG
	THRU	3	3	RATIO 7.3%		THRU	8	9	RATIO -
	RIGHT	4	7	ADT 300		RIGHT	9	11	ADT 0
EAST BOUND	LEFT	0	0	EAST LEG	EAST BOUND	LEFT	0	0	EAST LEG
	THRU	0	0	RATIO 12.0%		THRU	0	0	RATIO -
	RIGHT	0	0	ADT 200		RIGHT	0	0	ADT 0
WEST BOUND	LEFT	9	9	WEST LEG	WEST BOUND	LEFT	256	257	WEST LEG
	THRU	10	11	RATIO 10.5%		THRU	14	16	RATIO -
	RIGHT	4	4	ADT 200		RIGHT	14	14	ADT 0

**Harvard Road (NS) / I-15 Freeway SB Ramps (EW) - #2**  
**FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES**  
**NCHRP 255**

YEAR 2035 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR INPUT DATA					SUNDAY MID-DAY PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2035 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2035 TOTAL
NORTH BOUND	LEFT	1	SOUTH LEG		NORTH BOUND	LEFT	3	SOUTH LEG	
	THRU	5	IN ...	20		THRU	9	IN ...	20
	RIGHT	0	OUT ...	10		RIGHT	0	OUT ...	260
SOUTH BOUND	LEFT	0	NORTH LEG		SOUTH BOUND	LEFT	0	NORTH LEG	
	THRU	3	IN ...	20		THRU	8	IN ...	30
	RIGHT	4	OUT ...	20		RIGHT	9	OUT ...	30
EAST BOUND	LEFT	0	WEST LEG		EAST BOUND	LEFT	0	WEST LEG	
	THRU	0	IN ...	0		THRU	0	IN ...	0
	RIGHT	0	OUT ...	40		RIGHT	0	OUT ...	40
WEST BOUND	LEFT	9	EAST LEG		WEST BOUND	LEFT	256	EAST LEG	
	THRU	10	IN ...	20		THRU	14	IN ...	300
	RIGHT	4	OUT ...	0		RIGHT	14	OUT ...	0

YEAR 2035 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR RESULTS					SUNDAY MID-DAY PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2035 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2035 FORECAST	PEAK - DAILY RELATIONSHIP
NORTH BOUND	LEFT	1	6	NORTH LEG	NORTH BOUND	LEFT	3	5	NORTH LEG
	THRU	5	17	RATIO 14.7%		THRU	9	14	RATIO -
	RIGHT	0	0	ADT 300		RIGHT	0	0	ADT 0
SOUTH BOUND	LEFT	0	0	SOUTH LEG	SOUTH BOUND	LEFT	0	0	SOUTH LEG
	THRU	3	5	RATIO 12.7%		THRU	8	11	RATIO -
	RIGHT	4	18	ADT 300		RIGHT	9	17	ADT 0
EAST BOUND	LEFT	0	0	EAST LEG	EAST BOUND	LEFT	0	0	EAST LEG
	THRU	0	0	RATIO 14.5%		THRU	0	0	RATIO -
	RIGHT	0	0	ADT 200		RIGHT	0	0	ADT 0
WEST BOUND	LEFT	9	10	WEST LEG	WEST BOUND	LEFT	256	282	WEST LEG
	THRU	10	15	RATIO 19.5%		THRU	14	18	RATIO -
	RIGHT	4	4	ADT 200		RIGHT	14	16	ADT 0

Harvard Road (NS) / I-15 Freeway NB Ramps (EW) - #3											
MORNING PEAK HOUR					EVENING PEAK HOUR						
EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (AUTOS): 2016					EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (AUTOS): 2016						
		0	5	1			0	222	2		
		<	v	>			<	v	>		
2	^			^	0	2	^		^	0	
4	>			<	0	7	>		<	0	
0	v			v	0	8	v		v	0	
		0	3	4			0	7	5		
EXISTING PEAK HOUR COUNT YEAR (AUTOS): 2016					EXISTING PEAK HOUR COUNT YEAR (AUTOS): 2016						
		6	5				224	9			
		v	^				v	^			
0	<	IN =	19	<	0	0	<	IN =	253	<	0
6	>	OUT =	19	>	9	17	>	OUT =	253	>	14
		v	^				v	^			
		5	7				230	12			
EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (TRUCKS IN PCES): 2016					EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (TRUCKS IN PCES): 2016						
		0	17	0			0	32	3		
		<	v	>			<	v	>		
0	^			^	0	3	^		^	0	
3	>			<	0	3	>		<	0	
0	v			v	0	0	v		v	0	
PCE FACTORS BY AXLE: 2: 1.5 3: 2.0 4+: 3.0					PCE FACTORS BY AXLE: 2: 1.5 3: 2 4+: 3.0						
		<	^	>			<	^	>		
		0	0	0			0	0	0		
TOTAL EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (PCES): 2016					TOTAL EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES (PCES): 2016						
		0	22	1			0	254	5		
		<	v	>			<	v	>		
2	^			^	0	5	^		^	0	
7	>			<	0	10	>		<	0	
0	v			v	0	8	v		v	0	
		0	3	4			0	7	5		
EXISTING PEAK PERIOD MODEL YEAR (AUTO): 2008					EXISTING PEAK PERIOD MODEL YEAR (AUTO): 2008						
		29	30				29	30			
		v	^				v	^			
0	<	IN =	76	<	0	0	<	IN =	76	<	0
25	>	OUT =	77	>	11	25	>	OUT =	77	>	11
		v	^				v	^			
		36	22				36	22			
EXISTING PEAK PERIOD MODEL YEAR (TRUCKS IN PCES): 2008					EXISTING PEAK PERIOD MODEL YEAR (TRUCKS IN PCES): 2008						
		0	0				0	0			
		v	^				v	^			
0	<	IN =	0	<	0	0	<	IN =	0	<	0
0	>	OUT =	0	>	0	0	>	OUT =	0	>	0
		v	^				v	^			
		0	0				0	0			
EXISTING PEAK HOUR MODEL YEAR (PCES): PHF FOR CARS: 0.38 PHF FOR TRUCKS: 0.333					EXISTING PEAK HOUR MODEL YEAR (PCES): PHF FOR CARS: 0.28 PHF FOR TRUCKS: 0.25						
		11	11				8	8			
		v	^				v	^			
0	<	IN =	29	<	0	0	<	IN =	21	<	0
10	>	OUT =	29	>	4	7	>	OUT =	22	>	3
		v	^				v	^			
		14	8				10	6			
FUTURE PEAK PERIOD MODEL YEAR (AUTO): 2035					FUTURE PEAK PERIOD MODEL YEAR (AUTO): 2035						
		35	79				35	79			
		v	^				v	^			
0	<	IN =	171	<	0	0	<	IN =	171	<	0
58	>	OUT =	172	>	39	58	>	OUT =	172	>	39
		v	^				v	^			
		54	78				54	78			
FUTURE PEAK PERIOD MODEL YEAR (TRUCKS IN PCES): 2035					FUTURE PEAK PERIOD MODEL YEAR (TRUCKS IN PCES): 2035						
		0	0				0	0			
		v	^				v	^			
0	<	IN =	0	<	0	0	<	IN =	0	<	0
0	>	OUT =	0	>	0	0	>	OUT =	0	>	0
		v	^				v	^			
		0	0				0	0			
FUTURE PEAK HOUR MODEL YEAR (PCES): PHF FOR CARS: 0.38 PHF FOR TRUCKS: 0.333					FUTURE PEAK HOUR MODEL YEAR (PCES): PHF FOR CARS: 0.28 PHF FOR TRUCKS: 0.25						
		13	30				10	22			
		v	^				v	^			
0	<	IN =	65	<	0	0	<	IN =	48	<	0
22	>	OUT =	65	>	15	16	>	OUT =	48	>	11
		v	^				v	^			
		21	30				15	22			
RAW GROWTH (PCES): 2008 TO 2035 CONVERSION OF TRUCKS TO: 2035 FACTOR = 1.00					RAW GROWTH (PCES): 2008 TO 2035 CONVERSION OF TRUCKS TO: 2035 FACTOR = 1.00						
		2	19				2	14			
		v	^				v	^			
0	<			<	0	0	<			<	0
13	>			>	11	9	>			>	8
		v	^				v	^			
		7	21				5	16			
ADJUSTED GROWTH (PCES): 2008 TO 2035 10 MINIMUM GROWTH %					ADJUSTED GROWTH (PCES): 2008 TO 2035 10 MINIMUM GROWTH %						
		0	20				30	10			
		v	^				v	^			
0	<	IN =	30	<	0	0	<	IN =	60	<	0
10	>	OUT =	40	>	10	10	>	OUT =	30	>	10
		v	^				v	^			
		10	20				10	20			
PRORATED GROWTH (PCES): 2016 TO 2035 19 YEARS					PRORATED GROWTH (PCES): 2016 TO 2035 19 YEARS						
		0	10				20	10			
		v	^				v	^			
0	<			<	0	0	<			<	0
10	>			>	10	10	>			>	10
		v	^				v	^			
		10	10				10	10			
NEW PROJECTED VOLUMES (PCES): 2035					NEW PROJECTED VOLUMES (PCES): 2035						
		20	20				280	20			
		v	^				v	^			
0	<			<	0	0	<			<	0
20	>			>	20	30	>			>	30
		v	^				v	^			
		30	20				270	20			
YEAR 2017 GROWTH: 2016 TO 2017 1 YEARS					YEAR 2017 GROWTH: 2016 TO 2017 1 YEARS						
		0	0				0	0			
		v	^				v	^			
0	<			<	0	0	<			<	0
0	>			>	0	0	>			>	0
		v	^				v	^			
		0	0				0	0			
INITIAL YEAR 2017 VOLUMES: 2017					INITIAL YEAR 2017 VOLUMES: 2017						
		20	10				260	10			
		v	^				v	^			
0	<	IN =	40	<	0	0	<	IN =	290	<	0
10	>	OUT =	40	>	10	20	>	OUT =	290	>	20
		v	^				v	^			
		20	10				260	10			
BALANCED YEAR 2017 VOLUMES: 2017					BALANCED YEAR 2017 VOLUMES: 2017						
		20	10				260	10			
		v	^				v	^			
0	<	IN =	40	<	0	0	<	IN =	290	<	0
10	>	OUT =	40	>	10	20	>	OUT =	290	>	20
		v	^				v	^			
		20	10				260	10			

**Harvard Road (NS) / I-15 Freeway NB Ramps (EW) - #3**  
**FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES**  
**NCHRP 255**

YEAR 2017 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR INPUT DATA					SATURDAY MID-DAY PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2017 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2017 TOTAL
NORTH BOUND	LEFT	0	SOUTH LEG		NORTH BOUND	LEFT	0	SOUTH LEG	
	THRU	3	IN ...	10	NORTH BOUND	THRU	7	IN ...	10
	RIGHT	4	OUT ...	20	NORTH BOUND	RIGHT	5	OUT ...	260
SOUTH BOUND	LEFT	1	NORTH LEG		SOUTH BOUND	LEFT	5	NORTH LEG	
	THRU	22	IN ...	20	SOUTH BOUND	THRU	254	IN ...	260
	RIGHT	0	OUT ...	10	SOUTH BOUND	RIGHT	0	OUT ...	10
EAST BOUND	LEFT	2	WEST LEG		EAST BOUND	LEFT	5	WEST LEG	
	THRU	7	IN ...	10	EAST BOUND	THRU	10	IN ...	20
	RIGHT	0	OUT ...	0	EAST BOUND	RIGHT	8	OUT ...	0
WEST BOUND	LEFT	0	EAST LEG		WEST BOUND	LEFT	0	EAST LEG	
	THRU	0	IN ...	0	WEST BOUND	THRU	0	IN ...	0
	RIGHT	0	OUT ...	10	WEST BOUND	RIGHT	0	OUT ...	20

YEAR 2017 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR RESULTS					SATURDAY MID-DAY PEAK HOUR RESULTS				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2017 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2017 FORECAST	PEAK - DAILY RELATIONSHIP
NORTH BOUND	LEFT	0	0	NORTH LEG	NORTH BOUND	LEFT	0	0	NORTH LEG
	THRU	3	6	RATIO 11.0%		THRU	7	7	RATIO -
	RIGHT	4	4	ADT 300		RIGHT	5	5	ADT 0
SOUTH BOUND	LEFT	1	1	SOUTH LEG	SOUTH BOUND	LEFT	5	6	SOUTH LEG
	THRU	22	22	RATIO 8.0%		THRU	254	255	RATIO -
	RIGHT	0	0	ADT 400		RIGHT	0	0	ADT 0
EAST BOUND	LEFT	2	4	EAST LEG	EAST BOUND	LEFT	5	5	EAST LEG
	THRU	7	7	RATIO 12.0%		THRU	10	10	RATIO -
	RIGHT	0	0	ADT 100		RIGHT	8	8	ADT 0
WEST BOUND	LEFT	0	0	WEST LEG	WEST BOUND	LEFT	0	0	WEST LEG
	THRU	0	0	RATIO 5.5%		THRU	0	0	RATIO -
	RIGHT	0	0	ADT 200		RIGHT	0	0	ADT 0

**Harvard Road (NS) / I-15 Freeway NB Ramps (EW) - #3**  
**FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES**  
**NCHRP 255**

YEAR 2035 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR INPUT DATA					SUNDAY MID-DAY PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2035 TOTAL	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	APPROACH	YEAR 2035 TOTAL
NORTH BOUND	LEFT	0	SOUTH LEG		NORTH BOUND	LEFT	0	SOUTH LEG	
	THRU	3	IN ...	20		THRU	7	IN ...	20
	RIGHT	4	OUT ...	30		RIGHT	5	OUT ...	270
SOUTH BOUND	LEFT	1	NORTH LEG		SOUTH BOUND	LEFT	5	NORTH LEG	
	THRU	22	IN ...	20		THRU	254	IN ...	280
	RIGHT	0	OUT ...	20		RIGHT	0	OUT ...	20
EAST BOUND	LEFT	2	WEST LEG		EAST BOUND	LEFT	5	WEST LEG	
	THRU	7	IN ...	20		THRU	10	IN ...	30
	RIGHT	0	OUT ...	0		RIGHT	8	OUT ...	0
WEST BOUND	LEFT	0	EAST LEG		WEST BOUND	LEFT	0	EAST LEG	
	THRU	0	IN ...	0		THRU	0	IN ...	0
	RIGHT	0	OUT ...	20		RIGHT	0	OUT ...	30

YEAR 2035 TRAFFIC CONDITIONS									
FRIDAY EVENING PEAK HOUR RESULTS					SUNDAY MID-DAY PEAK HOUR INPUT DATA				
APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2035 FORECAST	PEAK - DAILY RELATIONSHIP	APPROACH	TURNING MOVEMENT	BASE YEAR COUNT	YEAR 2035 FORECAST	PEAK - DAILY RELATIONSHIP
NORTH BOUND	LEFT	0	0	NORTH LEG	NORTH BOUND	LEFT	0	0	NORTH LEG
	THRU	3	12	RATIO 17.0%		THRU	7	12	RATIO -
	RIGHT	4	8	ADT 300		RIGHT	5	8	ADT 0
SOUTH BOUND	LEFT	1	1	SOUTH LEG	SOUTH BOUND	LEFT	5	8	SOUTH LEG
	THRU	22	30	RATIO 12.5%		THRU	254	279	RATIO -
	RIGHT	0	0	ADT 400		RIGHT	0	0	ADT 0
EAST BOUND	LEFT	2	8	EAST LEG	EAST BOUND	LEFT	5	8	EAST LEG
	THRU	7	12	RATIO 21.0%		THRU	10	14	RATIO -
	RIGHT	0	0	ADT 100		RIGHT	8	9	ADT 0
WEST BOUND	LEFT	0	0	WEST LEG	WEST BOUND	LEFT	0	0	WEST LEG
	THRU	0	0	RATIO 10.0%		THRU	0	0	RATIO -
	RIGHT	0	0	ADT 200		RIGHT	0	0	ADT 0

**APPENDIX F**

**EXPLANATION AND CALCULATION OF INTERSECTION DELAY**

## **EXPLANATION AND CALCULATION OF INTERSECTION LEVEL OF SERVICE USING DELAY METHODOLOGY**

The levels of service at the unsignalized and signalized intersections are calculated using the delay methodology in the Highway Capacity Manual. This methodology views an intersection as consisting of several lane groups. A lane group is a set of lanes serving a movement. If there are two northbound left turn lanes, then the lane group serving the northbound left turn movement has two lanes. Similarly, there may be three lanes in the lane group serving the northbound through movement, one lane in the lane group serving the northbound right turn movement, and so forth. It is also possible for one lane to serve two lane groups. A shared lane might result in there being 1.5 lanes in the northbound left turn lane group and 2.5 lanes in the northbound through lane group.

For each lane group, there is a capacity. That capacity is calculated by multiplying the number of lanes in the lane group times a theoretical maximum lane capacity per lane time's 12 adjustment factors.

Each of the 12 adjustment factors has a value of approximately 1.00. A value less than 1.00 is generally assigned when a less than desirable condition occurs.

The 12 adjustment factors are as follows:

1. Peak hour factor (to account for peaking within the peak hour)
2. Lane utilization factor (to account for not all lanes loading equally)
3. Lane width
4. Percent of heavy trucks
5. Approach grade
6. Parking
7. Bus stops at intersections
8. Area type (CBD or other)
9. Right turns
10. Left turns

11. Pedestrian activity
12. Signal progression

The maximum theoretical lane capacity and the 12 adjustment factors for it are all unknowns for which approximate estimates have been recommended in the Highway Capacity Manual. For the most part, the recommended values are not based on statistical analysis but rather on educated estimates. However, it is possible to use the delay method and get reasonable results as will be discussed below.

Once the lane group volume is known and the lane group capacity is known, a volume to capacity ratio can be calculated for the lane group.

With a volume to capacity ratio calculated, average delay per vehicle in a lane group can be estimated. The average delay per vehicle in a lane group is calculated using a complex formula provided by the Highway Capacity Manual, which can be simplified and described as follows:

Delay per vehicle in a lane group is a function of the following:

1. Cycle length
2. Amount of red time faced by a lane group
3. Amount of yellow time for that lane group
4. The volume to capacity ratio of the lane group

The average delay per vehicle for each lane group is calculated, and eventually an overall average delay for all vehicles entering the intersection is calculated. This average delay per vehicle is then used to judge Level of Service. The Level of Services are defined in the table that follows this discussion.

Experience has shown that when a maximum lane capacity of 1,900 vehicles per hour is used (as recommended in the Highway Capacity Manual), little or no yellow time penalty is used, and none of the 12 penalty factors are applied, calculated delay is realistic. The delay calculation for instance assumes that yellow time is totally unused. Yet experience shows that most of the yellow time is used.

An idiosyncrasy of the delay methodology is that it is possible to add traffic to an intersection and reduce the average total delay per vehicle. If the average total delay is 30 seconds per vehicle for all vehicles traveling through an intersection, and traffic is added to a movement that has an average total delay of 15 seconds per vehicle, then the overall average total delay is reduced.

The delay calculation for a lane group is based on a concept that the delay is a function of the amount of unused capacity available. As the volume approaches capacity and there is no more unused capacity available, then the delay rapidly increases. Delay is not proportional to volume, but rather increases rapidly as the unused capacity approaches zero.

Because delay is not linearly related to volumes, the delay does not reflect how close an intersection is to overloading. If an intersection is operating at Level of Service C and has an average total delay of 18 seconds per vehicle, you know very little as to what percent the traffic can increase before Level of Service E is reached.

## LEVEL OF SERVICE DESCRIPTION<sup>1</sup>

Level Of Service	Description	Average Total Delay Per Vehicle (Seconds)	
		Signalized	Unsignalized
A	Level of Service A occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0 to 10.00	0 to 10.00
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average total delay.	10.01 to 20.00	10.01 to 15.00
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	20.01 to 35.00	15.01 to 25.00
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.01 to 55.00	25.01 to 35.00
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	55.01 to 80.00	35.01 to 50.00
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	80.01 and up	50.01 and up

<sup>1</sup> Source: [Highway Capacity Manual](#) Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 2000.

**Existing**

## Newberry Springs Service Station

Vistro File: J:\...\E Fri.vistro

Scenario 1: Existing - Friday Evening Peak Hour

Report File: J:\...\E Fri.pdf

6/23/2016

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harvard Road (NS) at Barrett Road/Hacienda Road (EW)	Two-way stop	HCM 2010	WB Thru	0.001	9.1	A
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.016	9.2	A
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.016	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road/Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	4	1	0	0	0	0	1	0	0	1	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	1	0	0	0	0	1	0	0	1	1	0
Peak Hour Factor	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	0	0	0	0	0	0	0	0	0
Total Analysis Volume [veh/h]	6	1	0	0	0	0	1	0	0	1	1	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.21	0.00	0.00	7.20	0.00	0.00	8.59	9.08	8.30	8.59	9.09	8.31
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
95th-Percentile Queue Length [ft]	0.32	0.32	0.32	0.00	0.00	0.00	0.07	0.07	0.07	0.16	0.16	0.16
d_A, Approach Delay [s/veh]	6.18			2.40			8.59			8.84		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	6.95											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	1	5	0	0	3	4	0	0	0	9	10	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	5	0	0	3	4	0	0	0	9	10	4
Peak Hour Factor	0.7050	0.7050	0.7050	0.7050	0.7050	0.7050	1.0000	1.0000	1.0000	0.7050	0.7050	0.7050
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	2	0	0	1	1	0	0	0	3	4	1
Total Analysis Volume [veh/h]	1	7	0	0	4	6	0	0	0	13	14	6
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01
d_M, Delay for Movement [s/veh]	7.22	0.00	0.00	7.21	0.00	0.00	0.00	0.00	0.00	8.72	9.23	8.46
Movement LOS	A	A	A	A	A	A				A	A	A
95th-Percentile Queue Length [veh]	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11	0.11
95th-Percentile Queue Length [ft]	0.37	0.37	0.37	0.00	0.00	0.00	0.00	0.00	0.00	2.67	2.67	2.67
d_A, Approach Delay [s/veh]	0.90			0.00			0.00			8.89		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.89											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⊕			⊕			⊕					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	3	4	1	22	0	2	7	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	3	4	1	22	0	2	7	0	0	0	0
Peak Hour Factor	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	1	2	0	10	0	1	3	0	0	0	0
Total Analysis Volume [veh/h]	0	6	7	2	41	0	4	13	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

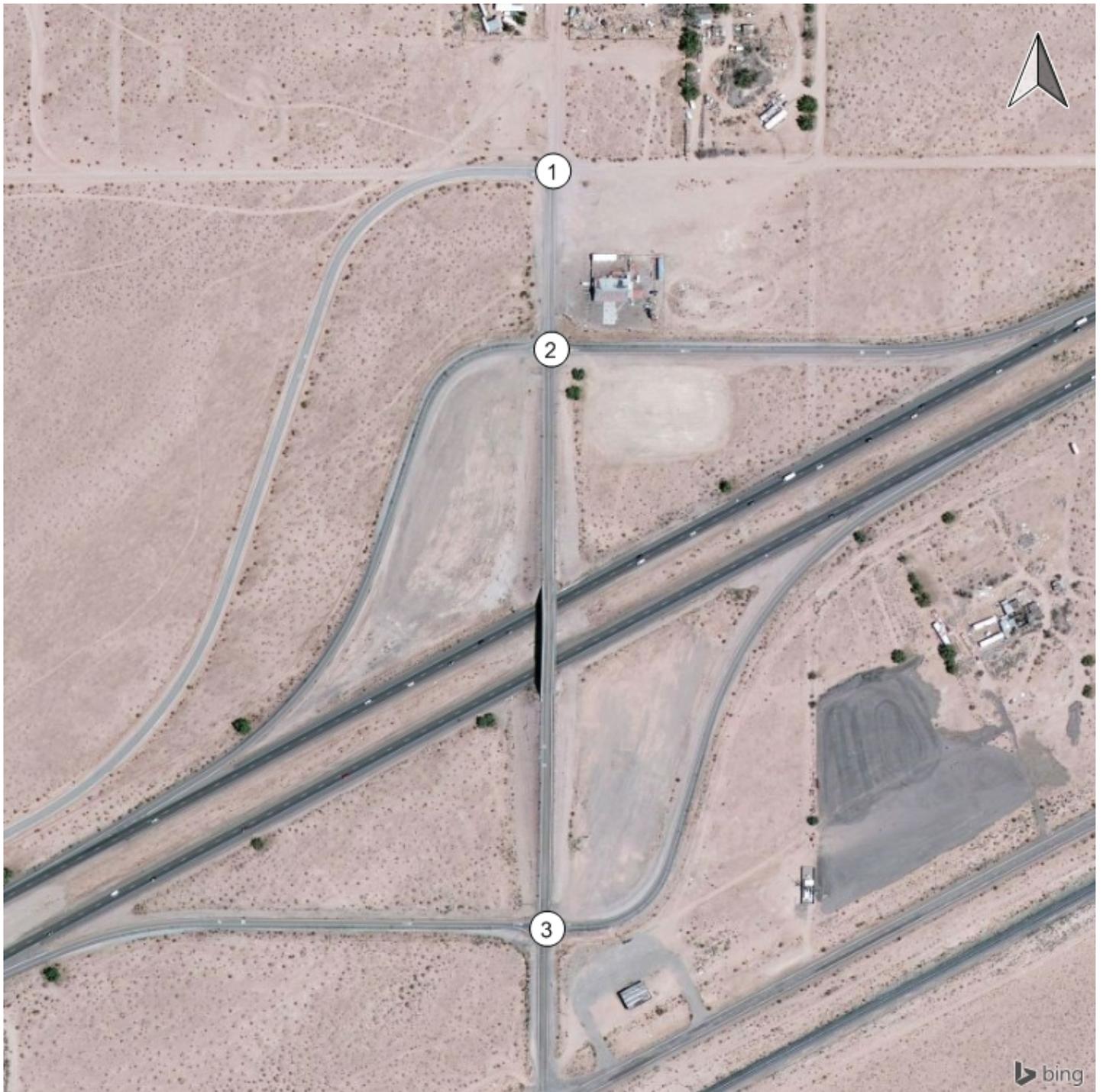
**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

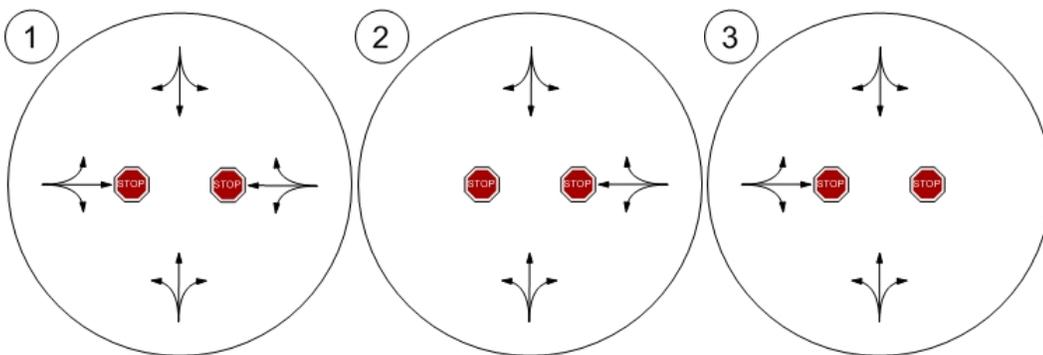
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.28	0.00	0.00	7.23	0.00	0.00	8.88	9.39	8.56	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	A	A	A			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.08	0.08	0.08	0.06	0.06	0.06	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	2.05	2.05	2.05	1.51	1.51	1.51	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.34			9.27			0.00		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	2.36											
Intersection LOS	A											

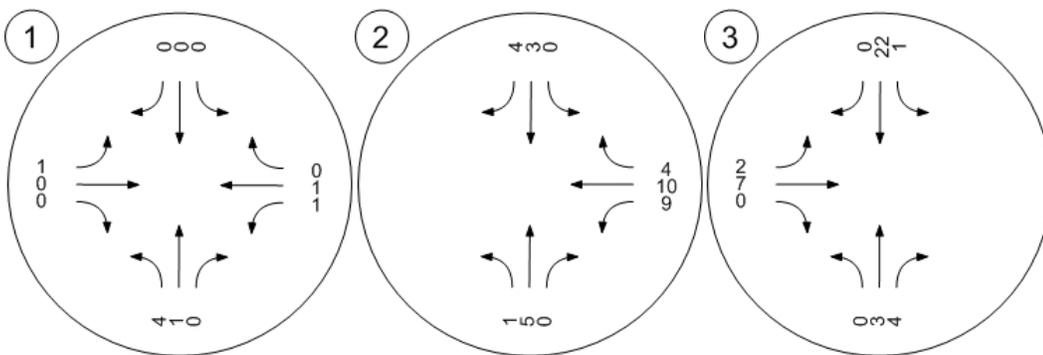
Study Intersections



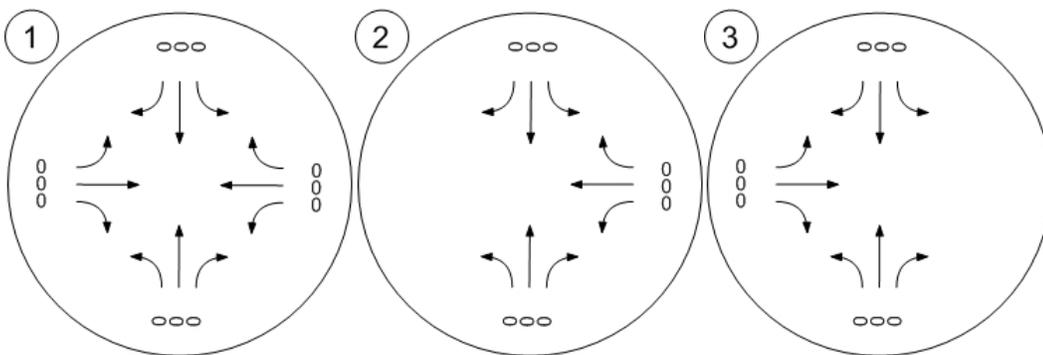
Lane Configuration and Traffic Control



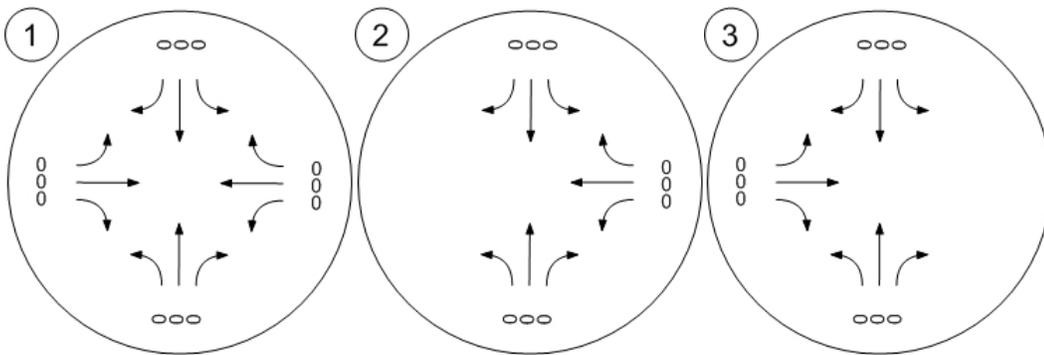
Traffic Volume - Base Volume



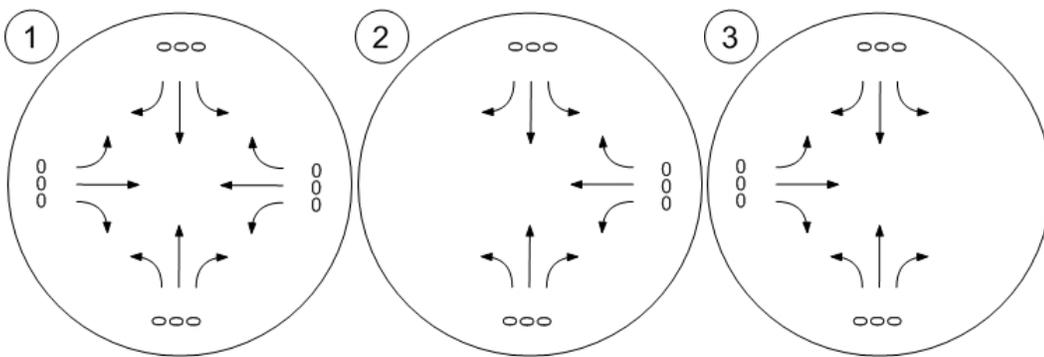
Traffic Volume - In-Process Volume



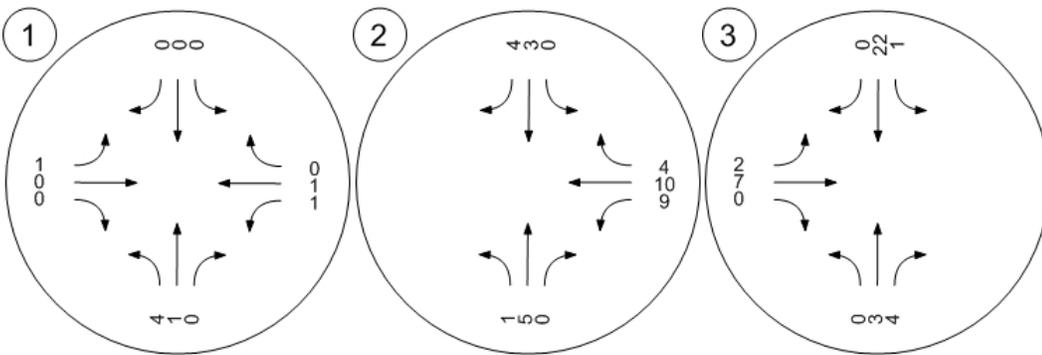
Traffic Volume - Net New Site Trips



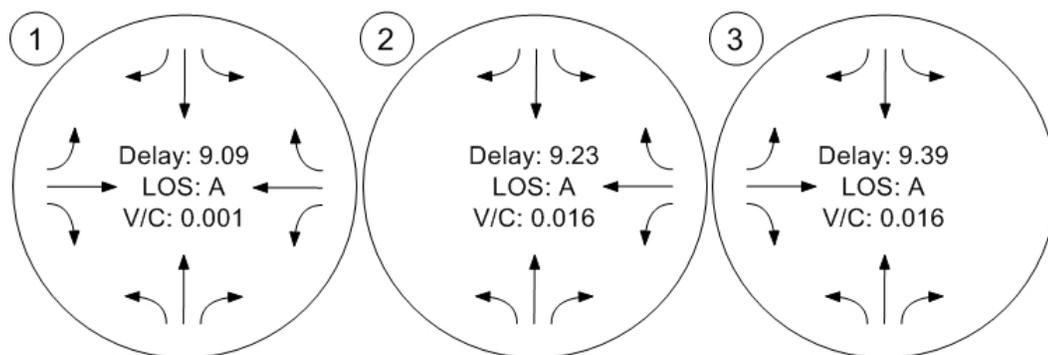
Traffic Volume - Other Volume



Traffic Volume - Future Total Volume



Traffic Conditions



## Newberry Springs Service Station

Vistro File: J:\...\E Sun.vistro

Scenario 1: Existing - Sunday Mid-Day Peak Hour

Report File: J:\...\E Sun.pdf

6/23/2016

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	EB Thru	0.000	9.2	A
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.021	11.4	B
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.022	11.5	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	8	2	0	0	1	1	0	0	4	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	2	0	0	1	1	0	0	4	0	0	0
Peak Hour Factor	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	0	0	0	0	0	0	1	0	0	0
Total Analysis Volume [veh/h]	12	3	0	0	1	1	0	0	6	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.22	0.00	0.00	7.21	0.00	0.00	8.69	9.19	8.32	8.71	9.18	8.31
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.03	0.00	0.00	0.00	0.02	0.02	0.02	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.69	0.69	0.69	0.00	0.00	0.00	0.42	0.42	0.42	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	5.78			0.00			8.32			8.73		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.94											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	11.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.021

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	3	9	0	0	8	9	0	0	0	256	14	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	9	0	0	8	9	0	0	0	256	14	14
Peak Hour Factor	0.7950	0.7950	0.7950	0.7950	0.7950	0.7950	1.0000	1.0000	1.0000	0.7950	0.7950	0.7950
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	3	0	0	3	3	0	0	0	81	4	4
Total Analysis Volume [veh/h]	4	11	0	0	10	11	0	0	0	322	18	18
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.02	0.02
d_M, Delay for Movement [s/veh]	7.24	0.00	0.00	7.22	0.00	0.00	0.00	0.00	0.00	10.83	11.35	10.48
Movement LOS	A	A	A	A	A	A				B	B	B
95th-Percentile Queue Length [veh]	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	1.71	1.71	1.71
95th-Percentile Queue Length [ft]	0.71	0.71	0.71	0.00	0.00	0.00	0.00	0.00	0.00	42.72	42.72	42.72
d_A, Approach Delay [s/veh]	1.93			0.00			0.00			10.84		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	9.92											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	11.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.022

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⊕			⊕			⊕					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	7	5	5	254	0	5	10	8	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	7	5	5	254	0	5	10	8	0	0	0
Peak Hour Factor	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	2	2	2	80	0	2	3	3	0	0	0
Total Analysis Volume [veh/h]	0	9	6	6	318	0	6	13	10	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

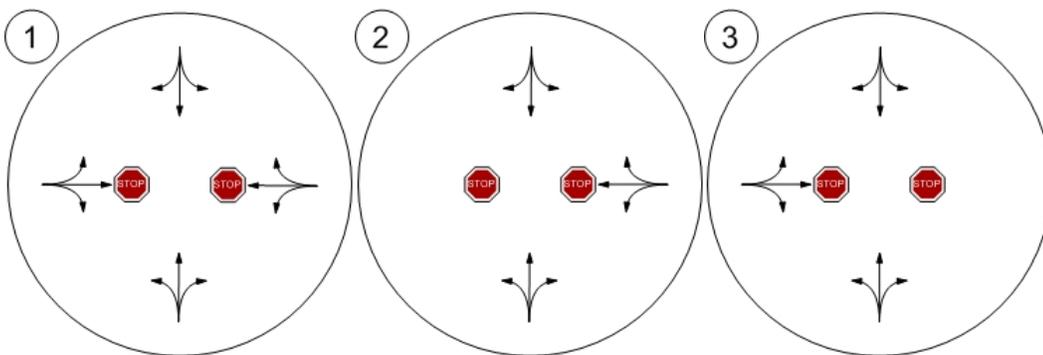
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.87	0.00	0.00	7.24	0.00	0.00	11.14	11.50	10.23	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	B	B	B			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.75	0.75	0.75	0.14	0.14	0.14	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	18.72	18.72	18.72	3.61	3.61	3.61	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.13			10.99			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	0.98											
Intersection LOS	B											

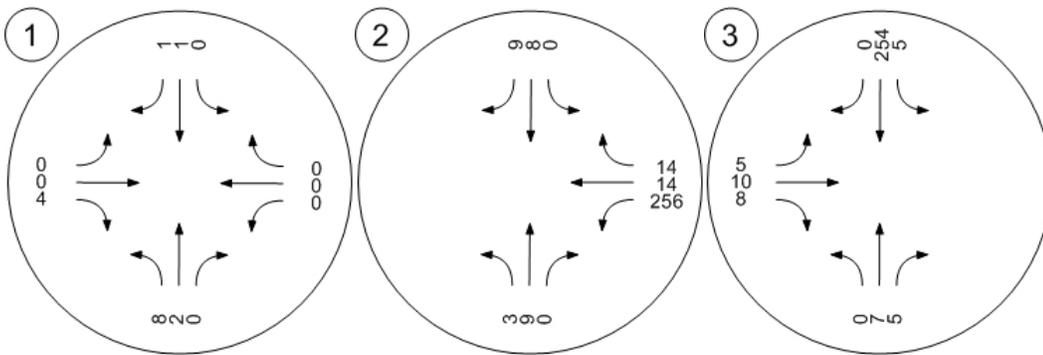
Study Intersections



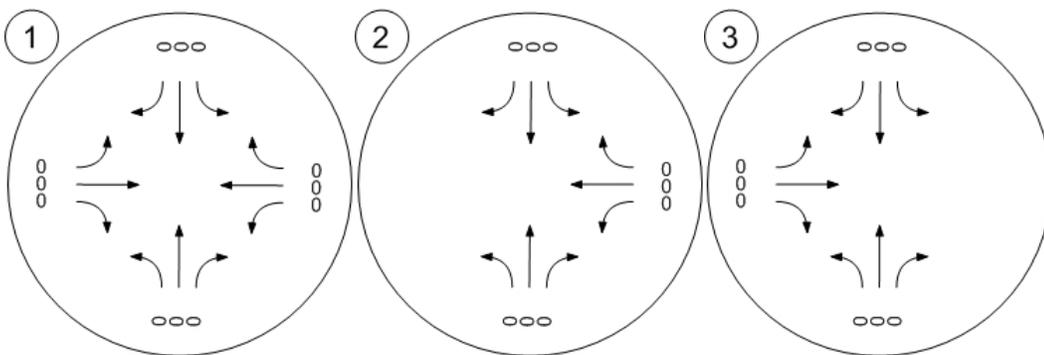
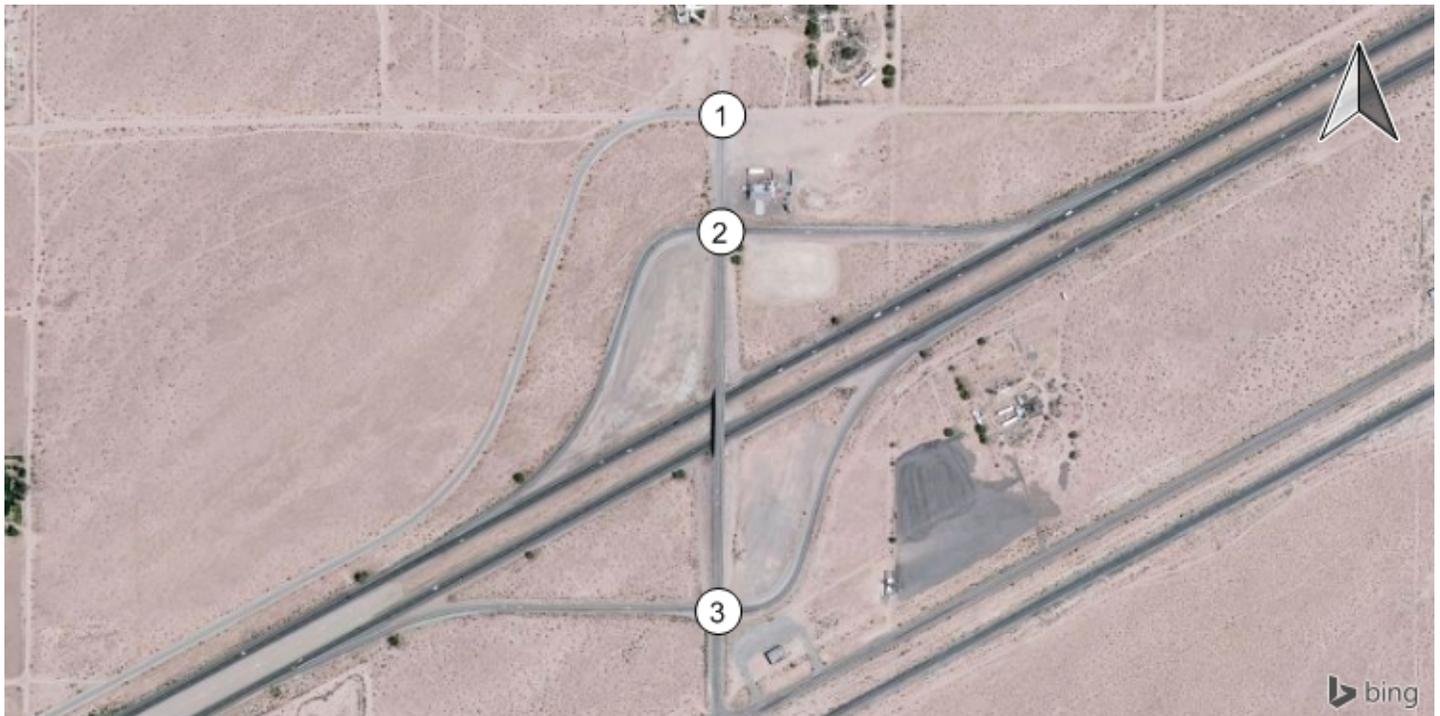
Lane Configuration and Traffic Control



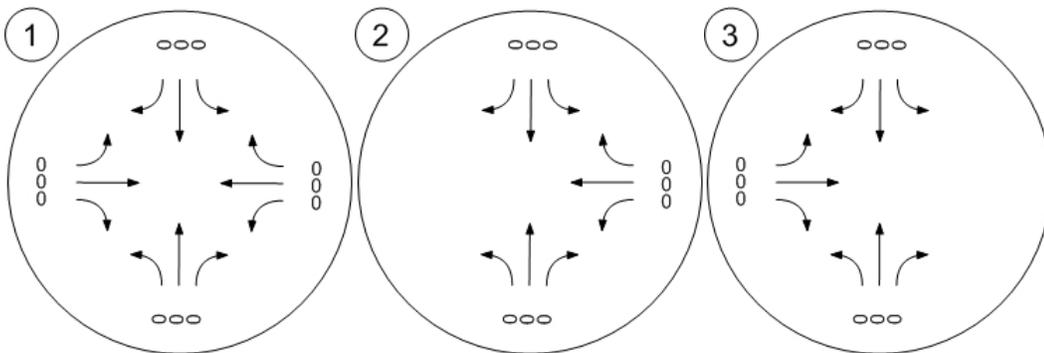
Traffic Volume - Base Volume



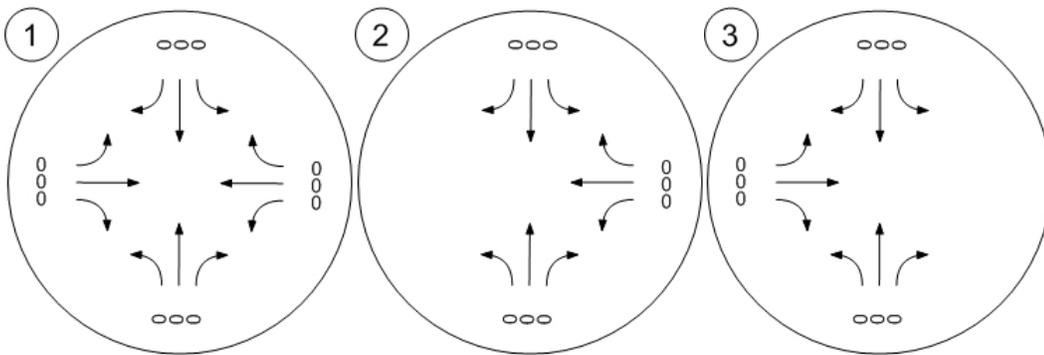
Traffic Volume - In-Process Volume



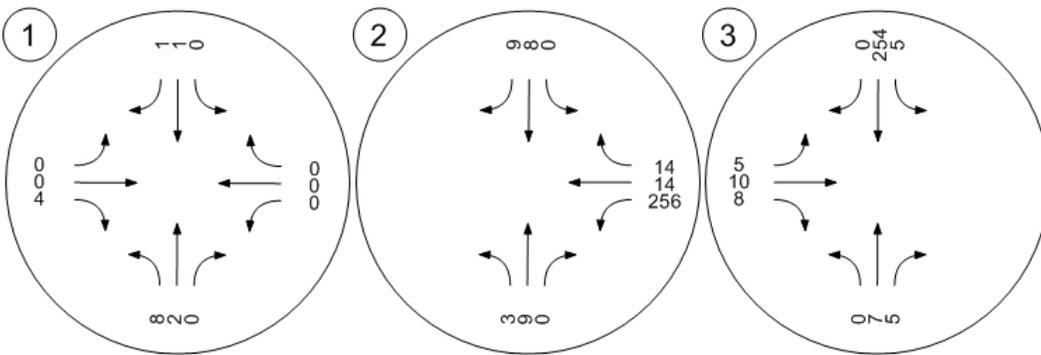
Traffic Volume - Net New Site Trips



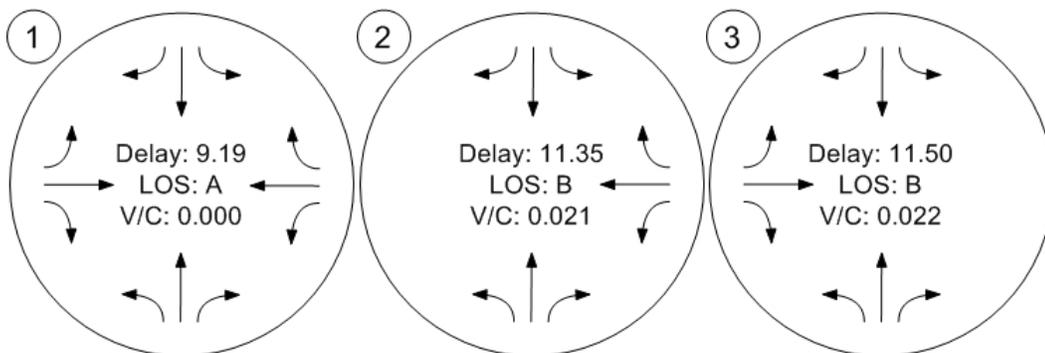
Traffic Volume - Other Volume



Traffic Volume - Future Total Volume



Traffic Conditions



**Existing Plus Project**

## Newberry Springs Service Station

Vistro File: J:\...\E Fri.vistro

Scenario 2: Existing Plus Project - Friday Evening Peak  
Hour

Report File: J:\...\EP Fri.pdf

6/23/2016

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	WB Thru	0.011	10.2	B
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.020	10.7	B
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.020	11.5	B
4	Project West Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.034	9.4	A
5	Project East Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.067	8.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	10.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.011

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	4	1	0	0	0	0	1	0	0	1	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	91	0	0	0	0	5	0	90	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	1	91	0	0	0	1	5	0	91	6	0
Peak Hour Factor	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	34	0	0	0	0	2	0	34	2	0
Total Analysis Volume [veh/h]	6	1	136	0	0	0	1	7	0	136	9	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.15	0.01	0.00
d_M, Delay for Movement [s/veh]	7.21	0.00	0.00	7.47	0.00	0.00	9.07	9.89	8.35	9.79	10.23	9.38
Movement LOS	A	A	A	A	A	A	A	A	A	A	B	A
95th-Percentile Queue Length [veh]	0.29	0.29	0.29	0.00	0.00	0.00	0.03	0.03	0.03	0.58	0.58	0.58
95th-Percentile Queue Length [ft]	7.17	7.17	7.17	0.00	0.00	0.00	0.80	0.80	0.80	14.47	14.47	14.47
d_A, Approach Delay [s/veh]	0.30			2.49			9.79			9.82		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.22											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	10.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.020

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	1	5	0	0	3	4	0	0	0	9	10	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	48	0	0	47	43	0	0	0	0	0	43
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	53	0	0	50	47	0	0	0	9	10	47
Peak Hour Factor	0.7050	0.7050	0.7050	0.7050	0.7050	0.7050	1.0000	1.0000	1.0000	0.7050	0.7050	0.7050
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	19	0	0	18	17	0	0	0	3	4	17
Total Analysis Volume [veh/h]	1	75	0	0	71	67	0	0	0	13	14	67
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.07
d_M, Delay for Movement [s/veh]	7.47	0.00	0.00	7.34	0.00	0.00	0.00	0.00	0.00	10.06	10.72	9.10
Movement LOS	A	A	A	A	A	A				B	B	A
95th-Percentile Queue Length [veh]	0.16	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.35
95th-Percentile Queue Length [ft]	4.12	4.12	4.12	0.00	0.00	0.00	0.00	0.00	0.00	8.73	8.73	8.73
d_A, Approach Delay [s/veh]	0.10			0.00			0.00			9.47		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	2.91											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	11.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.020

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	3	4	1	22	0	2	7	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	5	0	42	5	0	43	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	8	4	43	27	0	45	7	0	0	0	0
Peak Hour Factor	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	2	20	12	0	21	3	0	0	0	0
Total Analysis Volume [veh/h]	0	15	7	79	50	0	83	13	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.05	0.00	0.00	0.12	0.02	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.29	0.00	0.00	7.36	0.00	0.00	10.94	11.46	9.34	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	B	B	A			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.26	0.26	0.26	0.48	0.48	0.48	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	6.54	6.54	6.54	11.94	11.94	11.94	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			4.51			11.01			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	6.63											
Intersection LOS	B											

**Intersection Level Of Service Report**

**Intersection 4: Project West Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.034

**Intersection Setup**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	29	0	67	29	0	66
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	67	29	0	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	17	7	0	17
Total Analysis Volume [veh/h]	29	0	67	29	0	66
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.39	8.81	0.00	0.00	7.38	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.11	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	2.65	2.65	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.39		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.43					
Intersection LOS	A					

**Intersection Level Of Service Report**

**Intersection 5: Project East Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.067

**Intersection Setup**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	66	0	0	67	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	0	0	67	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	0	0	17	0	0
Total Analysis Volume [veh/h]	66	0	0	67	0	0
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

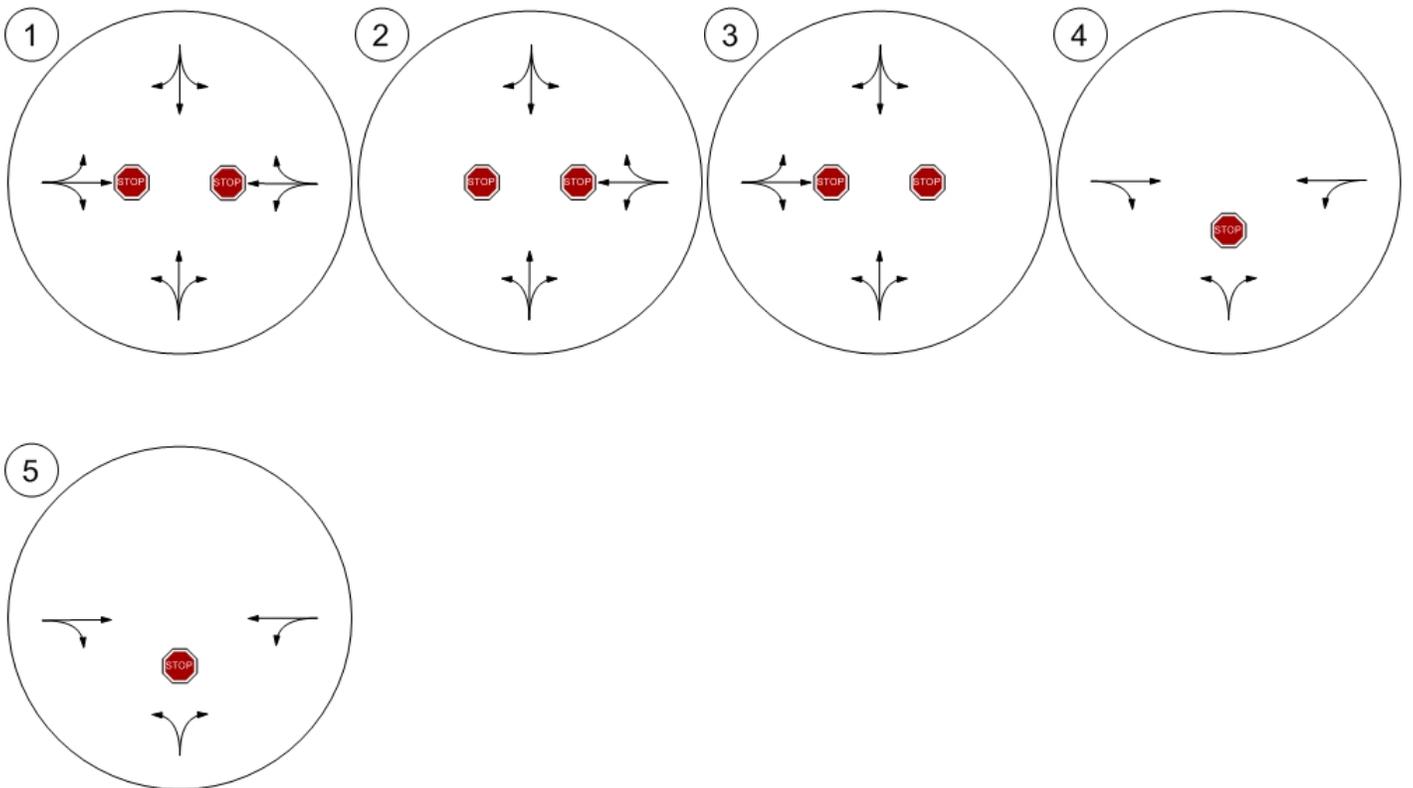
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.92	8.71	0.00	0.00	7.33	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.22	0.22	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	5.38	5.38	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.92		0.00		3.66	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.43					
Intersection LOS	A					

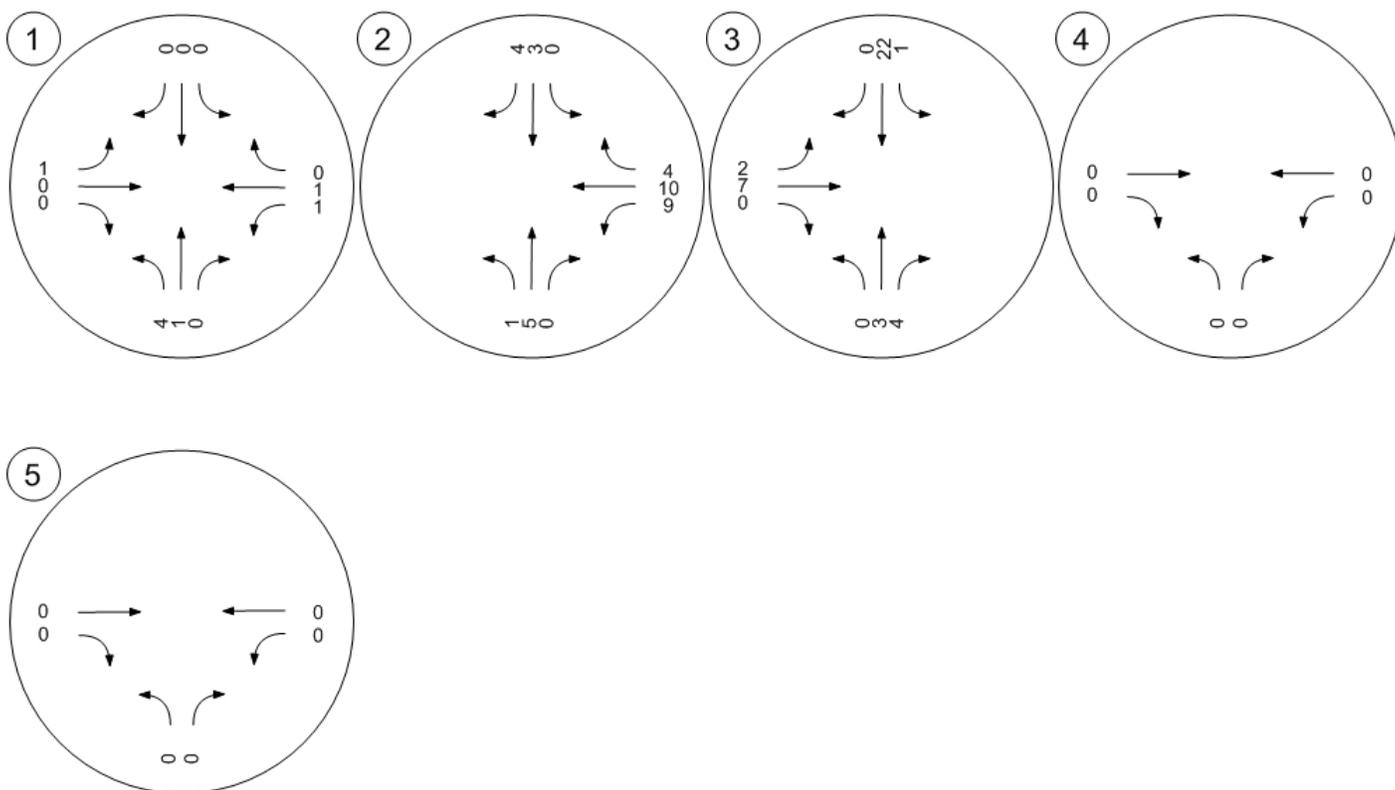
Study Intersections



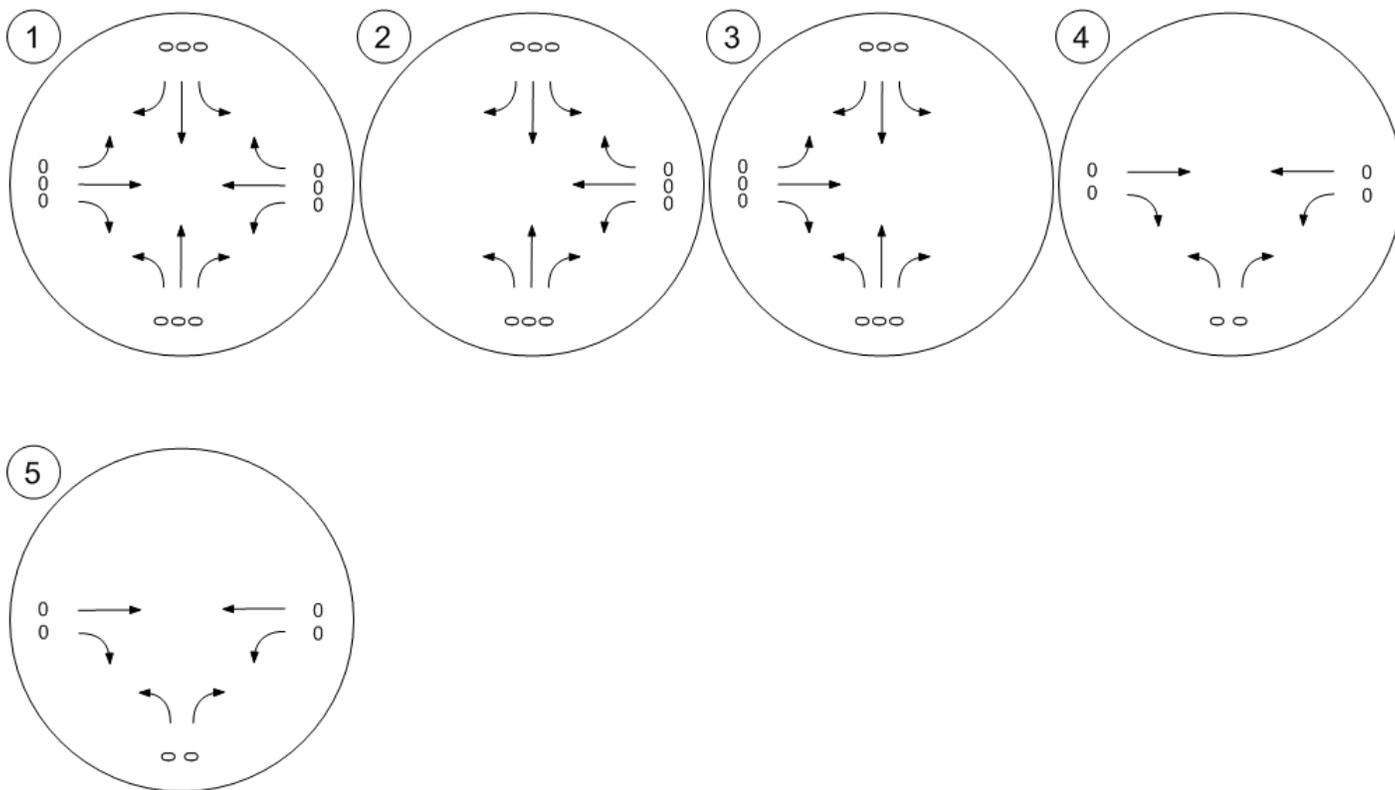
Lane Configuration and Traffic Control



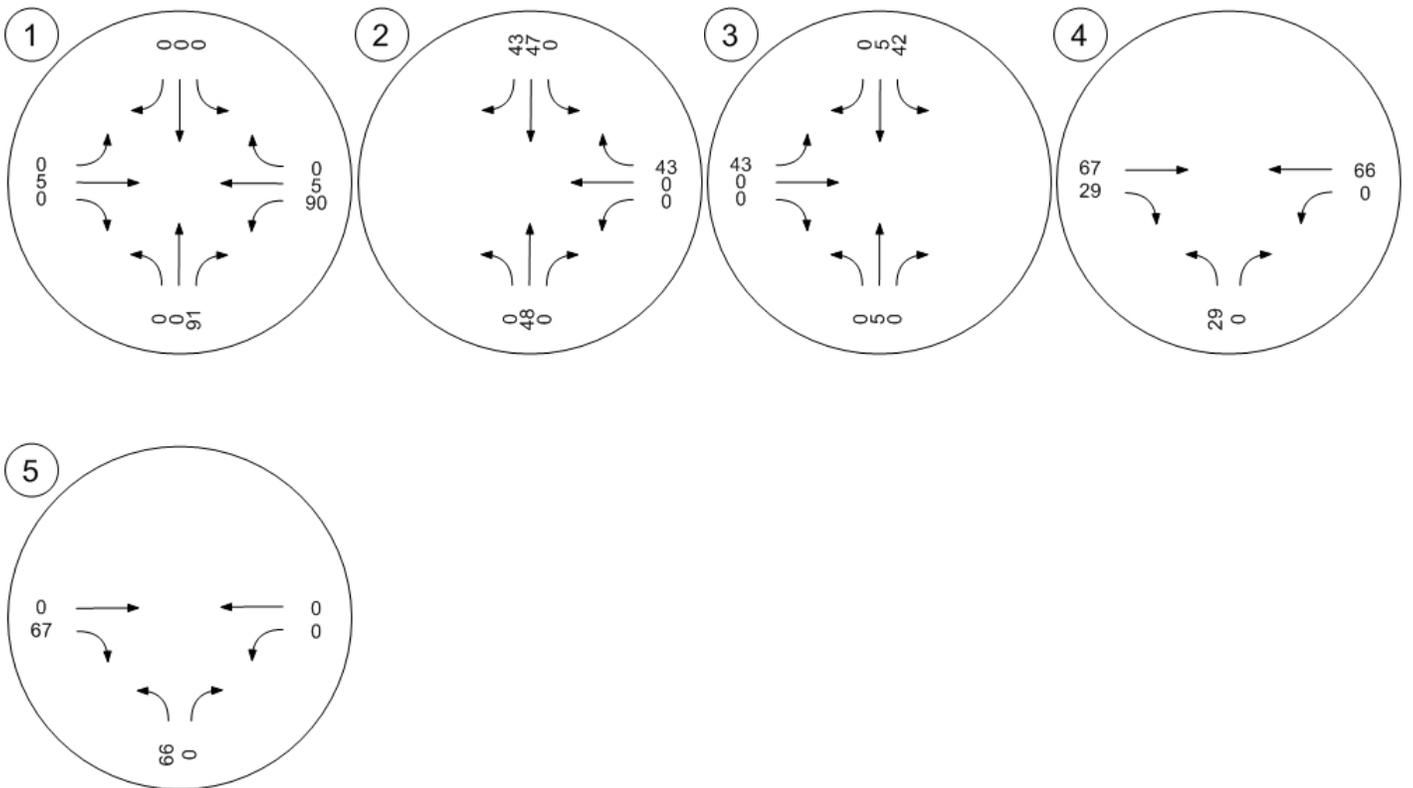
Traffic Volume - Base Volume



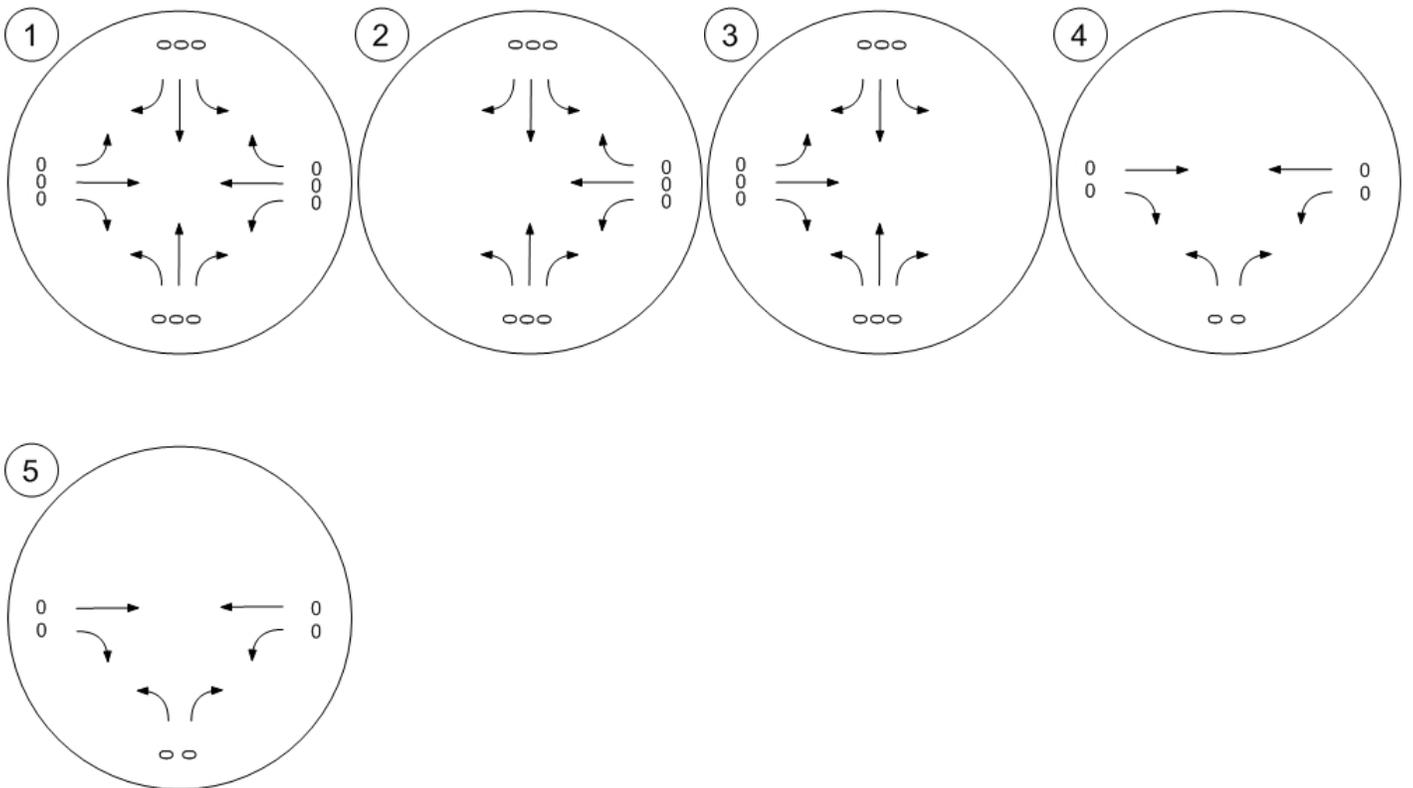
Traffic Volume - In-Process Volume



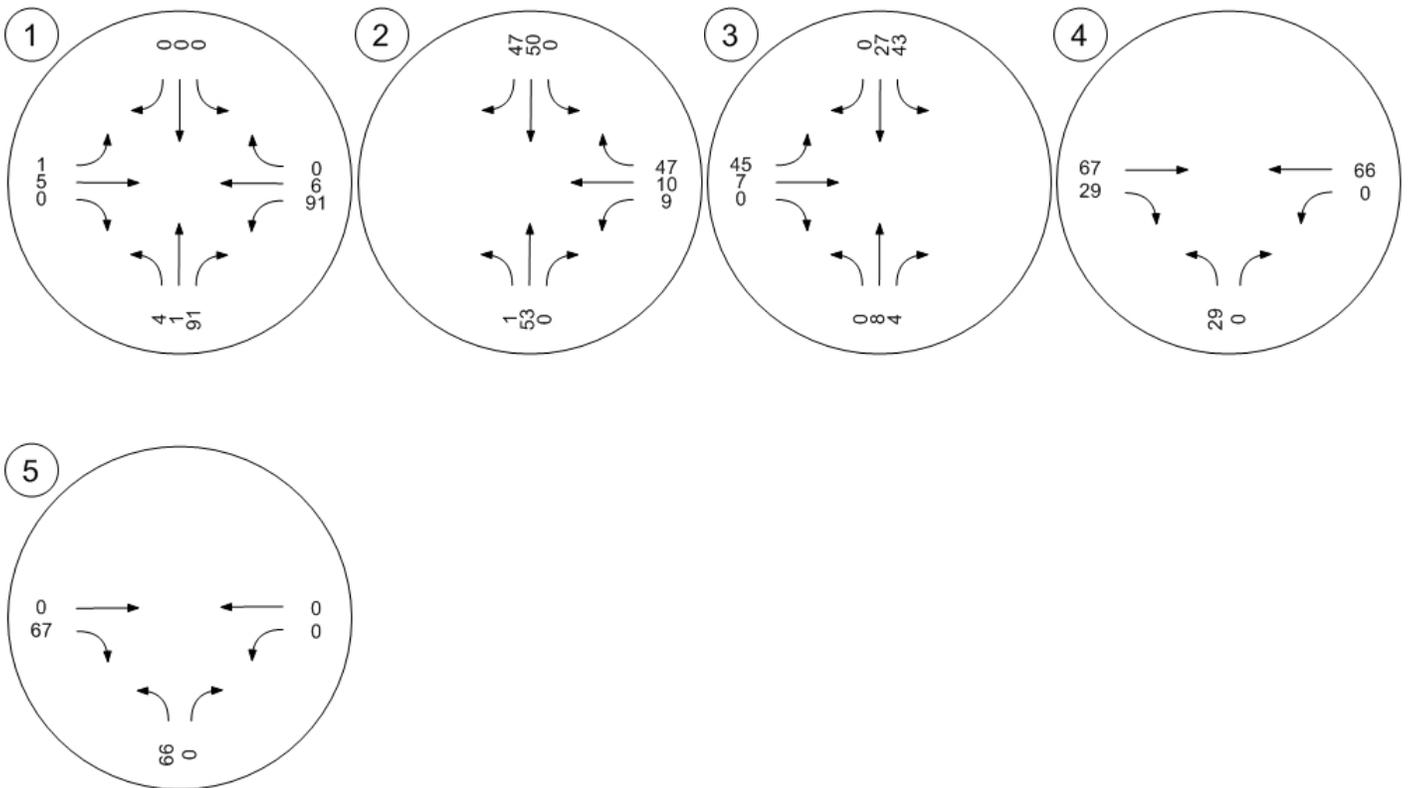
Traffic Volume - Net New Site Trips



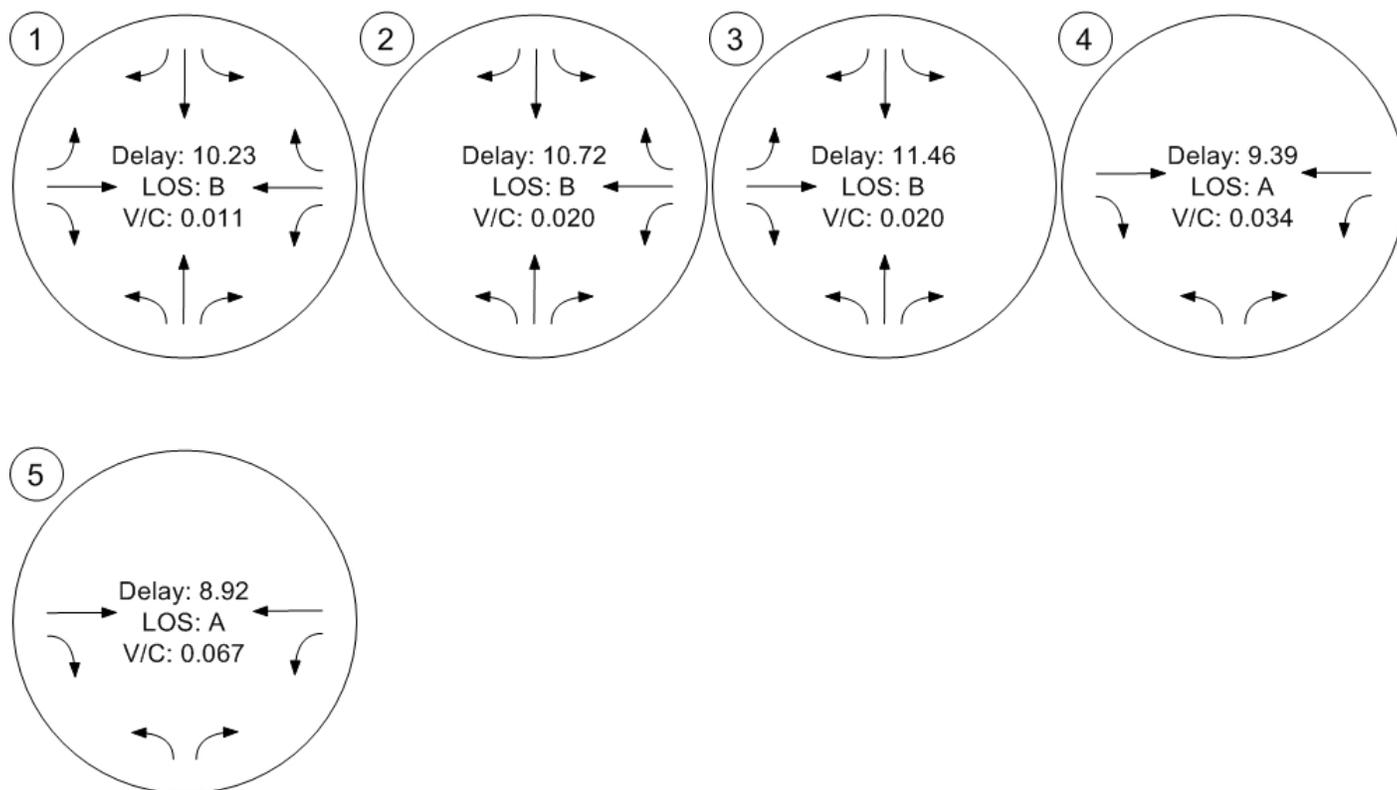
Traffic Volume - Other Volume



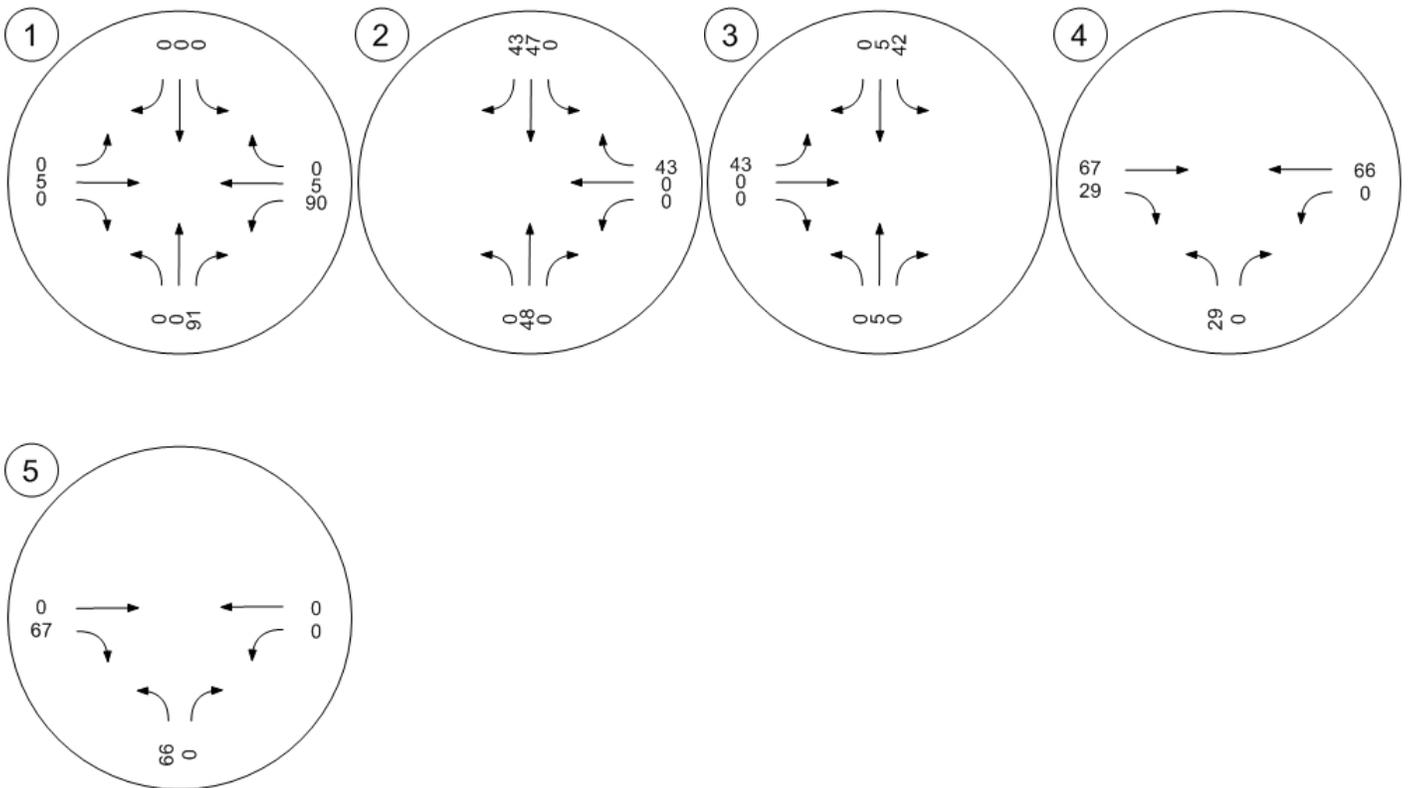
Traffic Volume - Future Total Volume



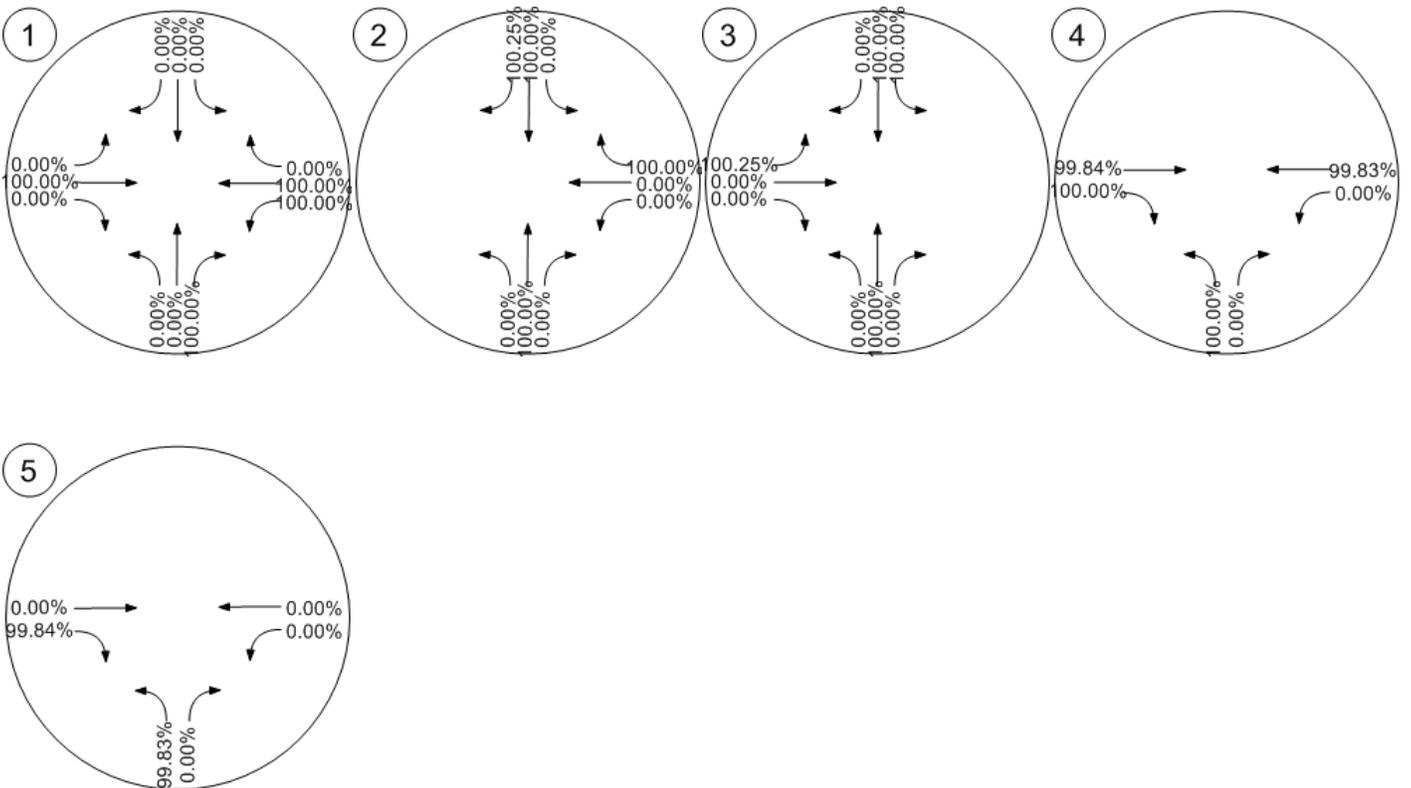
Traffic Conditions



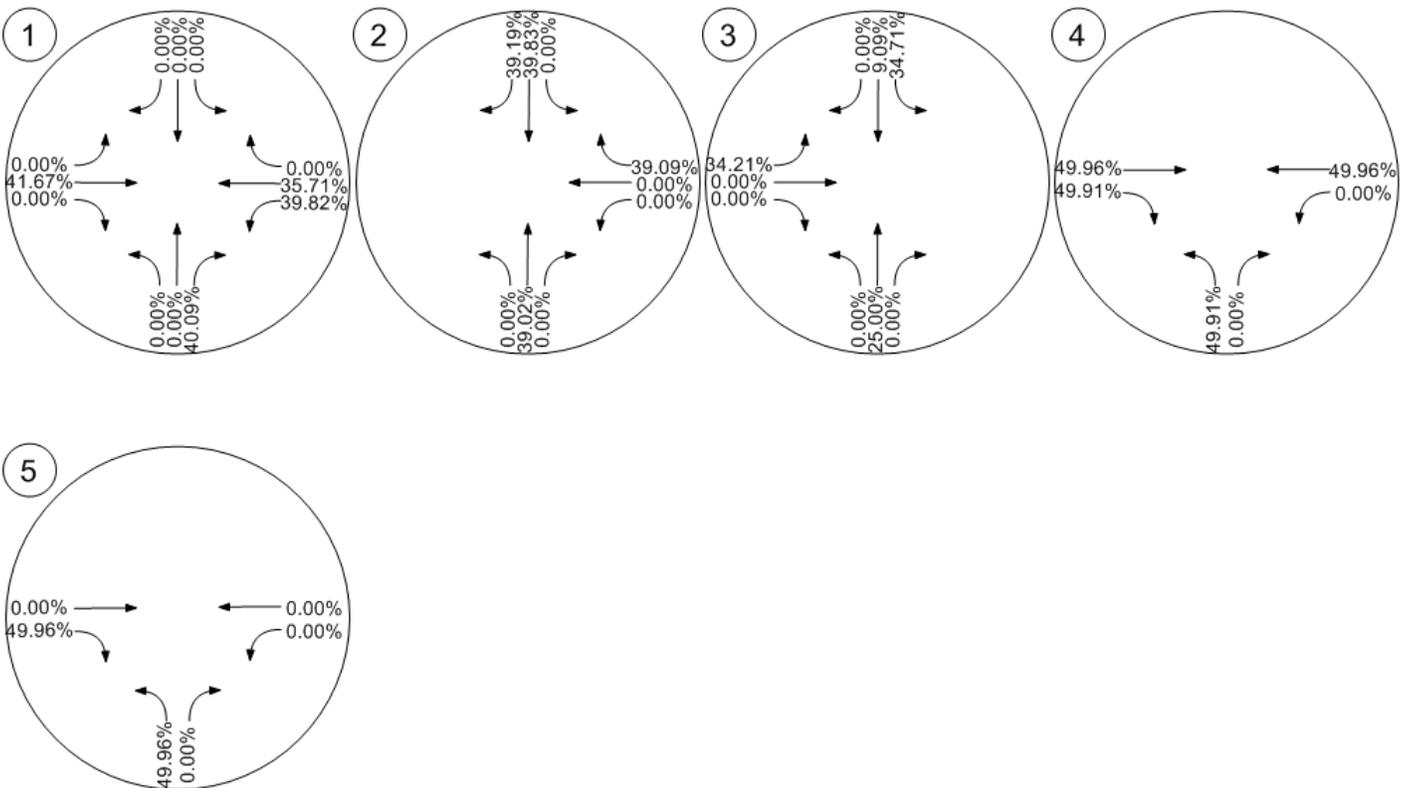
Fair Share - Fair Share Volumes - Zone 1: Project



Fair Share - Fair Share % of Net New Site - Zone 1: Project



Fair Share - Fair Share % of Total Analysis - Zone 1: Project



## Newberry Springs Service Station

Vistro File: J:\...\E Sun.vistro

Scenario 2: Existing Plus Project - Sunday Mid-Day Peak  
Hour

Report File: J:\...\EP Sun.pdf

6/23/2016

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	WB Thru	0.009	10.4	B
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.026	14.8	B
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.027	13.9	B
4	Project West Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.034	9.4	A
5	Project East Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.067	8.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	8	2	0	0	1	1	0	0	4	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	91	0	0	0	0	5	0	90	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	2	91	0	1	1	0	5	4	90	5	0
Peak Hour Factor	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	34	0	0	0	0	2	1	34	2	0
Total Analysis Volume [veh/h]	12	3	136	0	1	1	0	7	6	135	7	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.16	0.01	0.00
d_M, Delay for Movement [s/veh]	7.22	0.00	0.00	7.47	0.00	0.00	9.18	10.02	8.37	9.98	10.38	9.43
Movement LOS	A	A	A	A	A	A	A	B	A	A	B	A
95th-Percentile Queue Length [veh]	0.31	0.31	0.31	0.00	0.00	0.00	0.05	0.05	0.05	0.59	0.59	0.59
95th-Percentile Queue Length [ft]	7.63	7.63	7.63	0.00	0.00	0.00	1.15	1.15	1.15	14.70	14.70	14.70
d_A, Approach Delay [s/veh]	0.57			0.00			9.26			10.00		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	5.28											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	14.8
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.026

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	3	9	0	0	8	9	0	0	0	256	14	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	48	0	0	47	43	0	0	0	0	0	43
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	57	0	0	55	52	0	0	0	256	14	57
Peak Hour Factor	0.7950	0.7950	0.7950	0.7950	0.7950	0.7950	1.0000	1.0000	1.0000	0.7950	0.7950	0.7950
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	18	0	0	17	16	0	0	0	81	4	18
Total Analysis Volume [veh/h]	4	72	0	0	69	65	0	0	0	322	18	72
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.03	0.07
d_M, Delay for Movement [s/veh]	7.47	0.00	0.00	7.34	0.00	0.00	0.00	0.00	0.00	14.14	14.80	13.16
Movement LOS	A	A	A	A	A	A				B	B	B
95th-Percentile Queue Length [veh]	0.16	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	2.95	2.95	2.95
95th-Percentile Queue Length [ft]	4.11	4.11	4.11	0.00	0.00	0.00	0.00	0.00	0.00	73.67	73.67	73.67
d_A, Approach Delay [s/veh]	0.39			0.00			0.00			14.00		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	9.32											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	13.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.027

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	7	5	5	254	0	5	10	8	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	5	0	42	5	0	43	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	12	5	47	259	0	48	10	8	0	0	0
Peak Hour Factor	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	2	15	81	0	15	3	3	0	0	0
Total Analysis Volume [veh/h]	0	15	6	59	325	0	60	13	10	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.04	0.00	0.00	0.12	0.03	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.89	0.00	0.00	7.32	0.00	0.00	13.61	13.92	11.35	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	B	B	B			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.94	0.94	0.94	0.57	0.57	0.57	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	23.39	23.39	23.39	14.35	14.35	14.35	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			1.13			13.39			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	3.16											
Intersection LOS	B											

**Intersection Level Of Service Report**

**Intersection 4: Project West Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.034

**Intersection Setup**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	29	0	67	29	0	66
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	67	29	0	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	17	7	0	17
Total Analysis Volume [veh/h]	29	0	67	29	0	66
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.39	8.81	0.00	0.00	7.38	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.11	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	2.65	2.65	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.39		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.43					
Intersection LOS	A					

**Intersection Level Of Service Report**

**Intersection 5: Project East Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.067

**Intersection Setup**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	66	0	0	67	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	0	0	67	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	0	0	17	0	0
Total Analysis Volume [veh/h]	66	0	0	67	0	0
Pedestrian Volume [ped/h]	0		0		0	

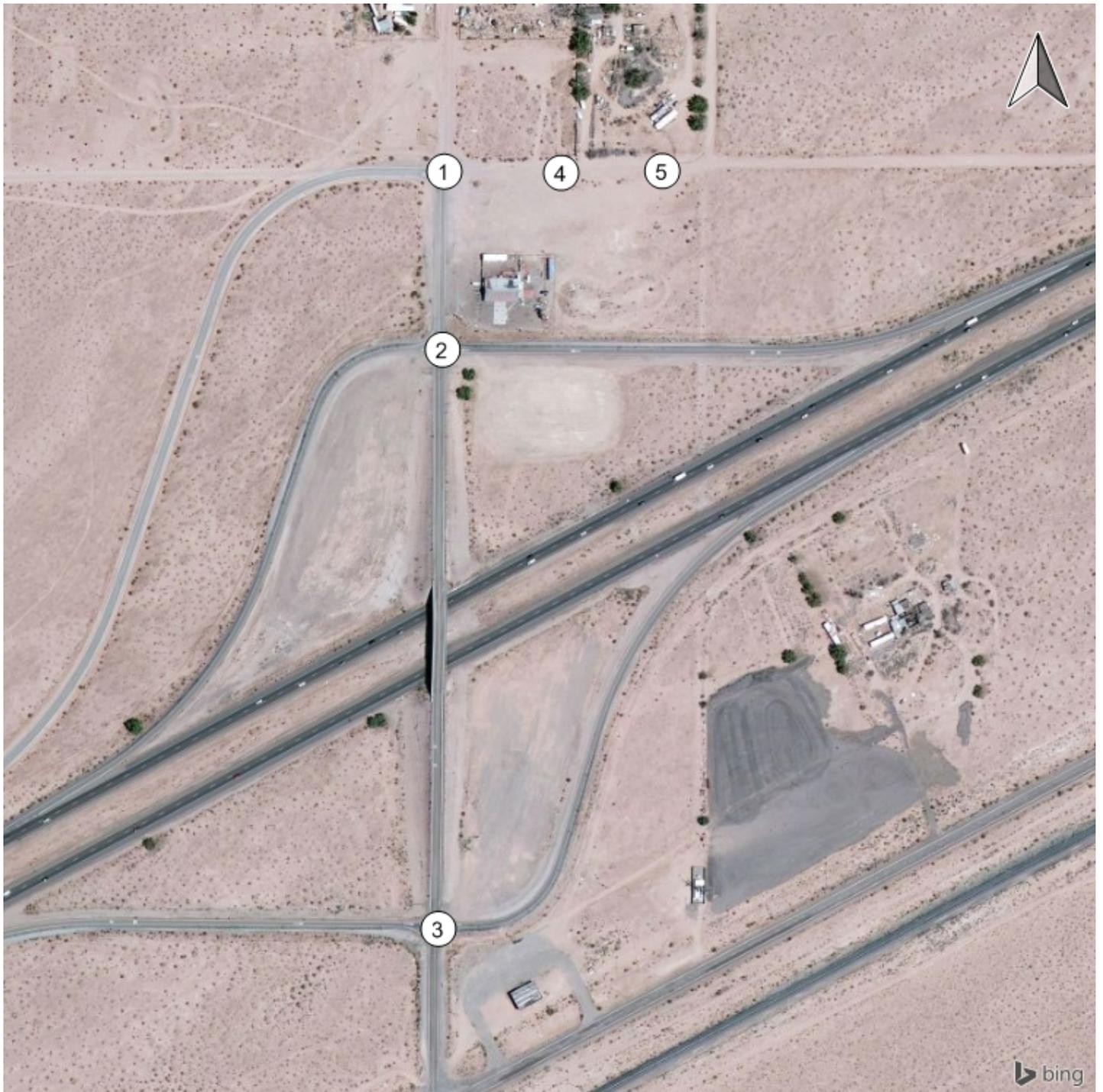
**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

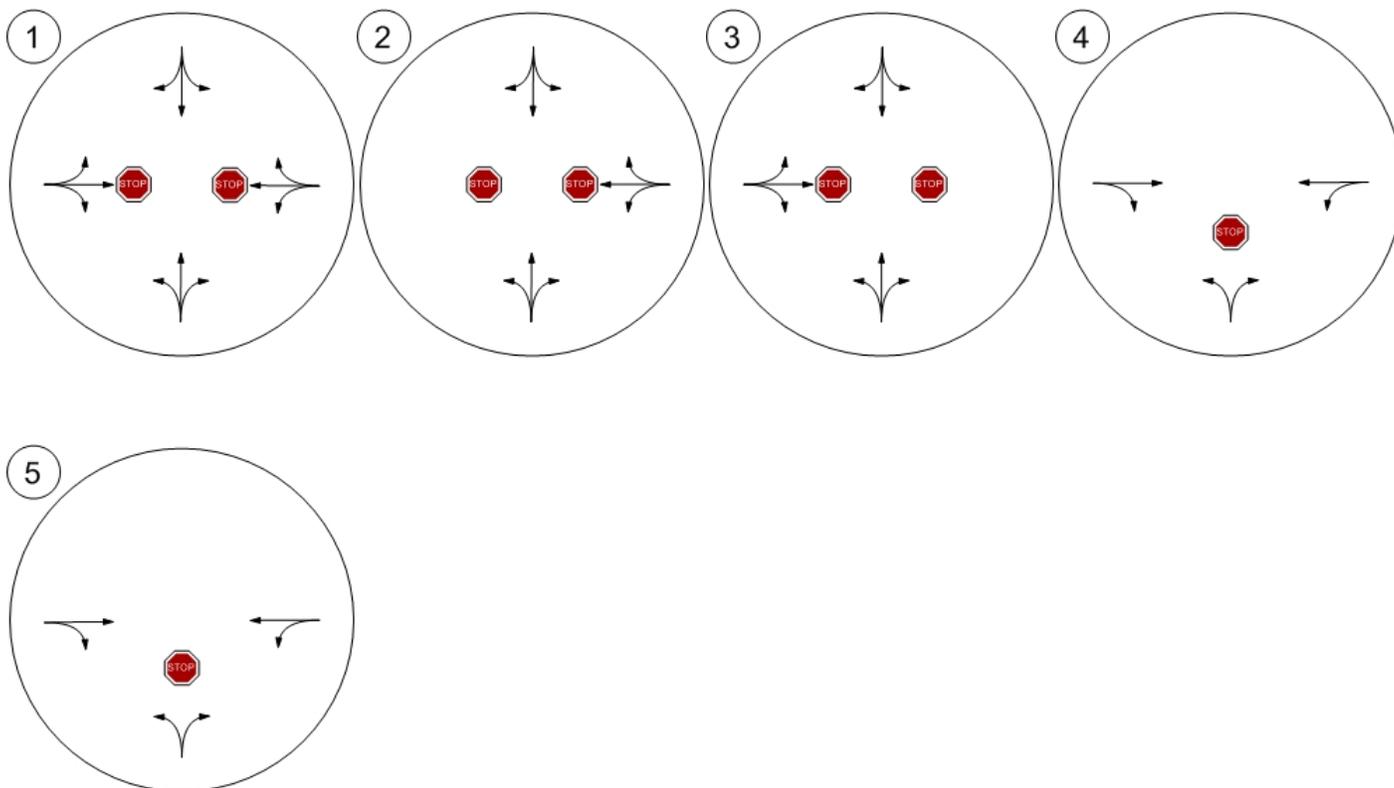
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.92	8.71	0.00	0.00	7.33	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.22	0.22	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	5.38	5.38	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.92		0.00		3.66	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.43					
Intersection LOS	A					

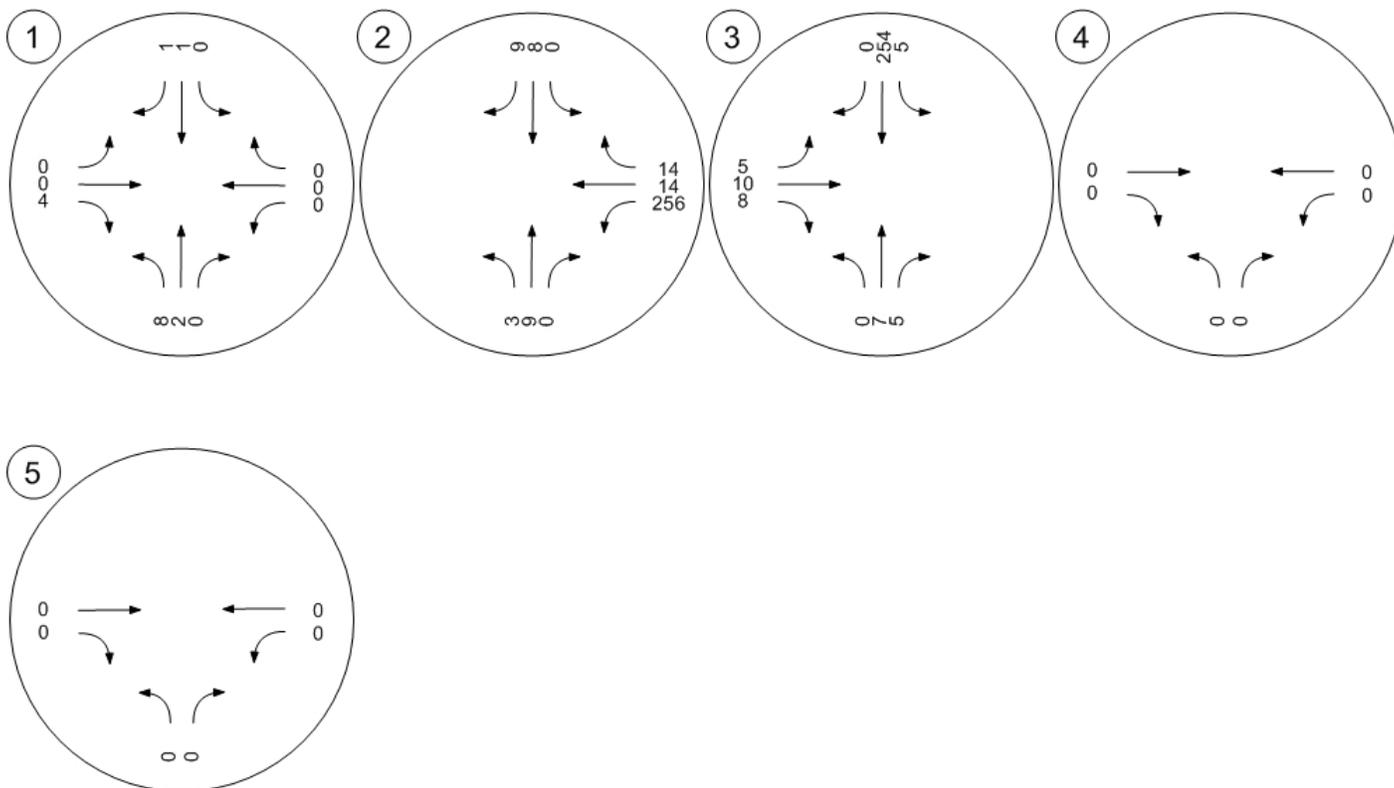
Study Intersections



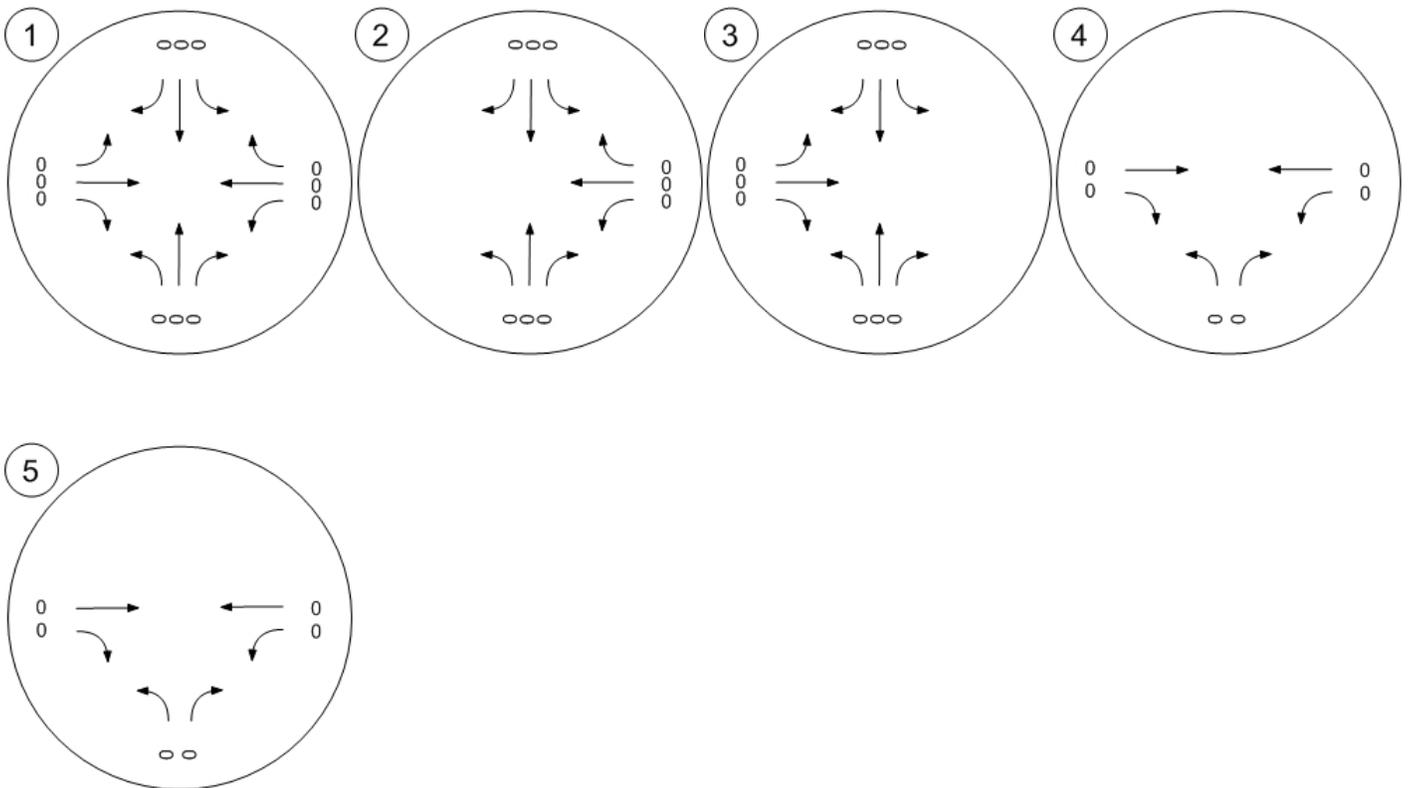
Lane Configuration and Traffic Control



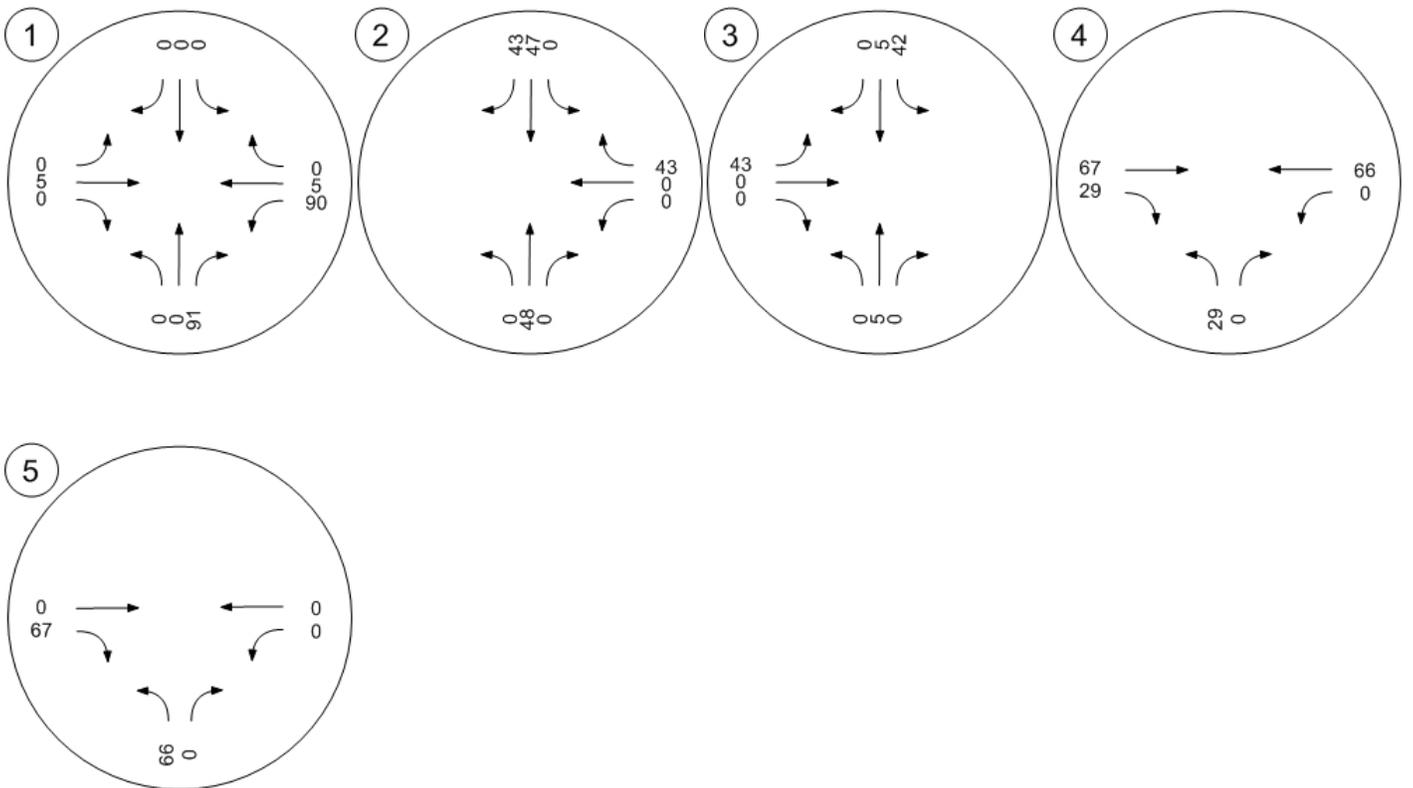
Traffic Volume - Base Volume



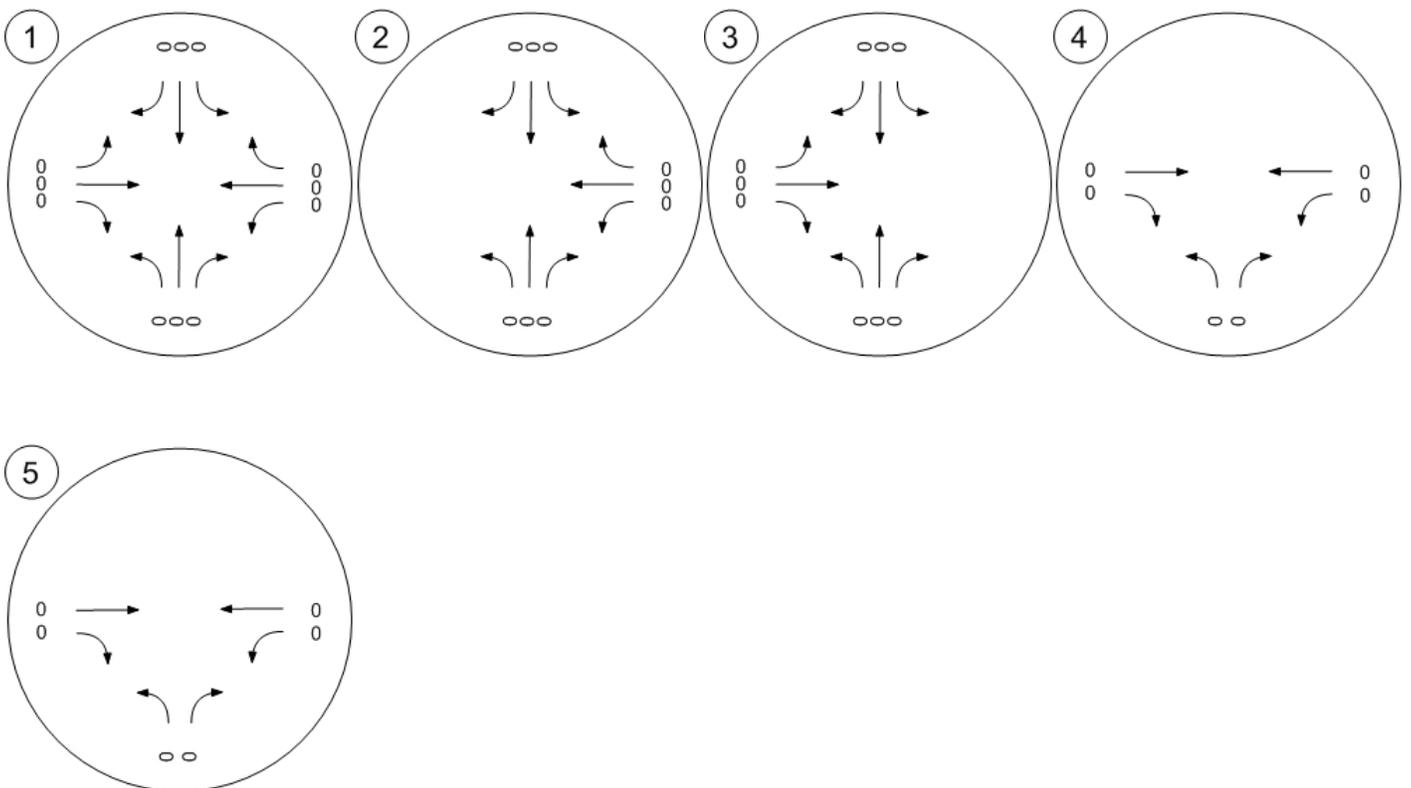
Traffic Volume - In-Process Volume



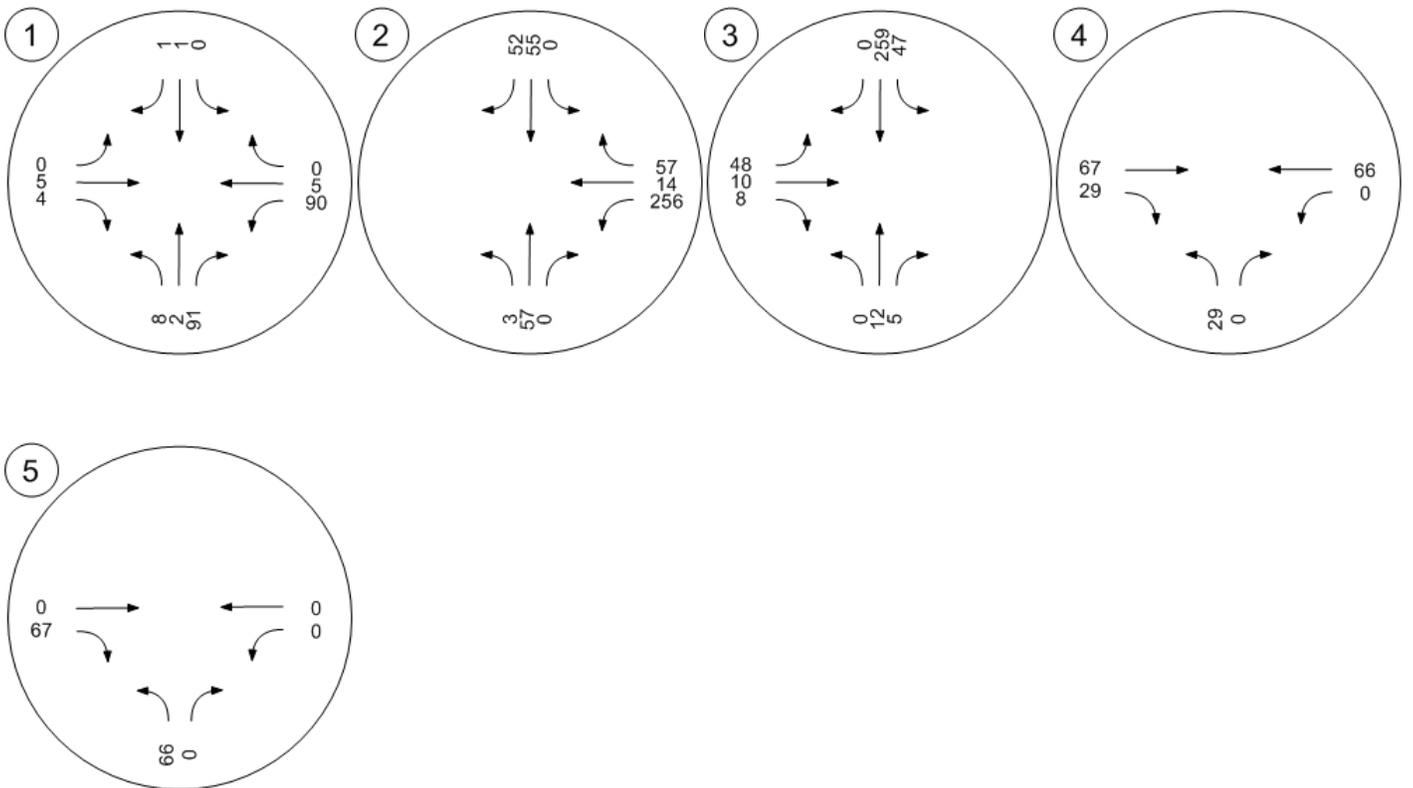
Traffic Volume - Net New Site Trips



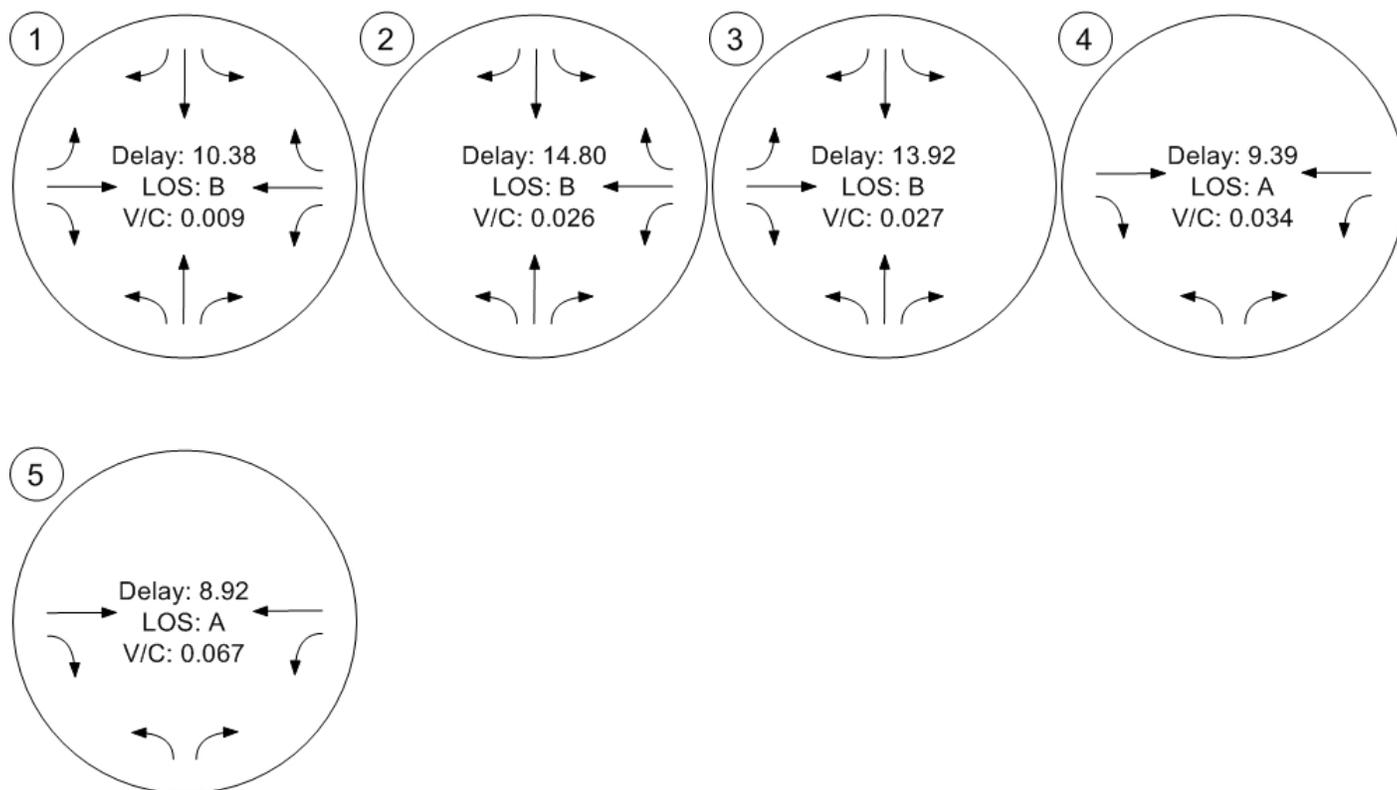
Traffic Volume - Other Volume



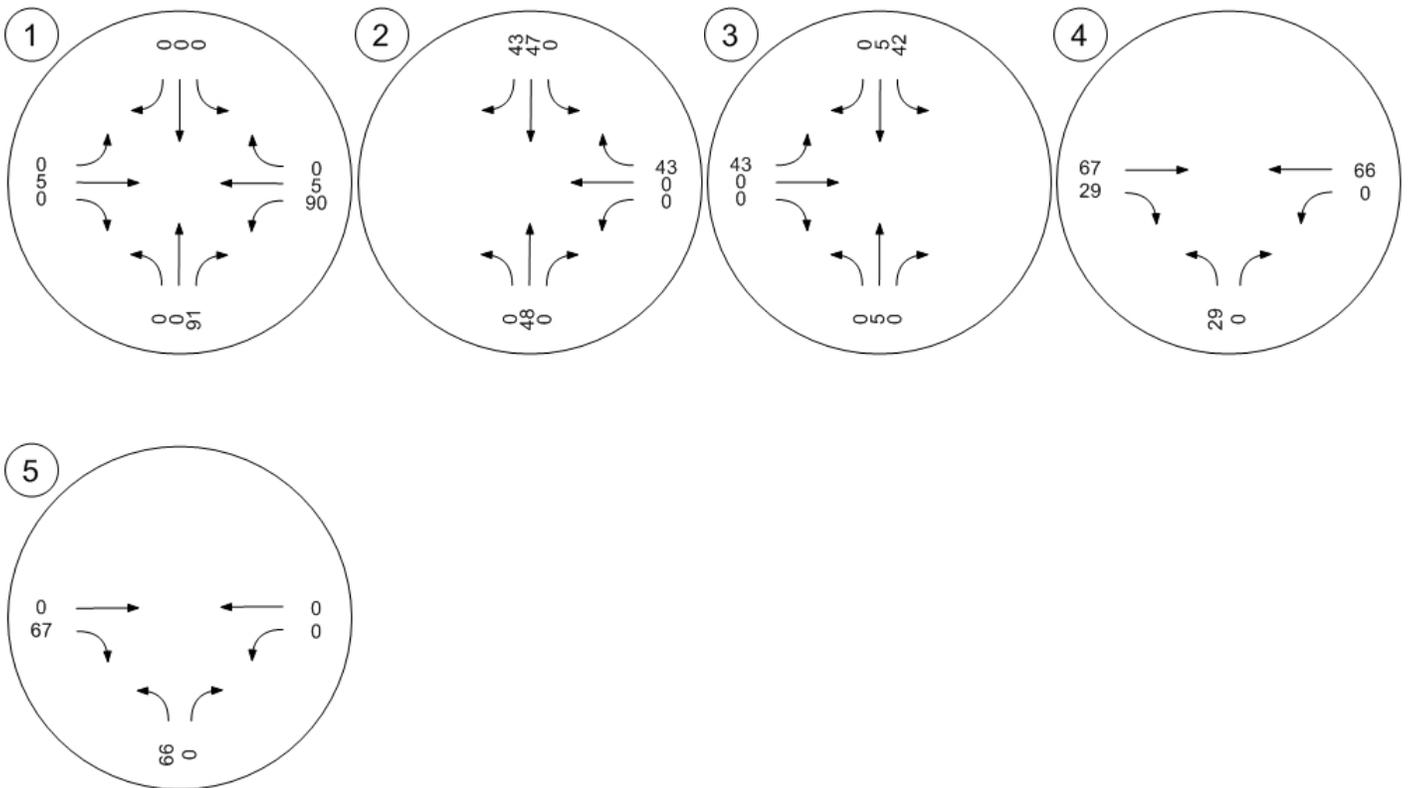
Traffic Volume - Future Total Volume



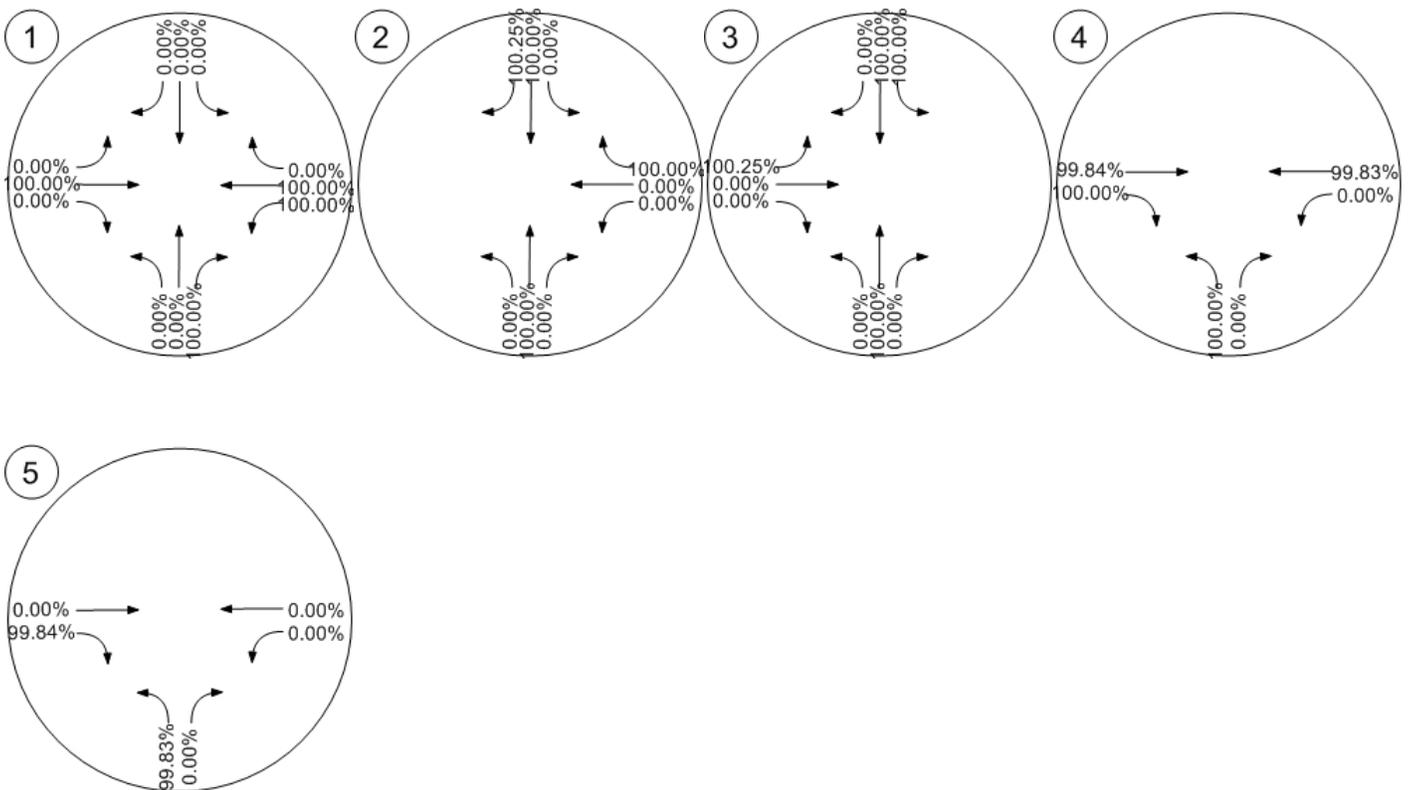
Traffic Conditions



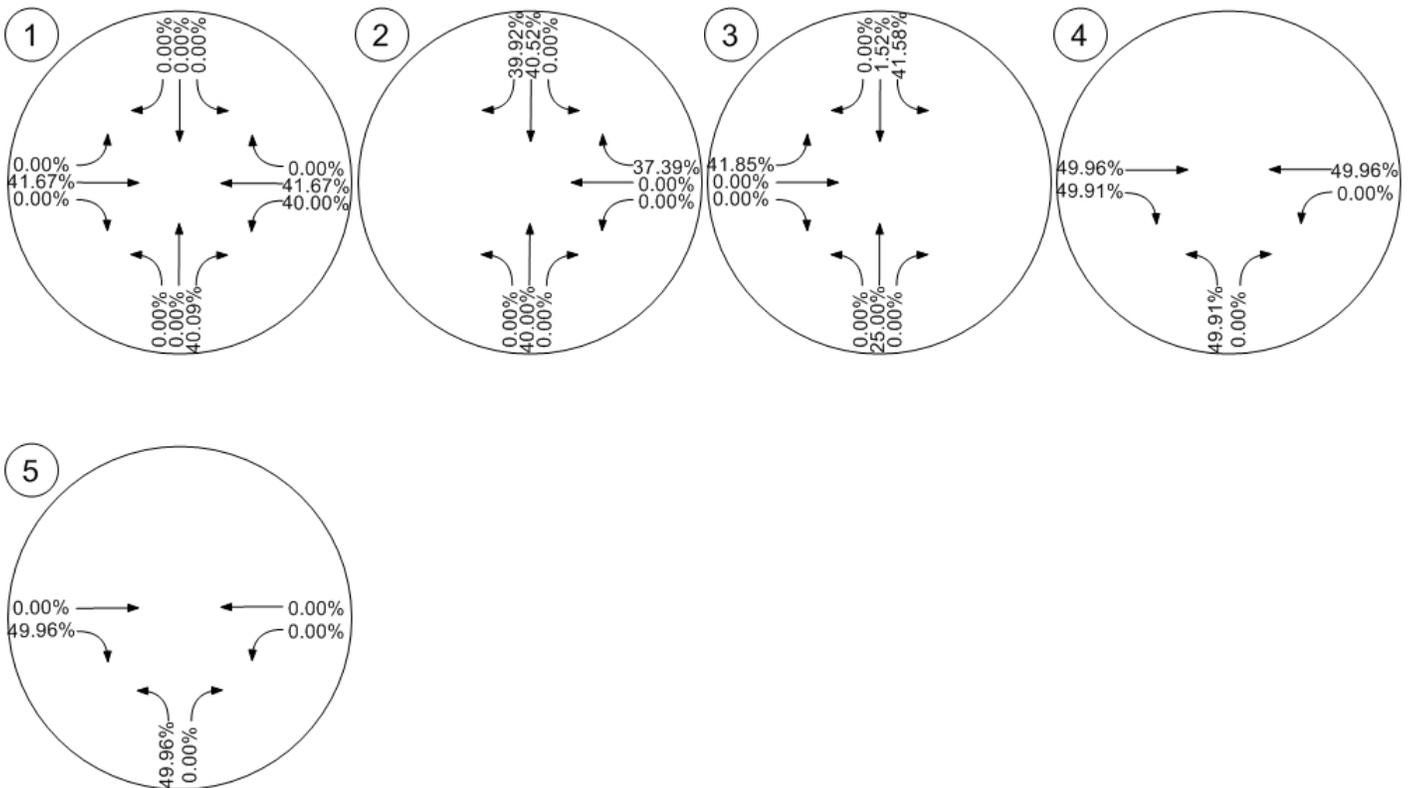
Fair Share - Fair Share Volumes - Zone 1: Project



Fair Share - Fair Share % of Net New Site - Zone 1: Project



Fair Share - Fair Share % of Total Analysis - Zone 1: Project



**Opening Year (2017) Without Project**

## Newberry Springs Service Station

Vistro File: J:\...\OY Fri.vistro

Scenario 1: Opening Year (2017) Without Project - Friday  
Evening Peak Hour

Report File: J:\...\OY Fri.pdf

6/23/2016

**Intersection Analysis Summary**

<b>ID</b>	<b>Intersection Name</b>	<b>Control Type</b>	<b>Method</b>	<b>Worst Mvmt</b>	<b>V/C</b>	<b>Delay (s/veh)</b>	<b>LOS</b>
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	WB Thru	0.001	9.2	A
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.019	9.3	A
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.016	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	10	1	0	0	0	0	1	0	0	1	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	1	0	0	0	0	1	0	0	1	1	0
Peak Hour Factor	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	0	0	0	0	0	0	0	0	0	0	0
Total Analysis Volume [veh/h]	15	1	0	0	0	0	1	0	0	1	1	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.22	0.00	0.00	7.20	0.00	0.00	8.70	9.20	8.30	8.70	9.21	8.31
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
95th-Percentile Queue Length [ft]	0.74	0.74	0.74	0.00	0.00	0.00	0.08	0.08	0.08	0.16	0.16	0.16
d_A, Approach Delay [s/veh]	6.77			2.40			8.70			8.95		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	7.10											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.019

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	3	7	0	0	3	7	0	0	0	9	11	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	7	0	0	3	7	0	0	0	9	11	4
Peak Hour Factor	0.7050	0.7050	0.7050	0.7050	0.7050	0.7050	1.0000	1.0000	1.0000	0.7050	0.7050	0.7050
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	2	0	0	1	2	0	0	0	3	4	1
Total Analysis Volume [veh/h]	4	10	0	0	4	10	0	0	0	13	16	6
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01
d_M, Delay for Movement [s/veh]	7.23	0.00	0.00	7.22	0.00	0.00	0.00	0.00	0.00	8.80	9.32	8.49
Movement LOS	A	A	A	A	A	A				A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.12	0.12
95th-Percentile Queue Length [ft]	0.65	0.65	0.65	0.00	0.00	0.00	0.00	0.00	0.00	2.90	2.90	2.90
d_A, Approach Delay [s/veh]	2.07			0.00			0.00			8.99		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.45											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	6	4	1	22	0	4	7	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	6	4	1	22	0	4	7	0	0	0	0
Peak Hour Factor	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	3	2	0	10	0	2	3	0	0	0	0
Total Analysis Volume [veh/h]	0	11	7	2	41	0	7	13	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

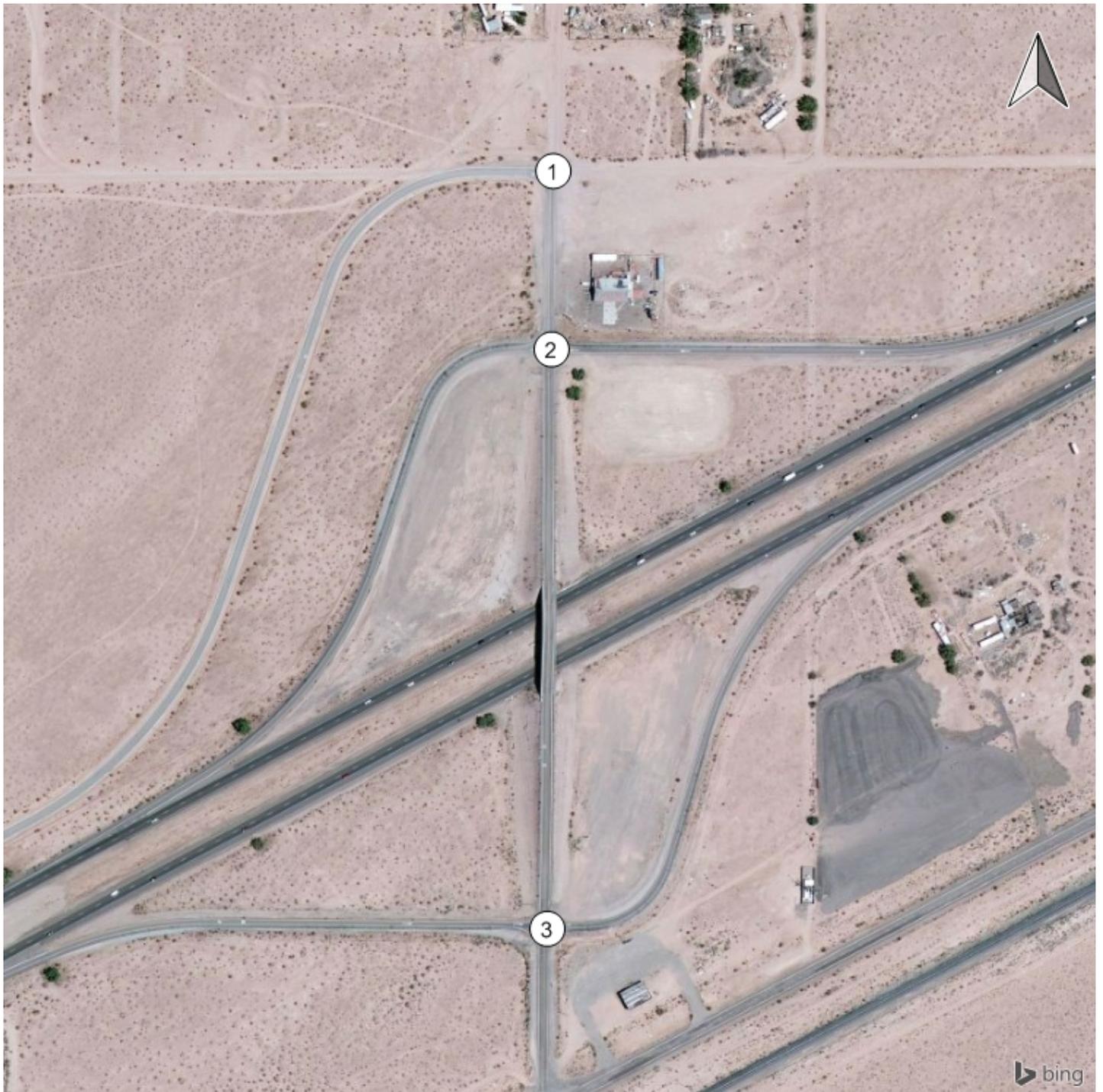
**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

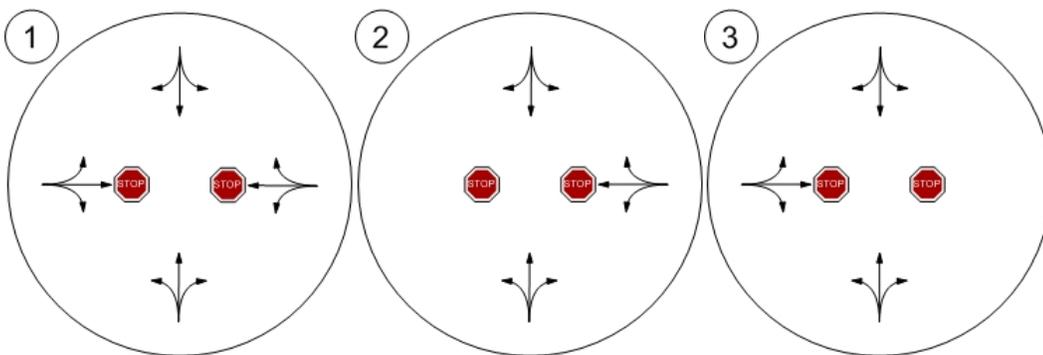
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.28	0.00	0.00	7.24	0.00	0.00	8.93	9.43	8.57	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	A	A	A			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.08	0.08	0.08	0.07	0.07	0.07	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	2.05	2.05	2.05	1.77	1.77	1.77	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.34			9.26			0.00		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	2.46											
Intersection LOS	A											

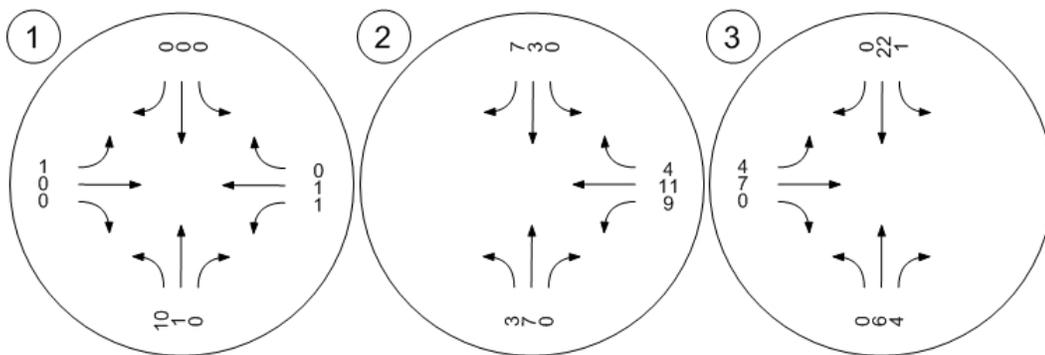
Study Intersections



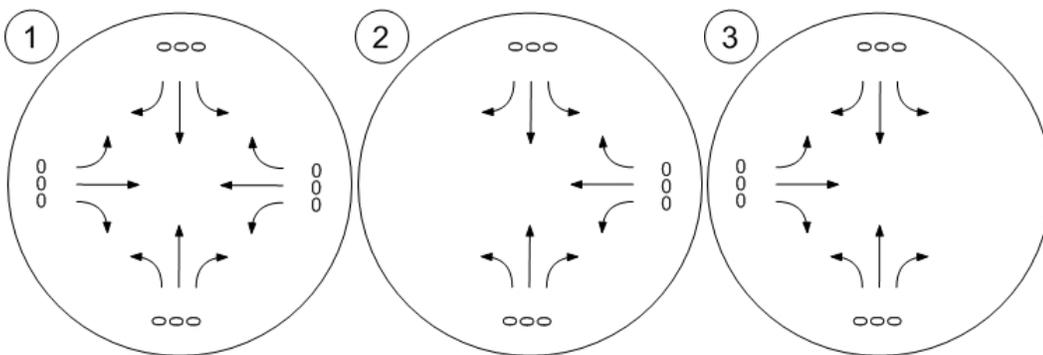
Lane Configuration and Traffic Control



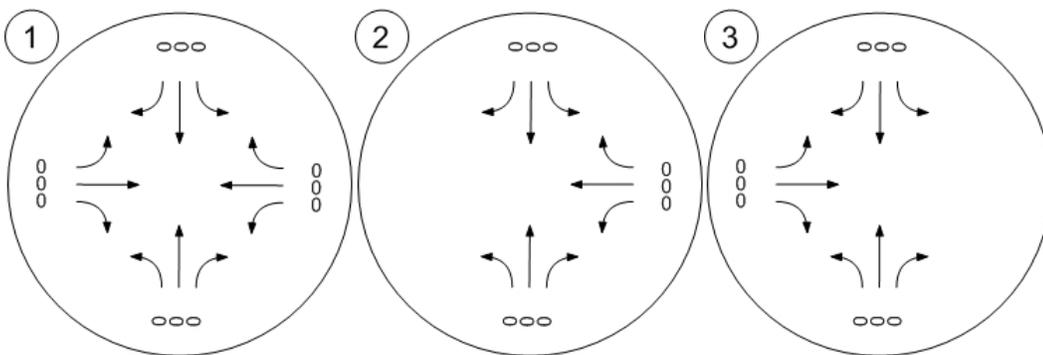
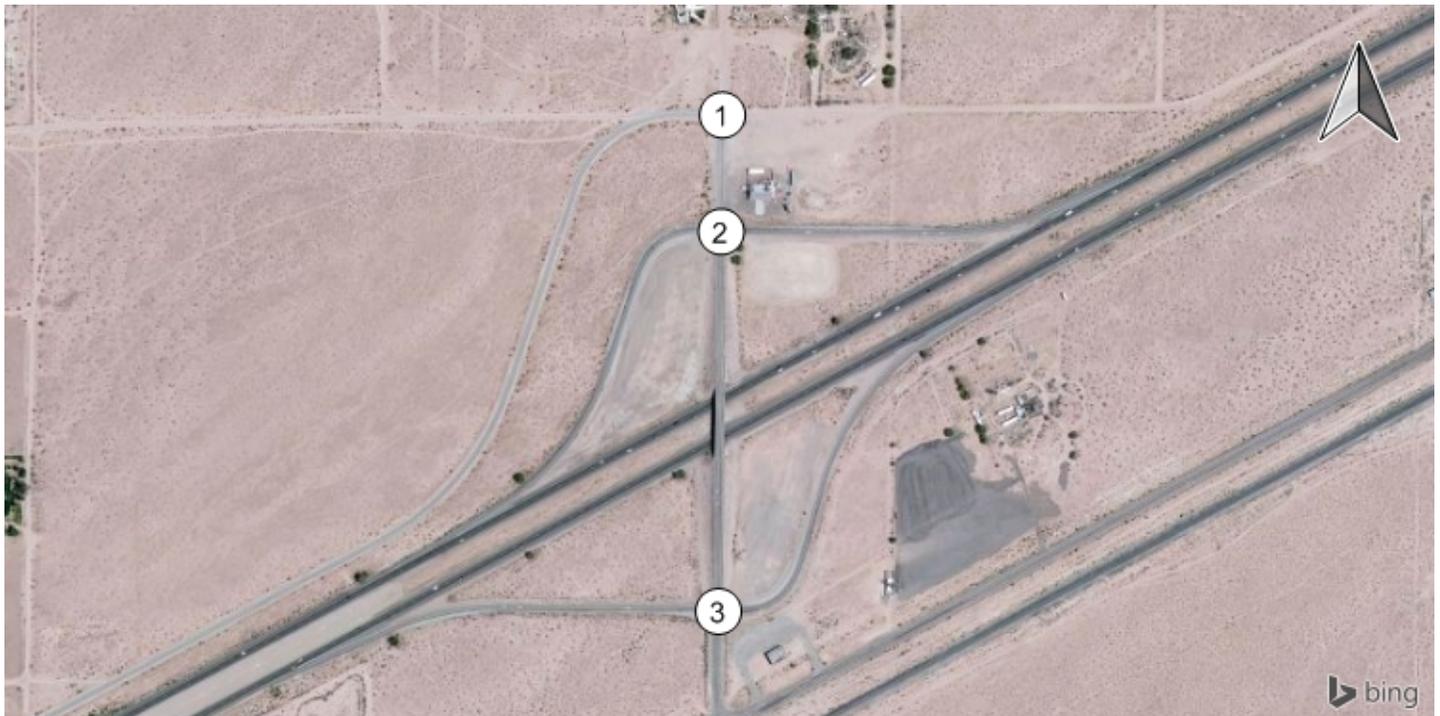
Traffic Volume - Base Volume



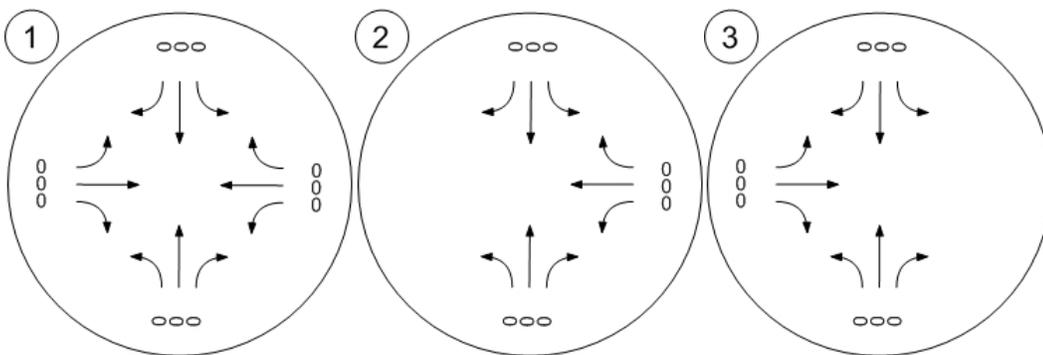
Traffic Volume - In-Process Volume



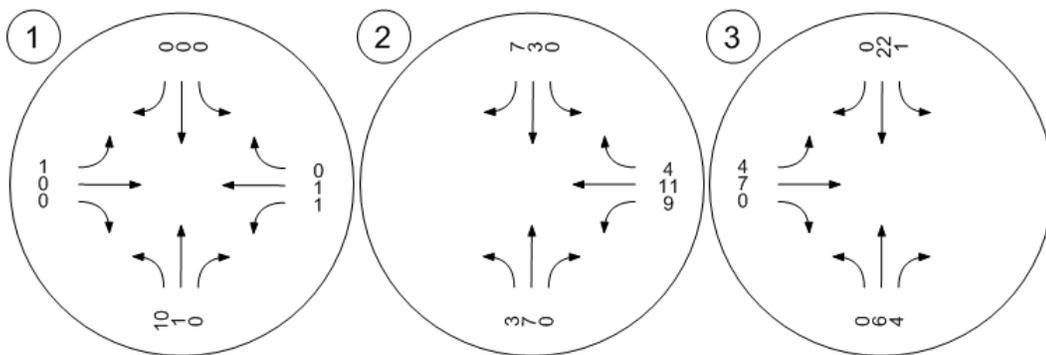
Traffic Volume - Net New Site Trips



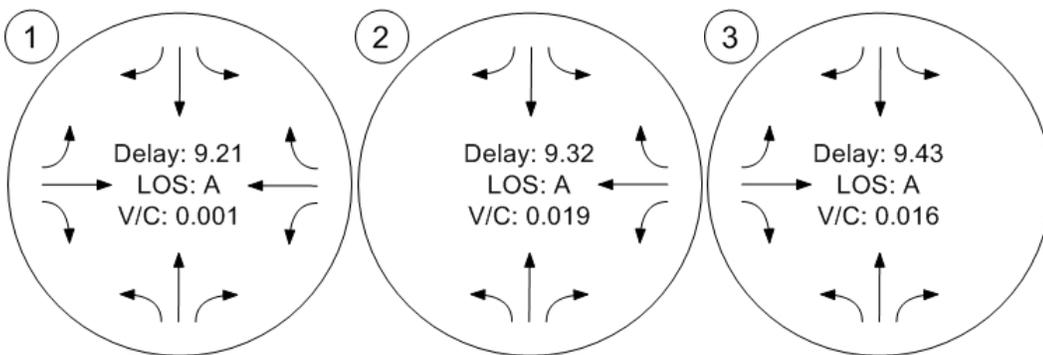
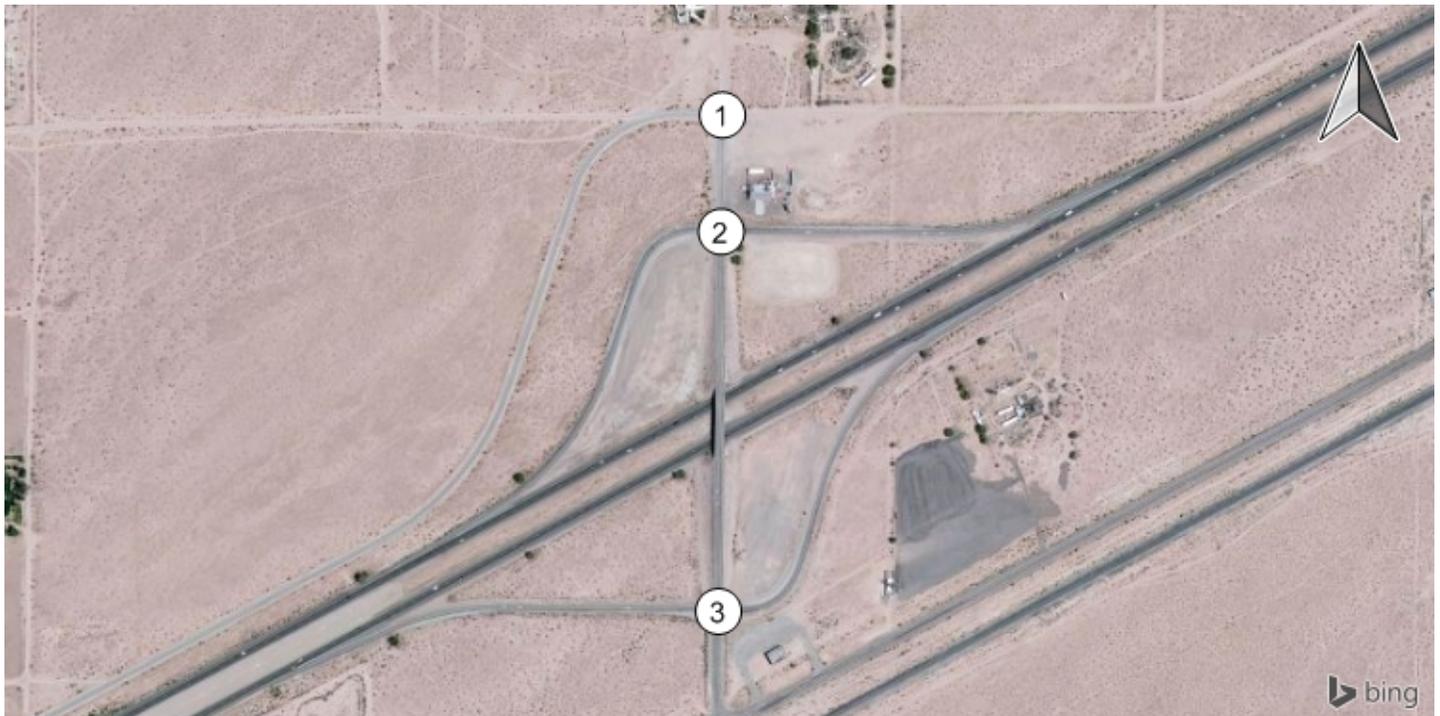
Traffic Volume - Other Volume



Traffic Volume - Future Total Volume



Traffic Conditions



## Newberry Springs Service Station

Vistro File: J:\...\OY Sun.vistro

Scenario 1: Opening Year (2017) Without Project - Sunday  
Mid-Day Peak Hour

Report File: J:\...\OY Sun.pdf

6/23/2016

**Intersection Analysis Summary**

<b>ID</b>	<b>Intersection Name</b>	<b>Control Type</b>	<b>Method</b>	<b>Worst Mvmt</b>	<b>V/C</b>	<b>Delay (s/veh)</b>	<b>LOS</b>
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	EB Thru	0.000	9.2	A
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.024	11.4	B
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.023	11.6	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	10	2	0	0	1	1	0	0	4	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	2	0	0	1	1	0	0	4	0	0	0
Peak Hour Factor	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	0	0	0	0	0	0	1	0	0	0
Total Analysis Volume [veh/h]	15	3	0	0	1	1	0	0	6	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.22	0.00	0.00	7.21	0.00	0.00	8.73	9.23	8.32	8.75	9.22	8.31
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.03	0.00	0.00	0.00	0.02	0.02	0.02	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.84	0.84	0.84	0.00	0.00	0.00	0.42	0.42	0.42	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	6.02			0.00			8.32			8.76		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	6.09											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	11.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.024

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	3	9	0	0	9	11	0	0	0	257	16	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	9	0	0	9	11	0	0	0	257	16	14
Peak Hour Factor	0.7950	0.7950	0.7950	0.7950	0.7950	0.7950	1.0000	1.0000	1.0000	0.7950	0.7950	0.7950
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	3	0	0	3	3	0	0	0	81	5	4
Total Analysis Volume [veh/h]	4	11	0	0	11	14	0	0	0	323	20	18
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.02	0.02
d_M, Delay for Movement [s/veh]	7.25	0.00	0.00	7.22	0.00	0.00	0.00	0.00	0.00	10.90	11.43	10.54
Movement LOS	A	A	A	A	A	A				B	B	B
95th-Percentile Queue Length [veh]	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	1.74	1.74	1.74
95th-Percentile Queue Length [ft]	0.71	0.71	0.71	0.00	0.00	0.00	0.00	0.00	0.00	43.56	43.56	43.56
d_A, Approach Delay [s/veh]	1.93			0.00			0.00			10.91		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	9.89											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.023

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	7	5	6	255	0	5	10	8	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	7	5	6	255	0	5	10	8	0	0	0
Peak Hour Factor	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	2	2	2	80	0	2	3	3	0	0	0
Total Analysis Volume [veh/h]	0	9	6	8	320	0	6	13	10	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

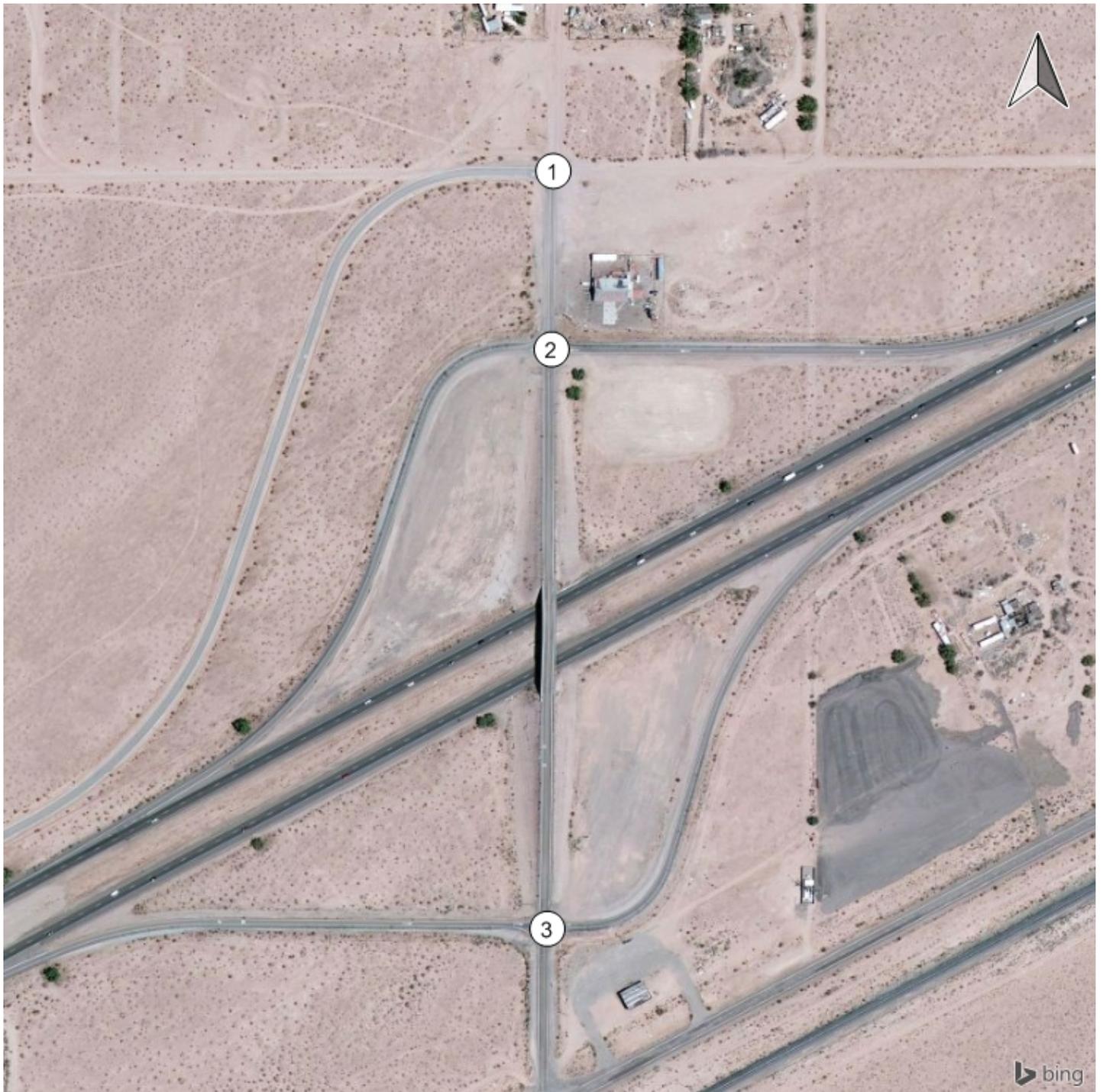
**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

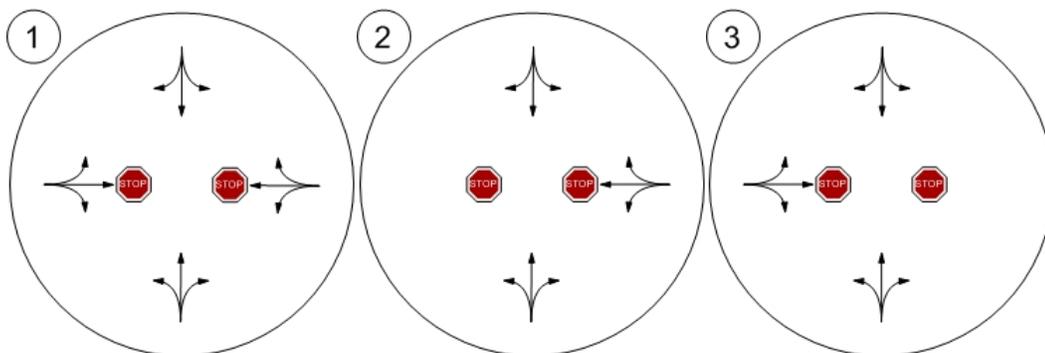
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.88	0.00	0.00	7.24	0.00	0.00	11.21	11.56	10.24	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	B	B	B			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.76	0.76	0.76	0.15	0.15	0.15	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	19.01	19.01	19.01	3.64	3.64	3.64	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.18			11.03			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	1.02											
Intersection LOS	B											

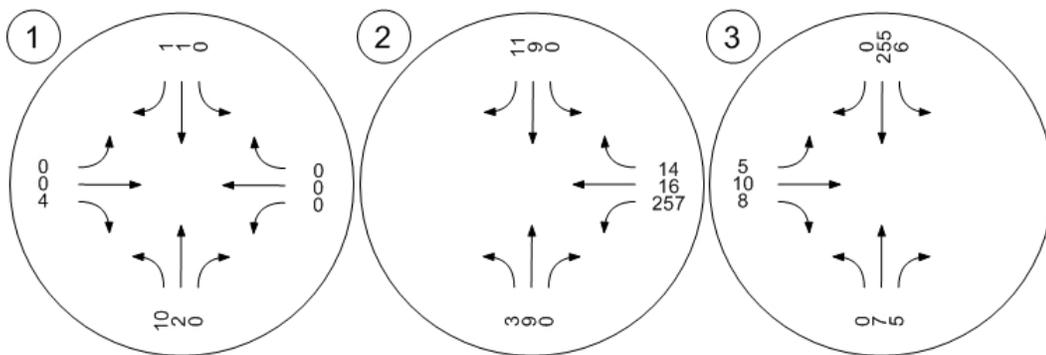
Study Intersections



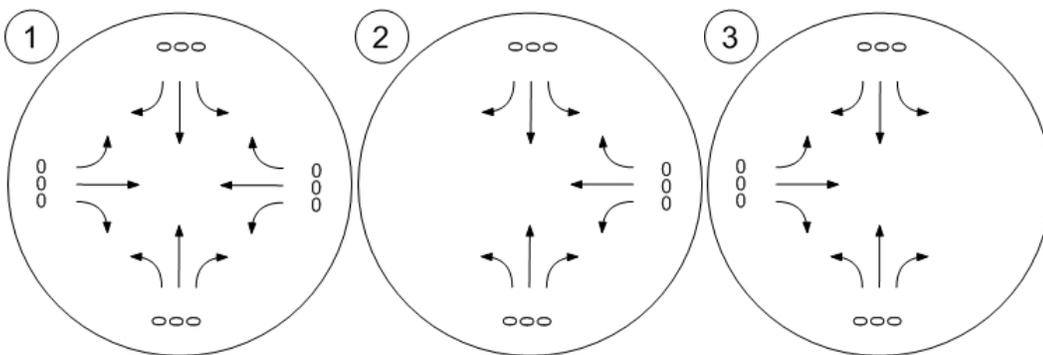
Lane Configuration and Traffic Control



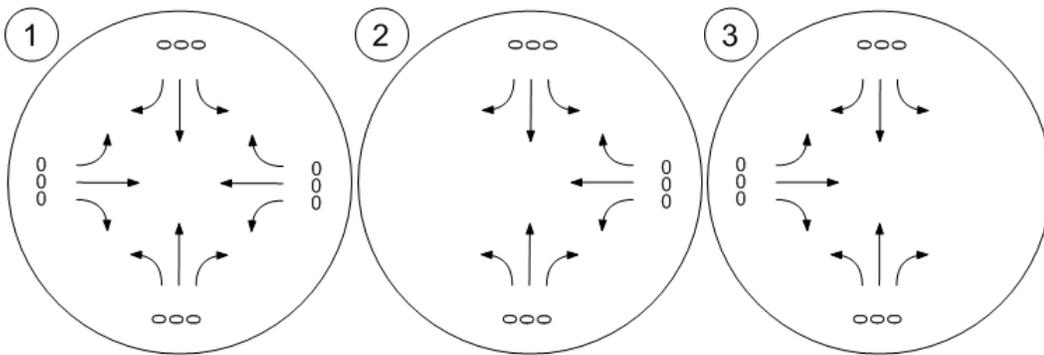
Traffic Volume - Base Volume



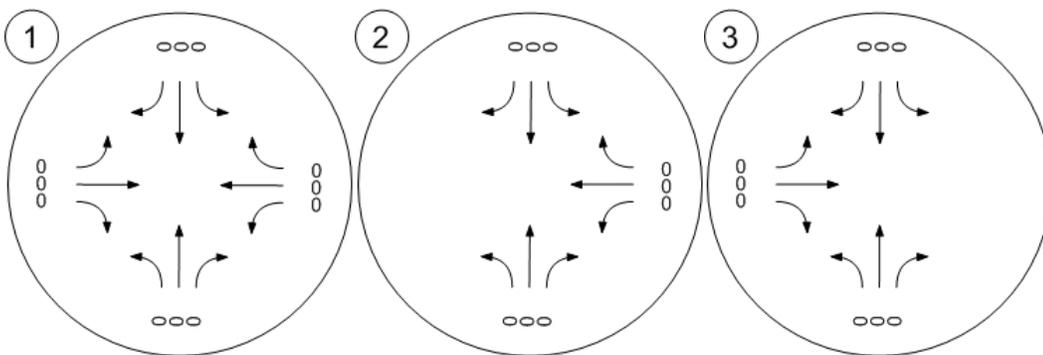
Traffic Volume - In-Process Volume



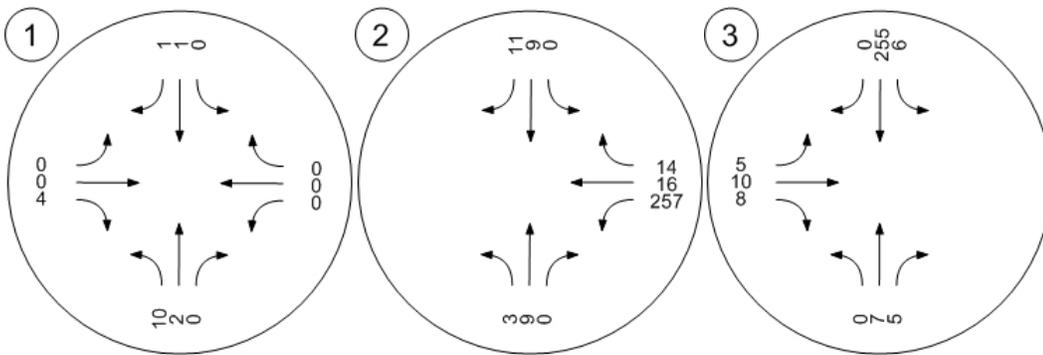
Traffic Volume - Net New Site Trips



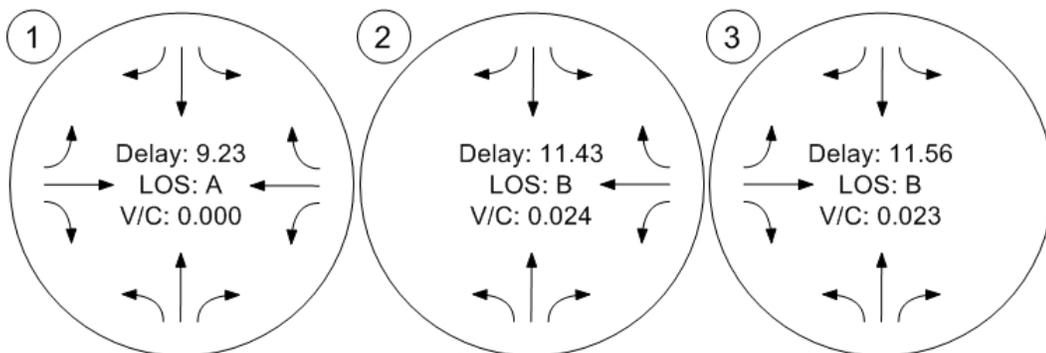
Traffic Volume - Other Volume



Traffic Volume - Future Total Volume



Traffic Conditions



**Opening Year (2017) With Project**

## Newberry Springs Service Station

Vistro File: J:\...\OY Fri.vistro

Scenario 2: Opening Year (2017) With Project - Friday  
Evening Peak Hour

Report File: J:\...\OYP Fri.pdf

6/23/2016

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	WB Thru	0.011	10.4	B
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.024	10.8	B
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.020	11.6	B
4	Project West Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.034	9.4	A
5	Project East Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.067	8.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.011

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	10	1	0	0	0	0	1	0	0	1	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	91	0	0	0	0	5	0	90	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	1	91	0	0	0	1	5	0	91	6	0
Peak Hour Factor	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	0	34	0	0	0	0	2	0	34	2	0
Total Analysis Volume [veh/h]	15	1	136	0	0	0	1	7	0	136	9	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.16	0.01	0.00
d_M, Delay for Movement [s/veh]	7.22	0.00	0.00	7.47	0.00	0.00	9.20	10.04	8.35	9.98	10.41	9.44
Movement LOS	A	A	A	A	A	A	A	B	A	A	B	A
95th-Percentile Queue Length [veh]	0.31	0.31	0.31	0.00	0.00	0.00	0.03	0.03	0.03	0.60	0.60	0.60
95th-Percentile Queue Length [ft]	7.67	7.67	7.67	0.00	0.00	0.00	0.82	0.82	0.82	15.02	15.02	15.02
d_A, Approach Delay [s/veh]	0.71			2.49			9.93			10.00		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	5.37											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	10.8
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.024

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	3	7	0	0	3	7	0	0	0	9	11	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	48	0	0	47	43	0	0	0	0	0	43
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	55	0	0	50	50	0	0	0	9	11	47
Peak Hour Factor	0.7050	0.7050	0.7050	0.7050	0.7050	0.7050	1.0000	1.0000	1.0000	0.7050	0.7050	0.7050
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	20	0	0	18	18	0	0	0	3	4	17
Total Analysis Volume [veh/h]	4	78	0	0	71	71	0	0	0	13	16	67
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.07
d_M, Delay for Movement [s/veh]	7.48	0.00	0.00	7.35	0.00	0.00	0.00	0.00	0.00	10.17	10.84	9.14
Movement LOS	A	A	A	A	A	A				B	B	A
95th-Percentile Queue Length [veh]	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.36	0.36
95th-Percentile Queue Length [ft]	4.48	4.48	4.48	0.00	0.00	0.00	0.00	0.00	0.00	9.09	9.09	9.09
d_A, Approach Delay [s/veh]	0.37			0.00			0.00			9.56		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	2.96											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.020

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	6	4	1	22	0	4	7	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	5	0	42	5	0	43	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	11	4	43	27	0	47	7	0	0	0	0
Peak Hour Factor	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	0.5420	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	5	2	20	12	0	22	3	0	0	0	0
Total Analysis Volume [veh/h]	0	20	7	79	50	0	87	13	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.05	0.00	0.00	0.12	0.02	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.29	0.00	0.00	7.37	0.00	0.00	11.03	11.55	9.40	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	B	B	A			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.26	0.26	0.26	0.50	0.50	0.50	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	6.57	6.57	6.57	12.62	12.62	12.62	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			4.51			11.10			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	6.61											
Intersection LOS	B											

**Intersection Level Of Service Report**

**Intersection 4: Project West Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.034

**Intersection Setup**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	29	0	67	29	0	66
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	67	29	0	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	17	7	0	17
Total Analysis Volume [veh/h]	29	0	67	29	0	66
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.39	8.81	0.00	0.00	7.38	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.11	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	2.65	2.65	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.39		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.43					
Intersection LOS	A					

**Intersection Level Of Service Report**

**Intersection 5: Project East Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.067

**Intersection Setup**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	66	0	0	67	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	0	0	67	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	0	0	17	0	0
Total Analysis Volume [veh/h]	66	0	0	67	0	0
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

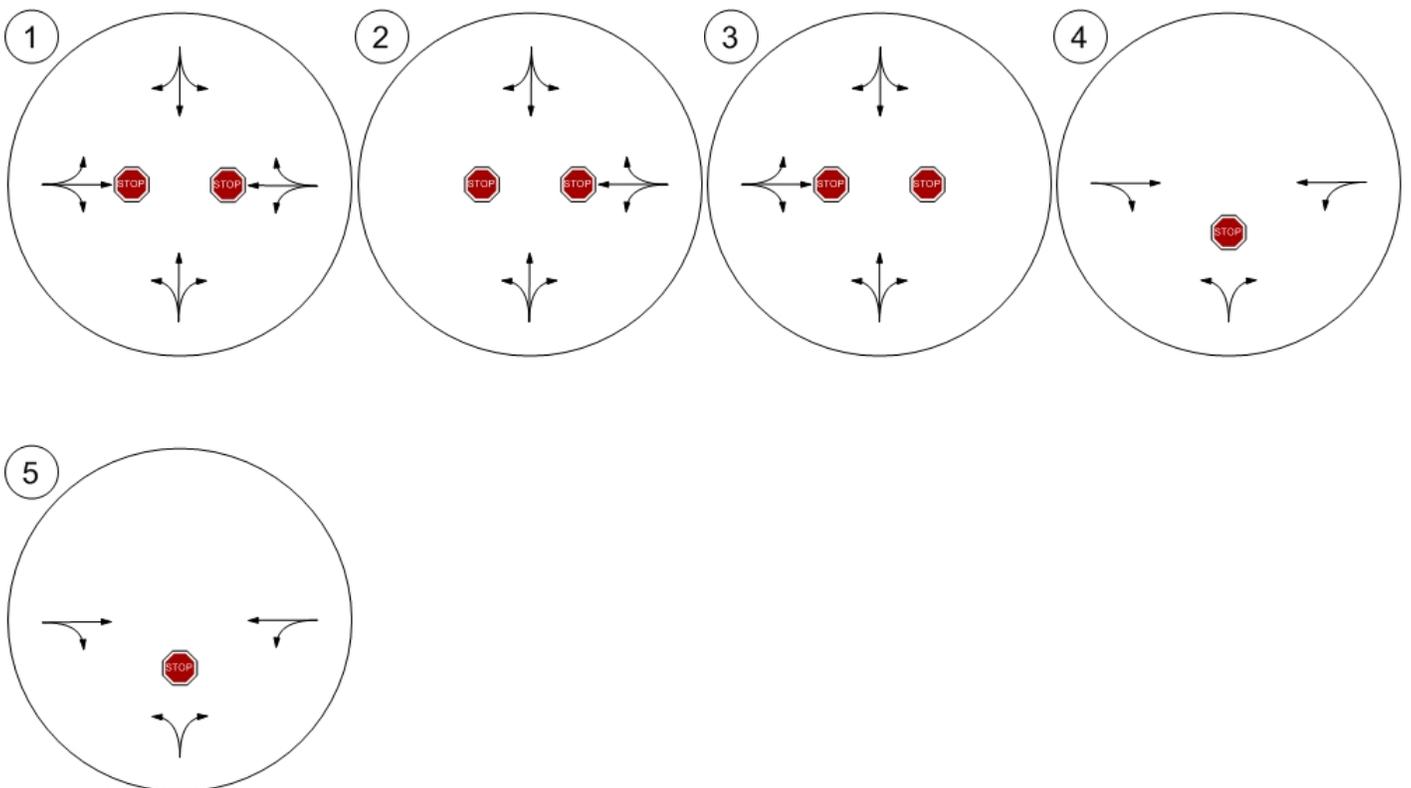
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.92	8.71	0.00	0.00	7.33	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.22	0.22	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	5.38	5.38	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.92		0.00		3.66	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.43					
Intersection LOS	A					

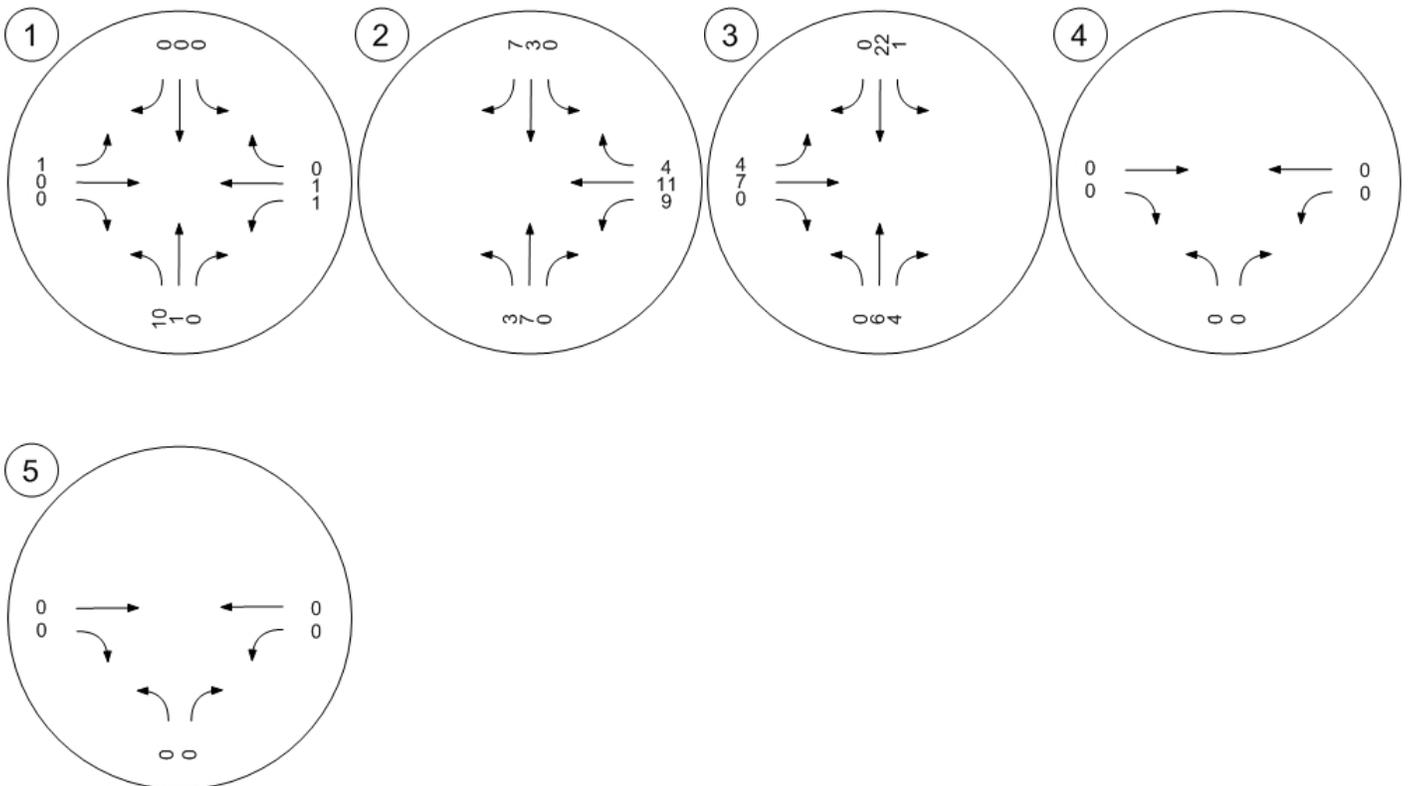
Study Intersections



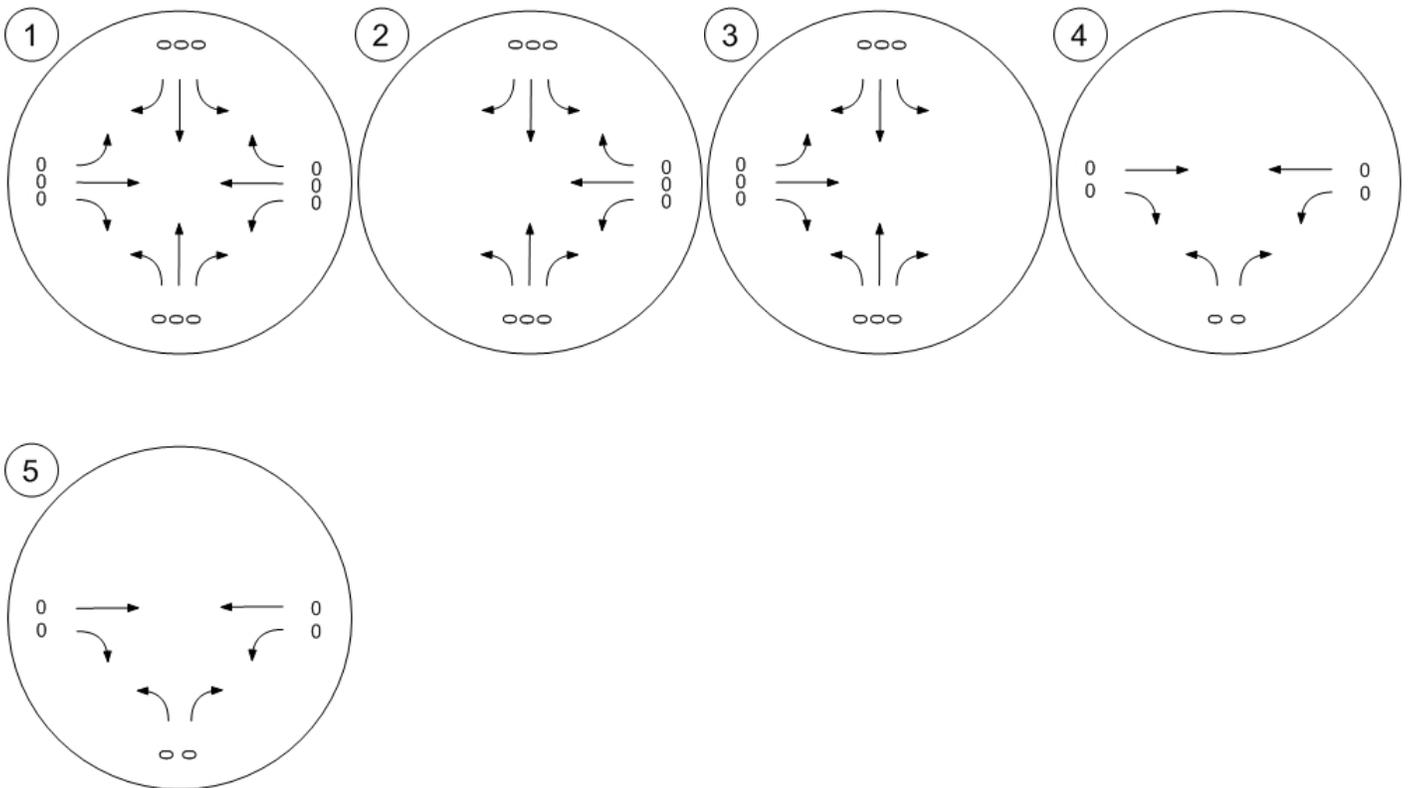
Lane Configuration and Traffic Control



Traffic Volume - Base Volume

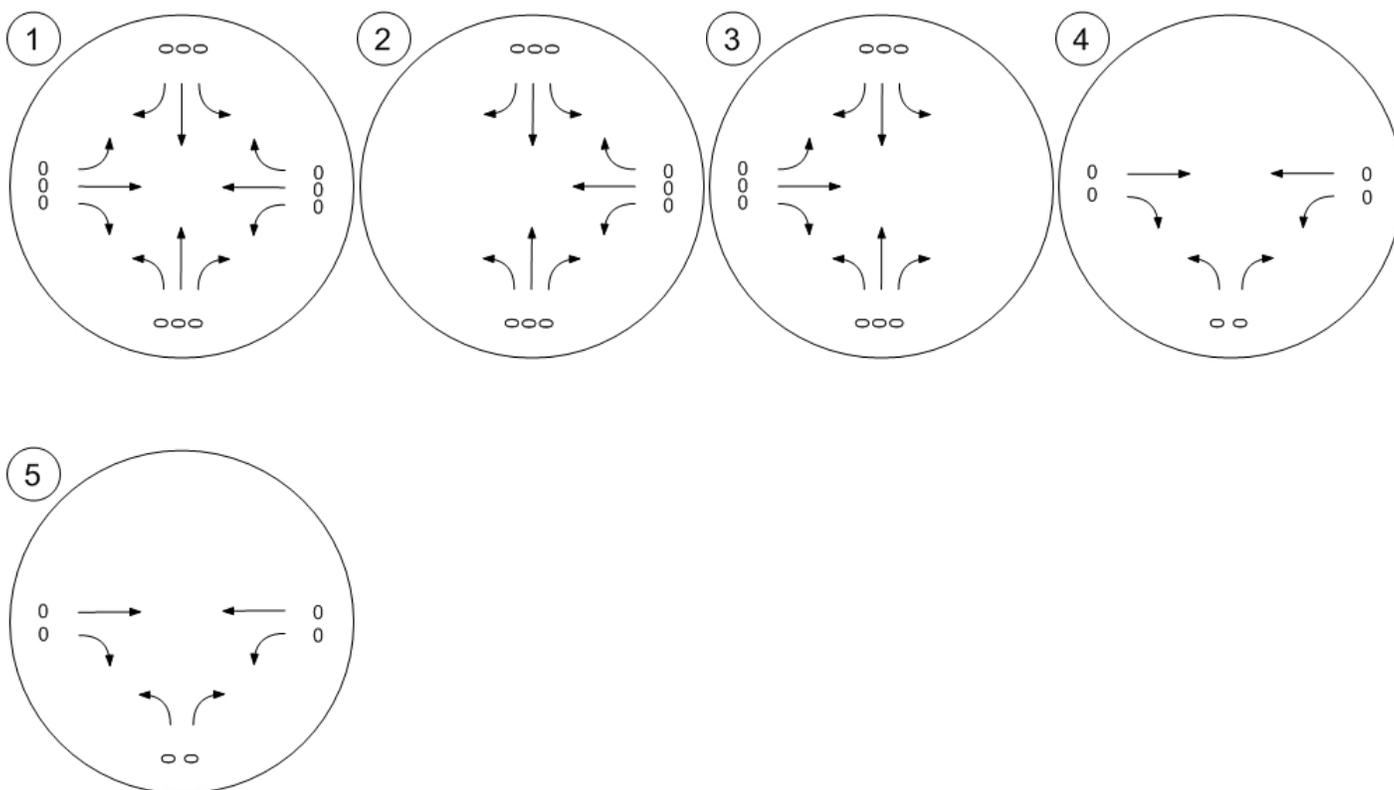


Traffic Volume - In-Process Volume

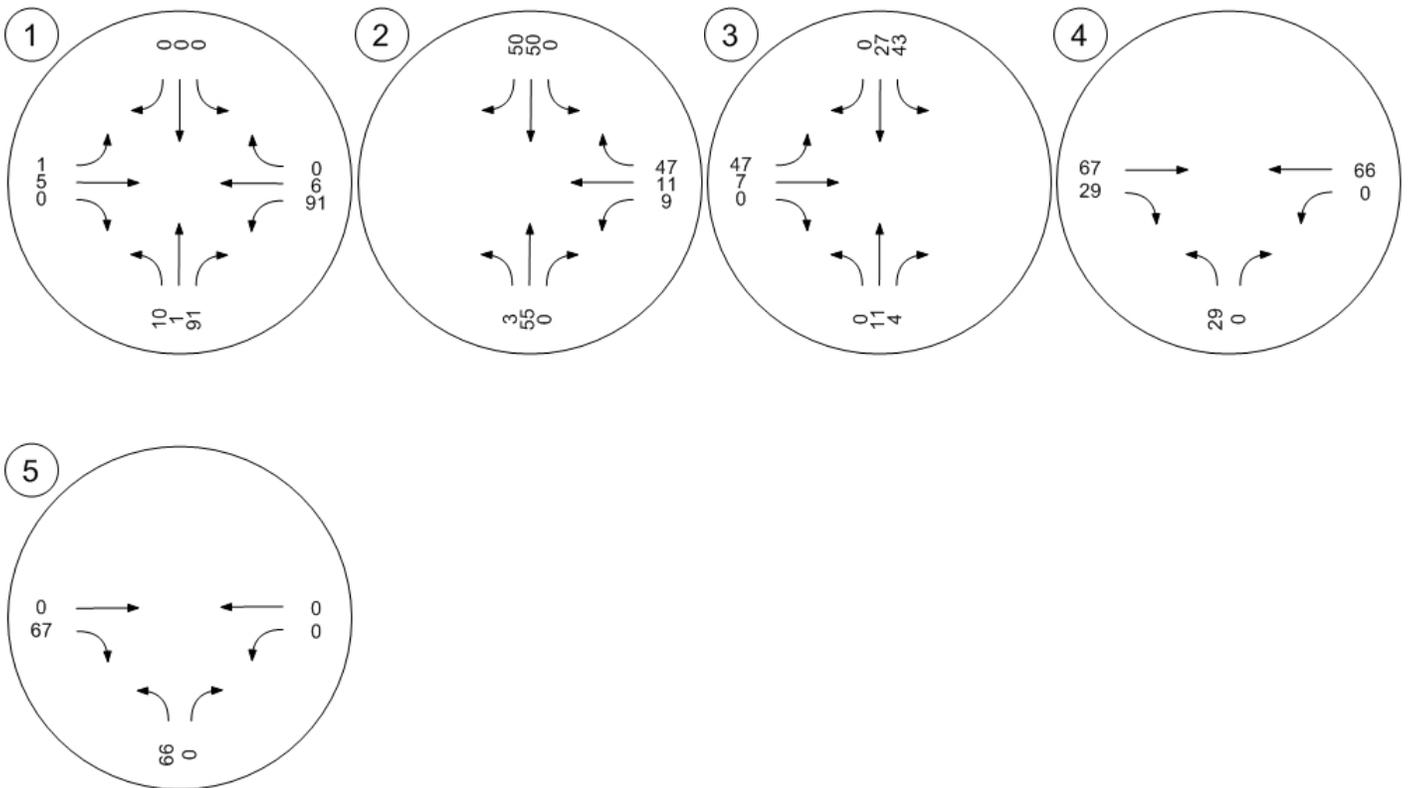




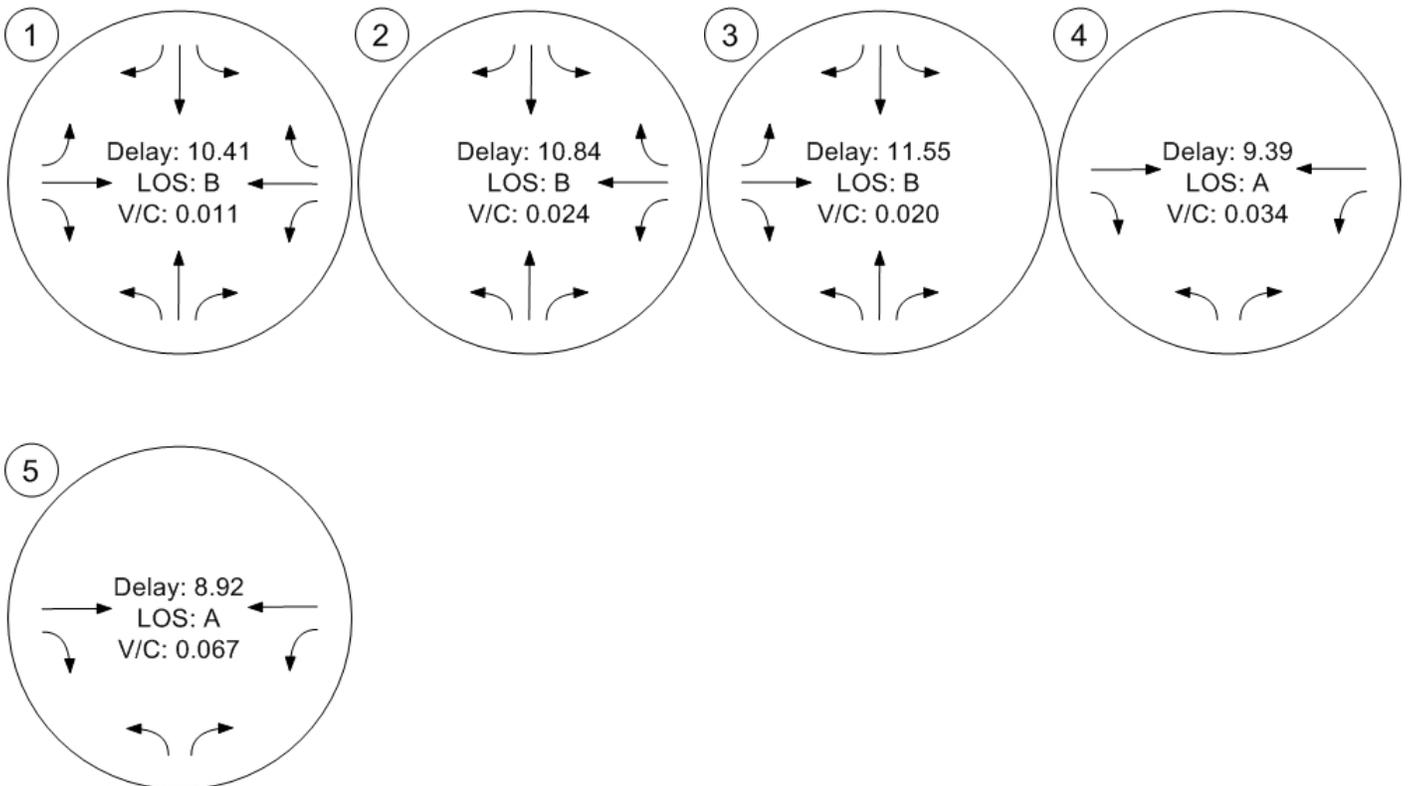
Traffic Volume - Other Volume



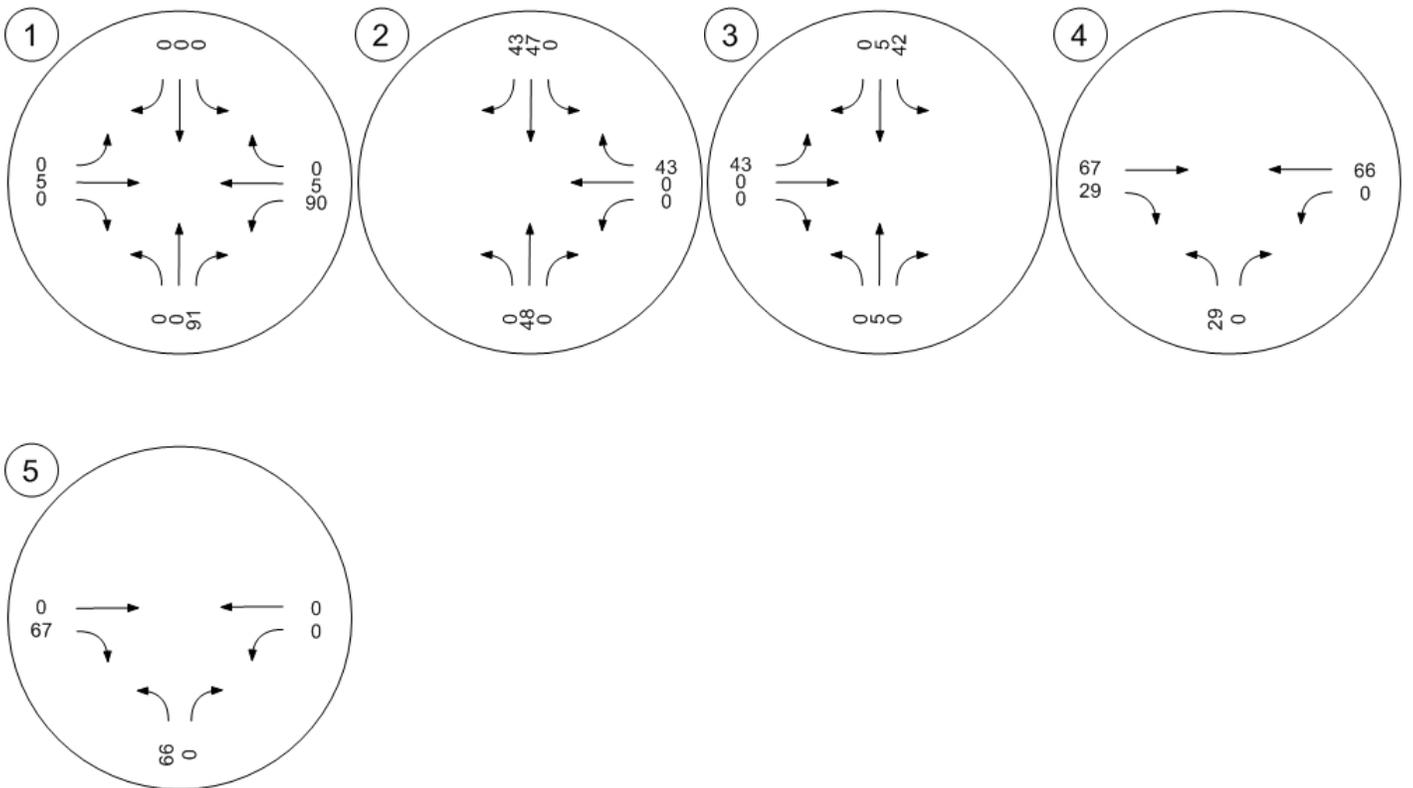
Traffic Volume - Future Total Volume



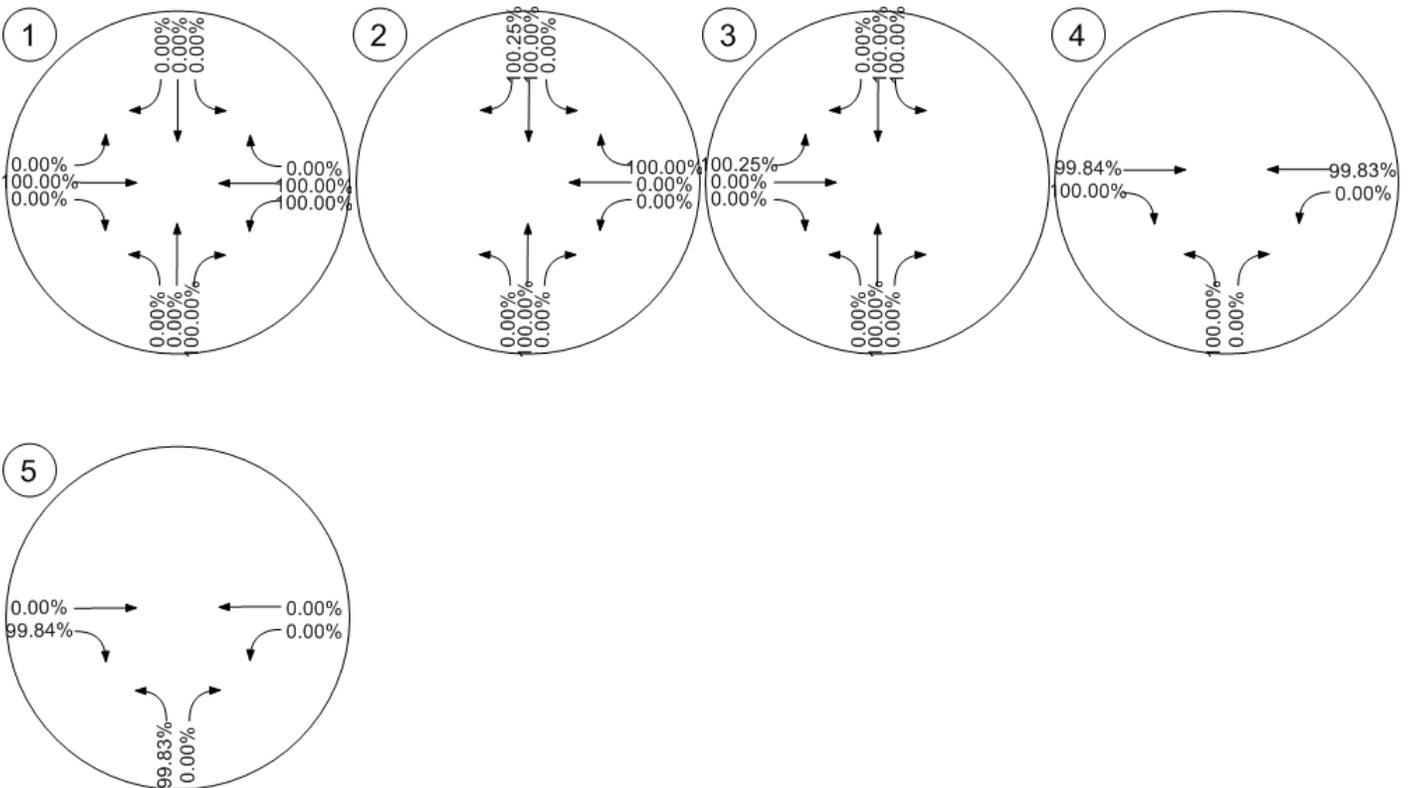
Traffic Conditions



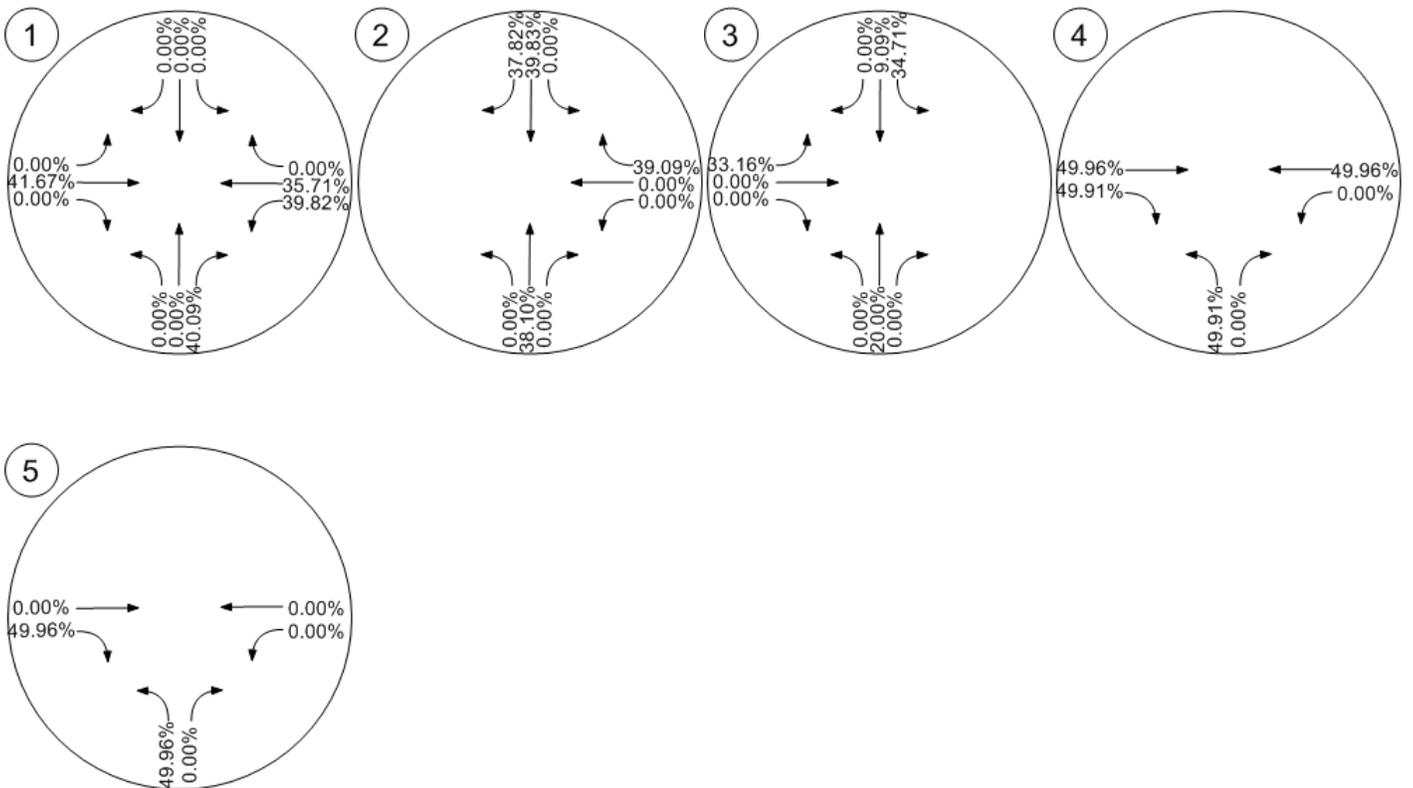
Fair Share - Fair Share Volumes - Zone 1: Project



Fair Share - Fair Share % of Net New Site - Zone 1: Project



Fair Share - Fair Share % of Total Analysis - Zone 1: Project



## Newberry Springs Service Station

Vistro File: J:\...\OY Sun.vistro

Scenario 2: Opening Year (2017) With Project - Sunday Mid-Day Peak Hour

Report File: J:\...\OYP Sun.pdf

6/23/2016

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	WB Thru	0.009	10.4	B
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.029	14.9	B
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.027	14.0	B
4	Project West Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.034	9.4	A
5	Project East Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.067	8.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	10	2	0	0	1	1	0	0	4	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	91	0	0	0	0	5	0	90	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	2	91	0	1	1	0	5	4	90	5	0
Peak Hour Factor	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670	0.6670
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	34	0	0	0	0	2	1	34	2	0
Total Analysis Volume [veh/h]	15	3	136	0	1	1	0	7	6	135	7	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.16	0.01	0.00
d_M, Delay for Movement [s/veh]	7.22	0.00	0.00	7.47	0.00	0.00	9.22	10.07	8.37	10.05	10.44	9.45
Movement LOS	A	A	A	A	A	A	A	B	A	B	B	A
95th-Percentile Queue Length [veh]	0.31	0.31	0.31	0.00	0.00	0.00	0.05	0.05	0.05	0.60	0.60	0.60
95th-Percentile Queue Length [ft]	7.79	7.79	7.79	0.00	0.00	0.00	1.16	1.16	1.16	14.89	14.89	14.89
d_A, Approach Delay [s/veh]	0.70			0.00			9.29			10.06		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	5.33											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	14.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.029

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	3	9	0	0	9	11	0	0	0	257	16	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	48	0	0	47	43	0	0	0	0	0	43
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	57	0	0	56	54	0	0	0	257	16	57
Peak Hour Factor	0.7950	0.7950	0.7950	0.7950	0.7950	0.7950	1.0000	1.0000	1.0000	0.7950	0.7950	0.7950
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	18	0	0	18	17	0	0	0	81	5	18
Total Analysis Volume [veh/h]	4	72	0	0	70	68	0	0	0	323	20	72
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.03	0.07
d_M, Delay for Movement [s/veh]	7.48	0.00	0.00	7.34	0.00	0.00	0.00	0.00	0.00	14.29	14.95	13.28
Movement LOS	A	A	A	A	A	A				B	B	B
95th-Percentile Queue Length [veh]	0.16	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	3.01	3.01	3.01
95th-Percentile Queue Length [ft]	4.12	4.12	4.12	0.00	0.00	0.00	0.00	0.00	0.00	75.27	75.27	75.27
d_A, Approach Delay [s/veh]	0.39			0.00			0.00			14.14		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	9.38											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	14.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.027

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	7	5	6	255	0	5	10	8	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	5	0	42	5	0	43	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	12	5	48	260	0	48	10	8	0	0	0
Peak Hour Factor	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	2	15	81	0	15	3	3	0	0	0
Total Analysis Volume [veh/h]	0	15	6	60	326	0	60	13	10	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.04	0.00	0.00	0.12	0.03	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.89	0.00	0.00	7.33	0.00	0.00	13.66	13.97	11.37	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	B	B	B			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.94	0.94	0.94	0.58	0.58	0.58	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	23.55	23.55	23.55	14.44	14.44	14.44	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			1.14			13.43			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	3.17											
Intersection LOS	B											

**Intersection Level Of Service Report**

**Intersection 4: Project West Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.034

**Intersection Setup**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	29	0	67	29	0	66
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	67	29	0	66
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	17	7	0	17
Total Analysis Volume [veh/h]	29	0	67	29	0	66
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.39	8.81	0.00	0.00	7.38	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.11	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	2.65	2.65	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.39		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.43					
Intersection LOS	A					

**Intersection Level Of Service Report**

**Intersection 5: Project East Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.067

**Intersection Setup**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	66	0	0	67	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	0	0	67	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	0	0	17	0	0
Total Analysis Volume [veh/h]	66	0	0	67	0	0
Pedestrian Volume [ped/h]	0		0		0	

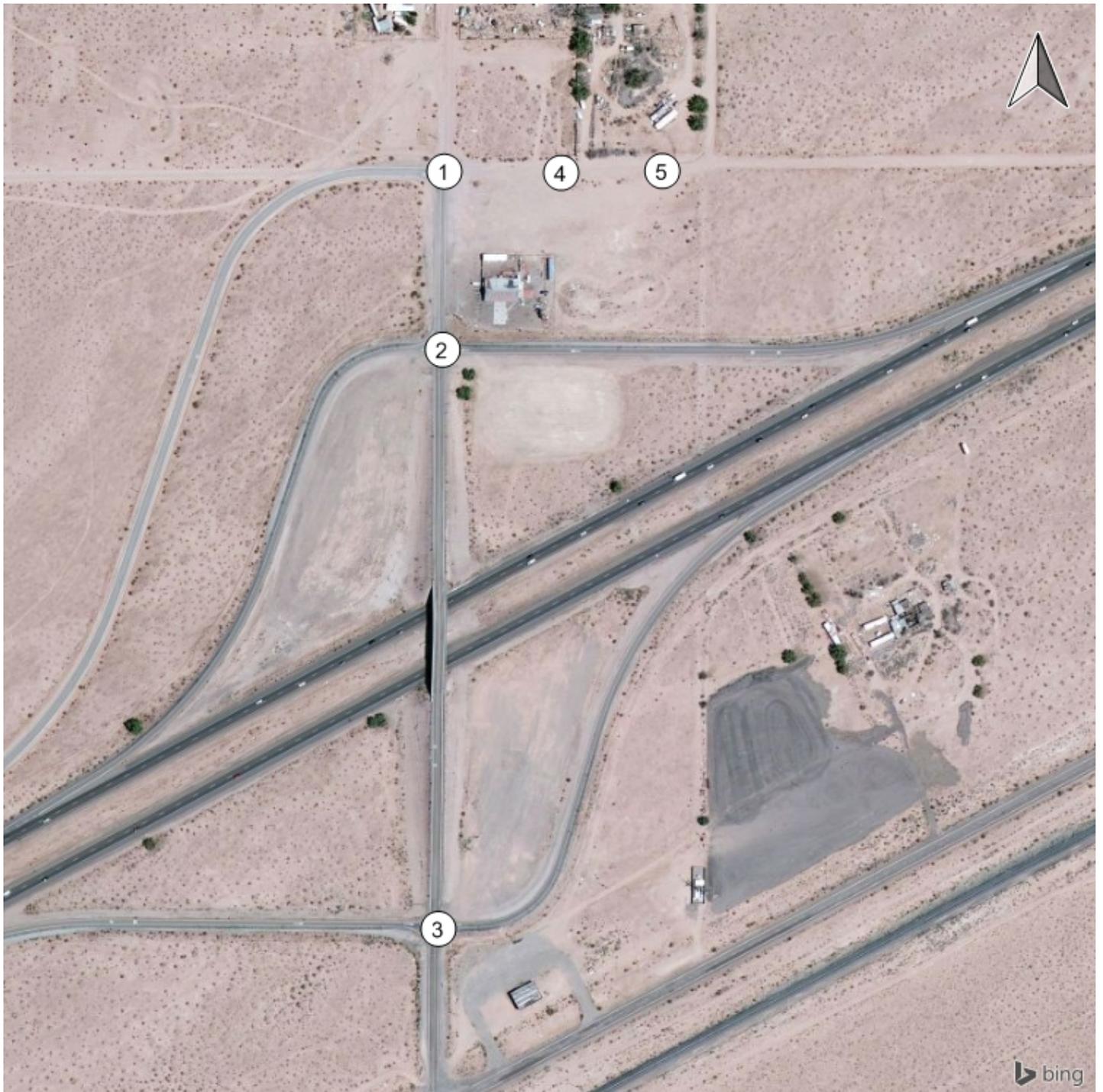
**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

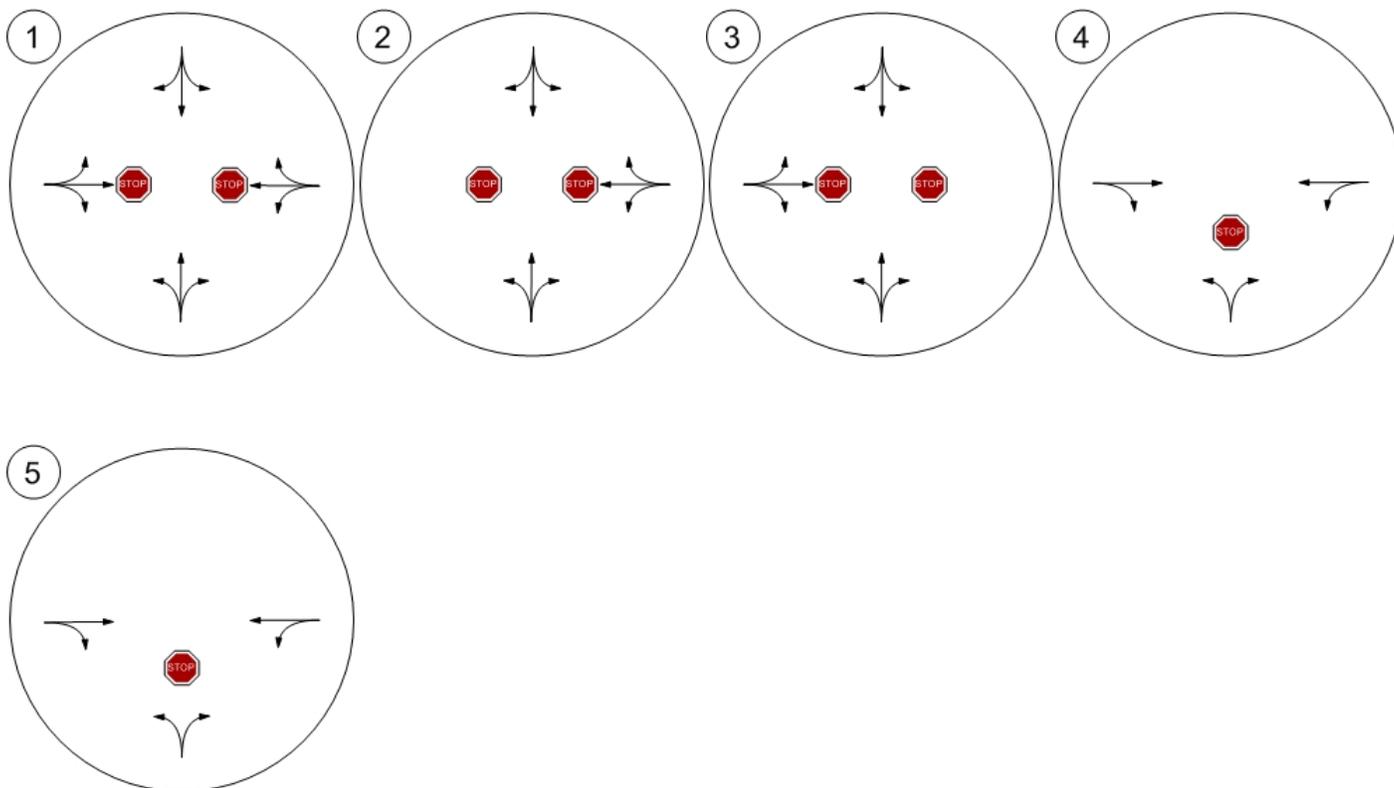
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.92	8.71	0.00	0.00	7.33	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.22	0.22	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	5.38	5.38	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.92		0.00		3.66	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.43					
Intersection LOS	A					

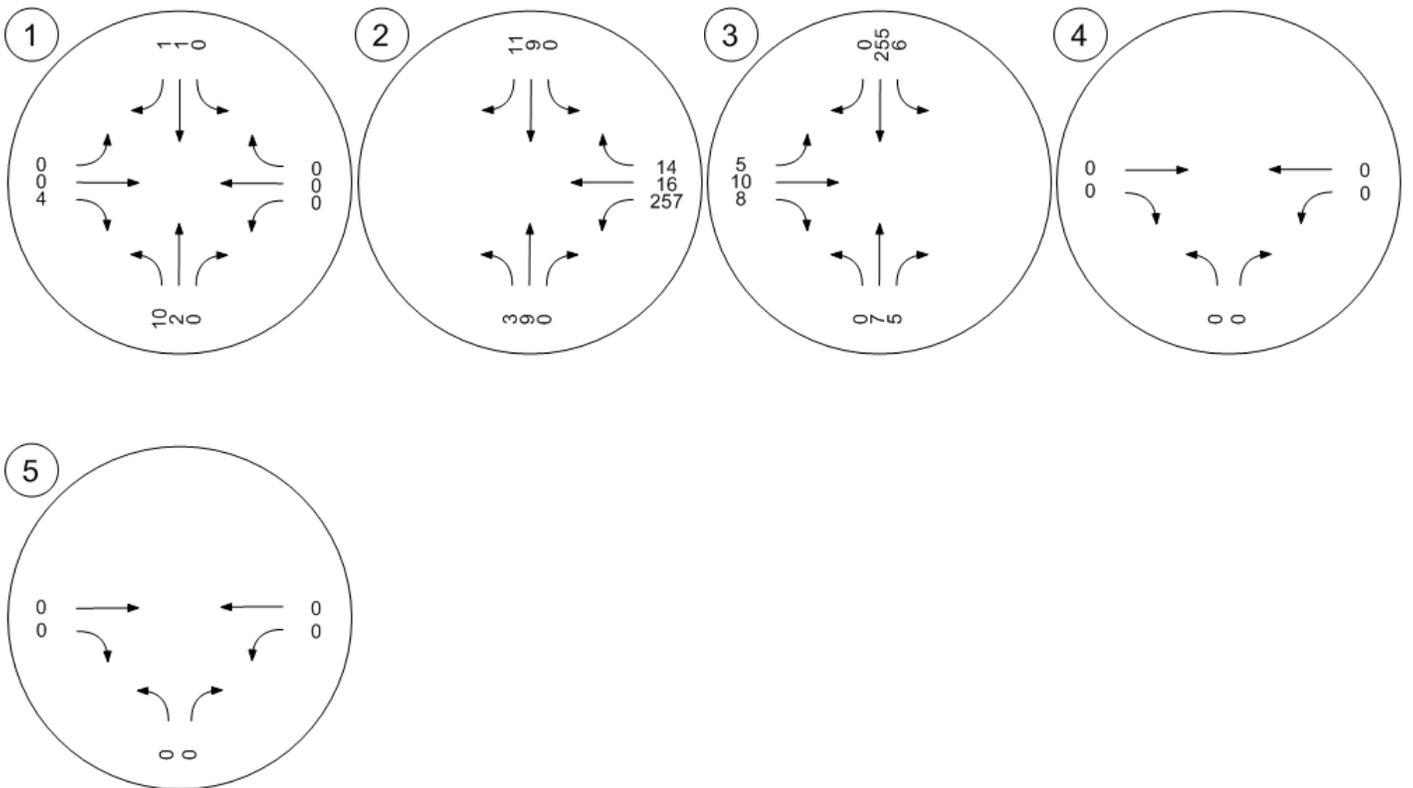
Study Intersections



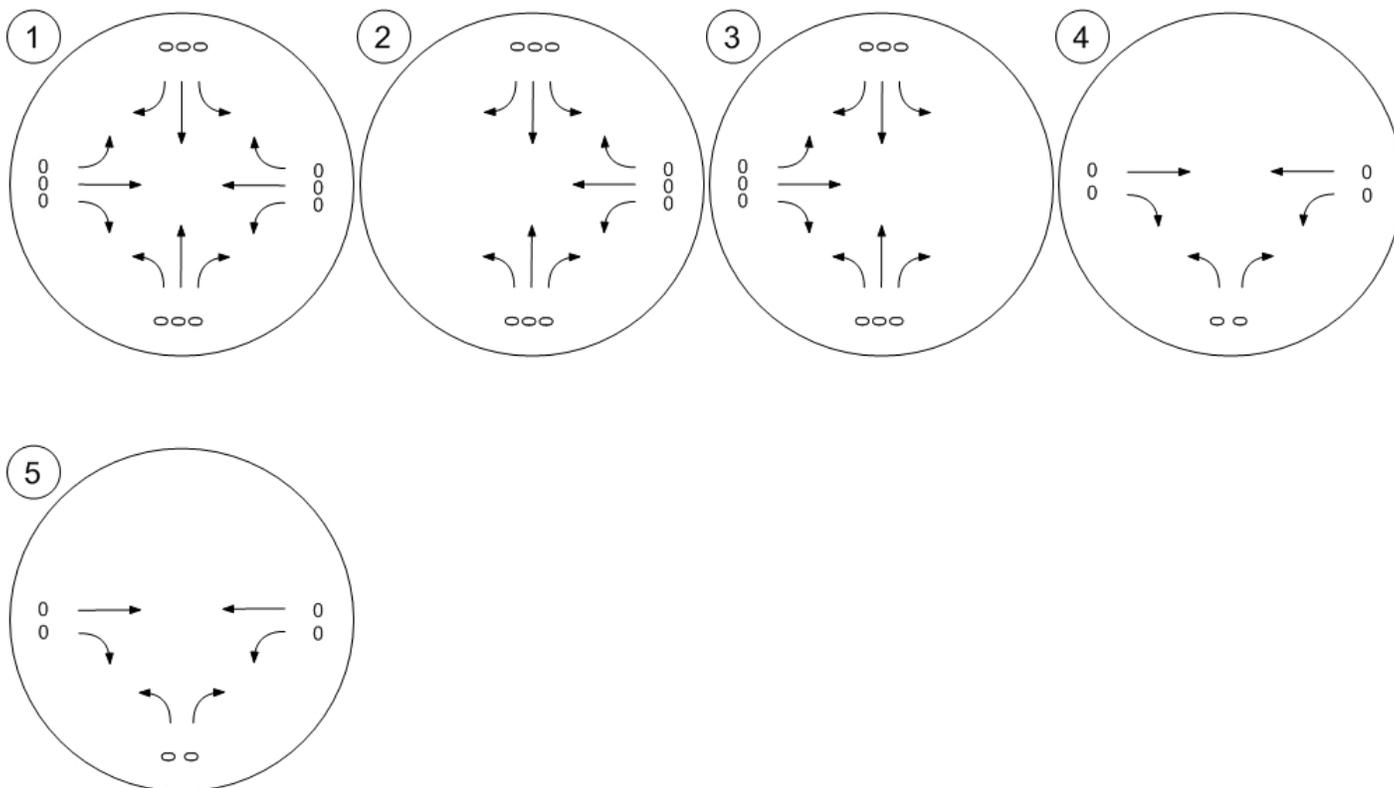
Lane Configuration and Traffic Control



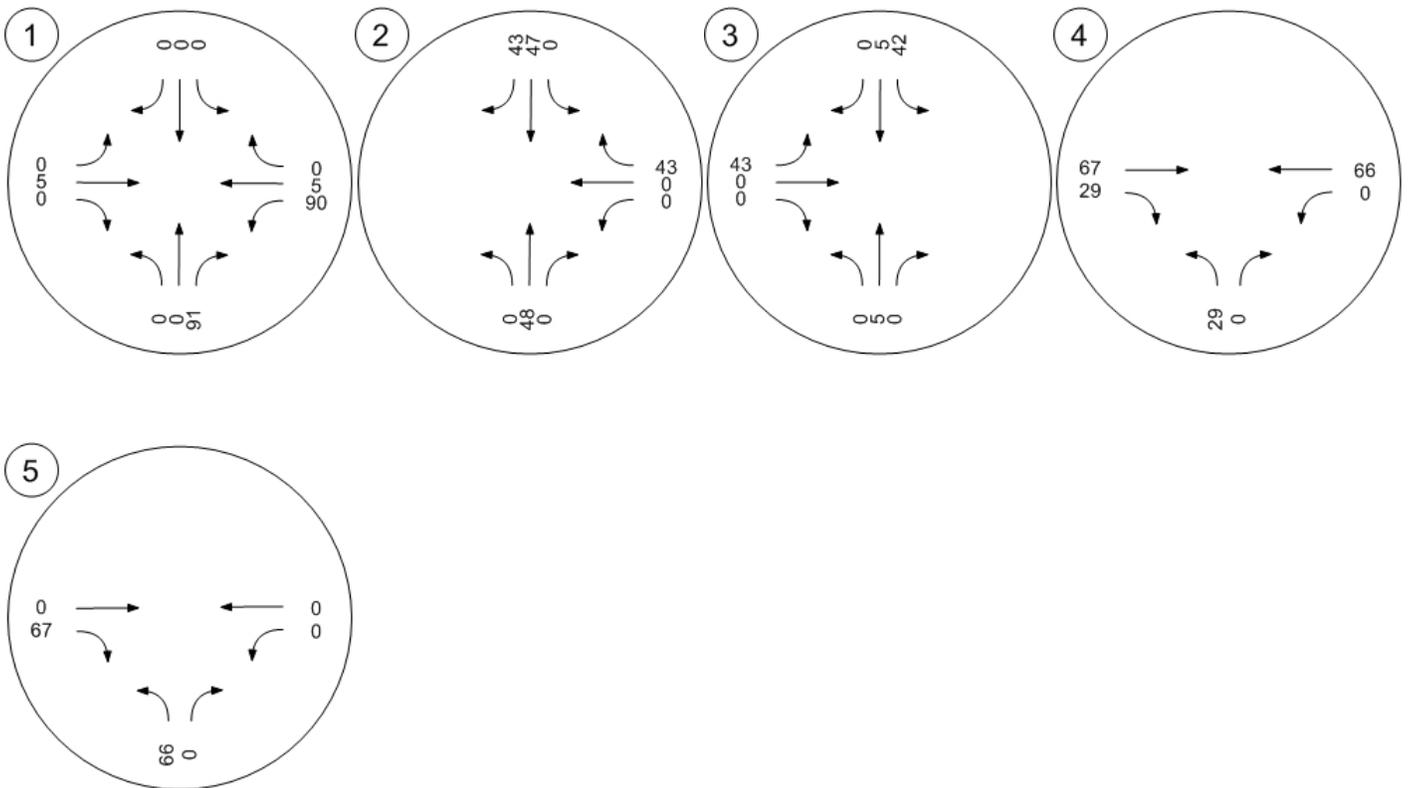
Traffic Volume - Base Volume



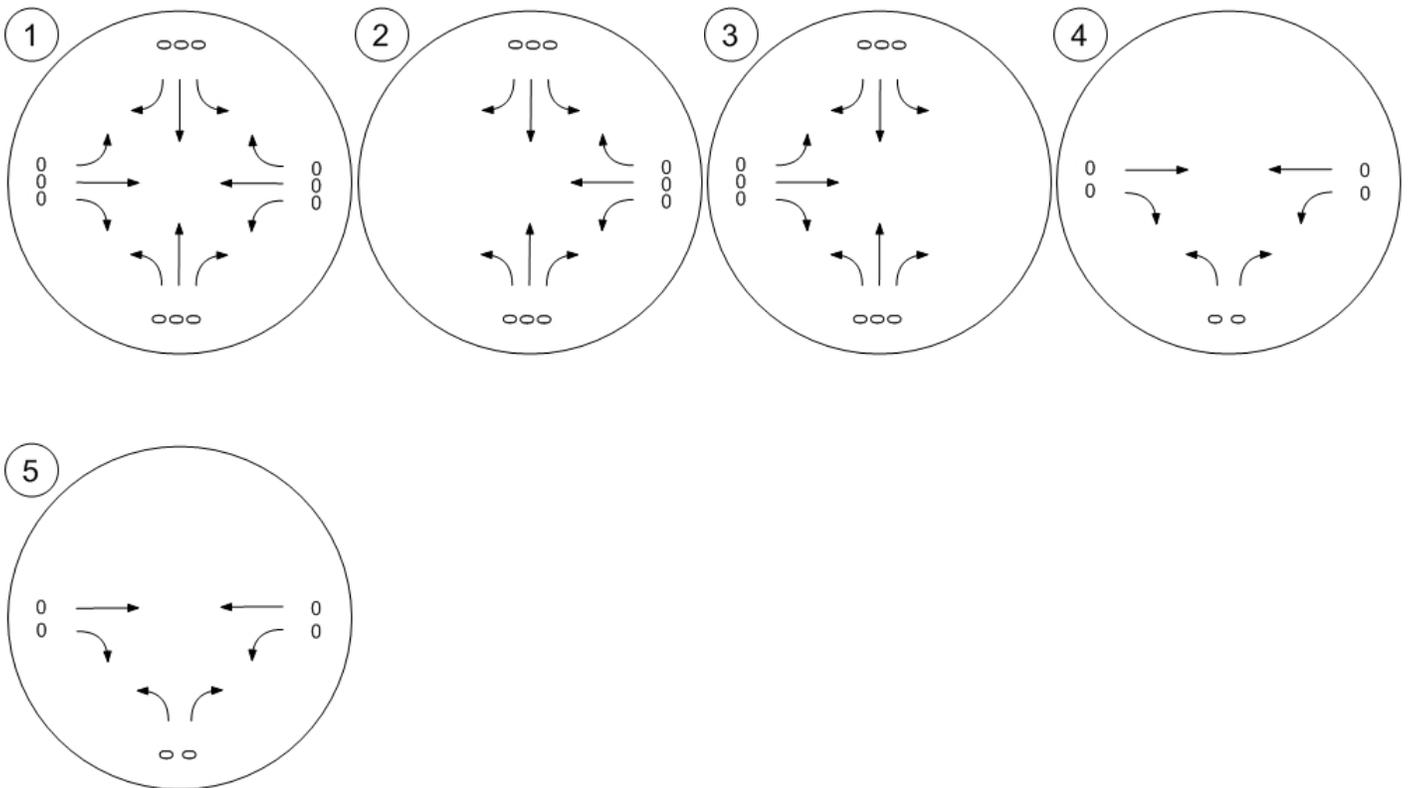
Traffic Volume - In-Process Volume



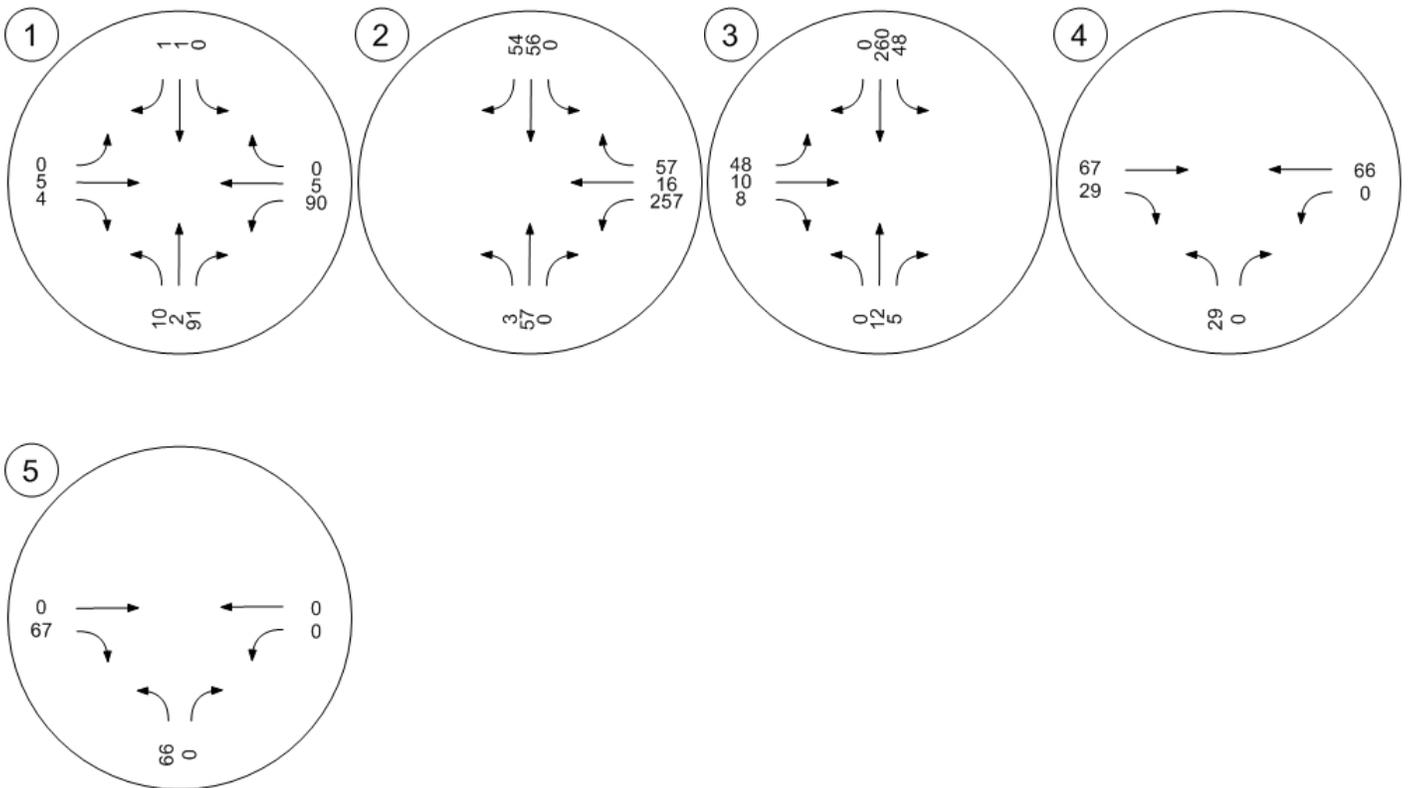
Traffic Volume - Net New Site Trips



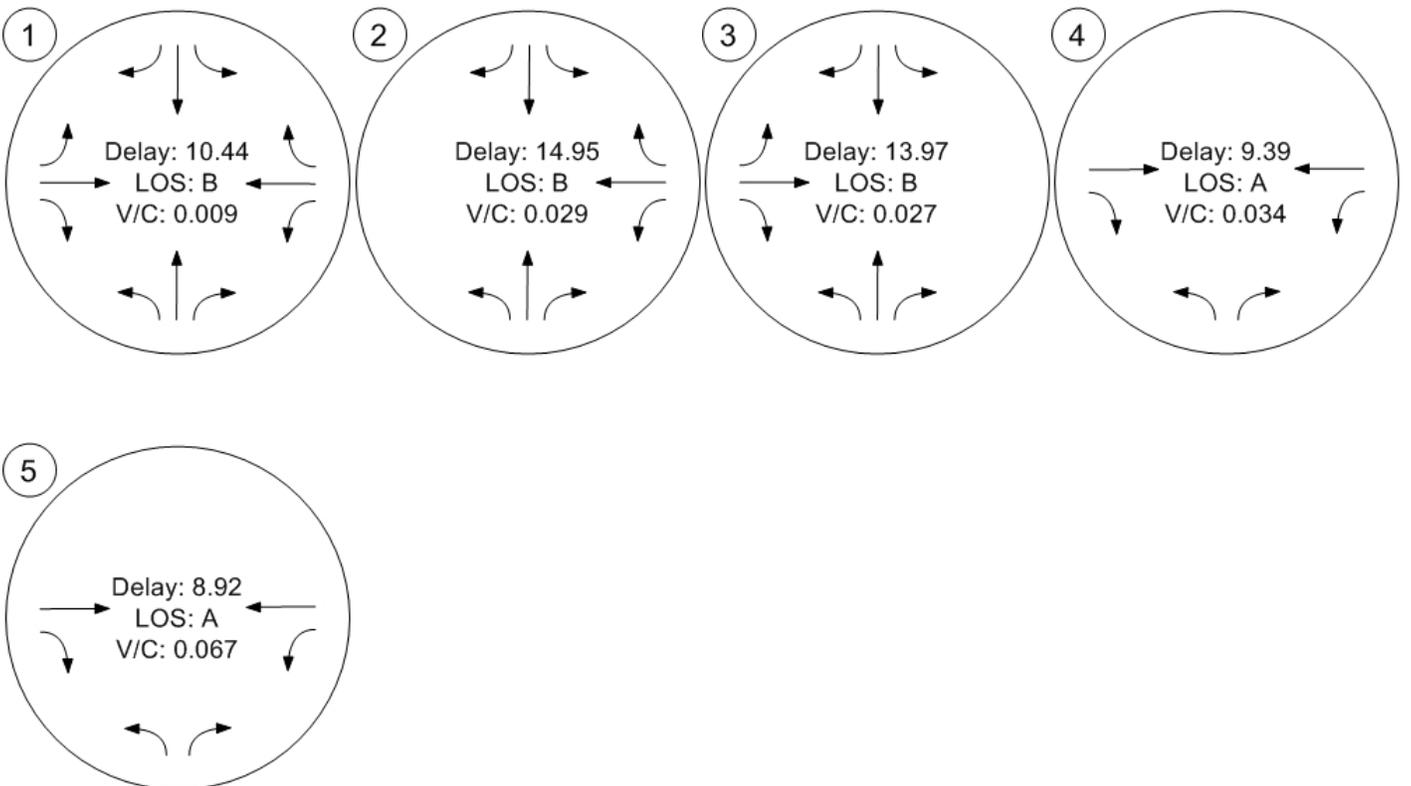
Traffic Volume - Other Volume



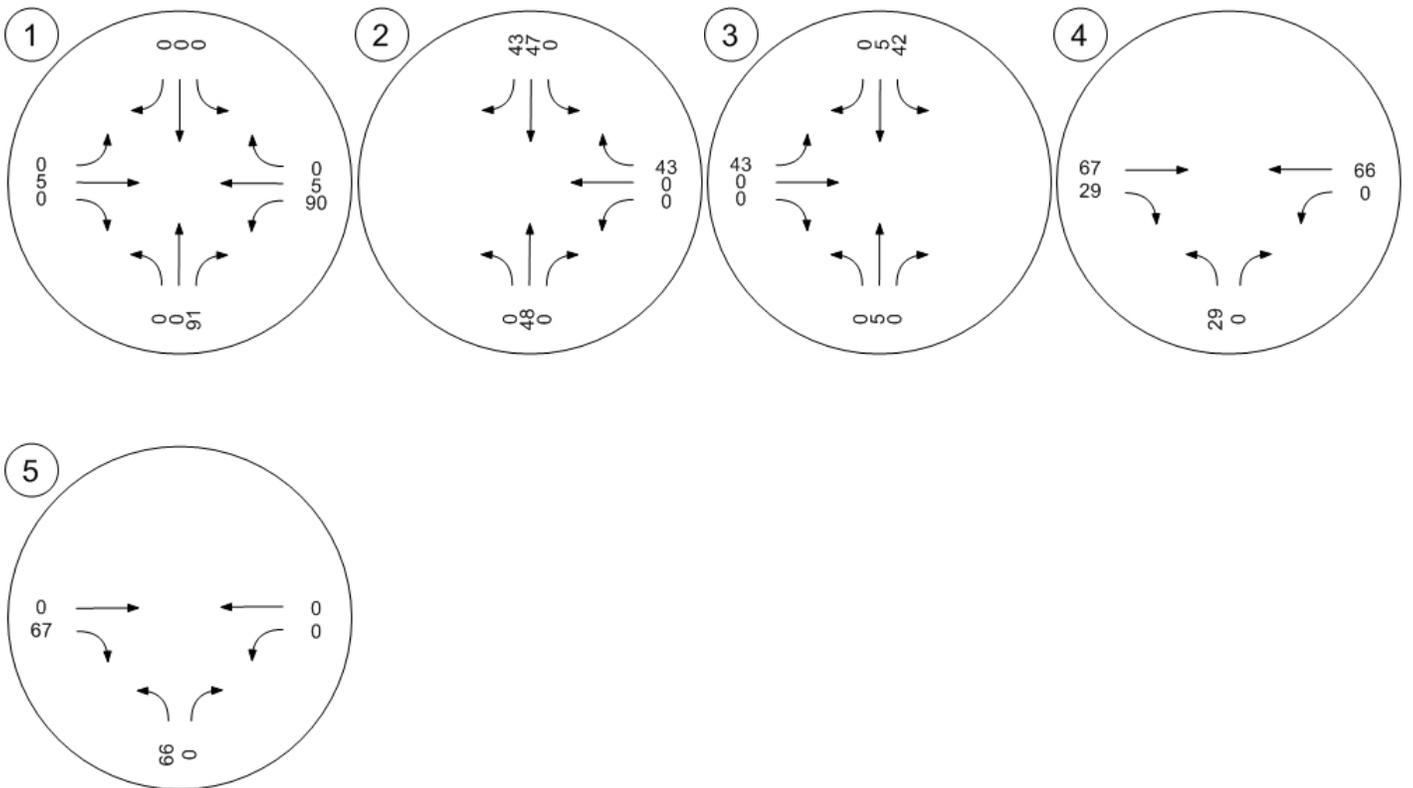
Traffic Volume - Future Total Volume



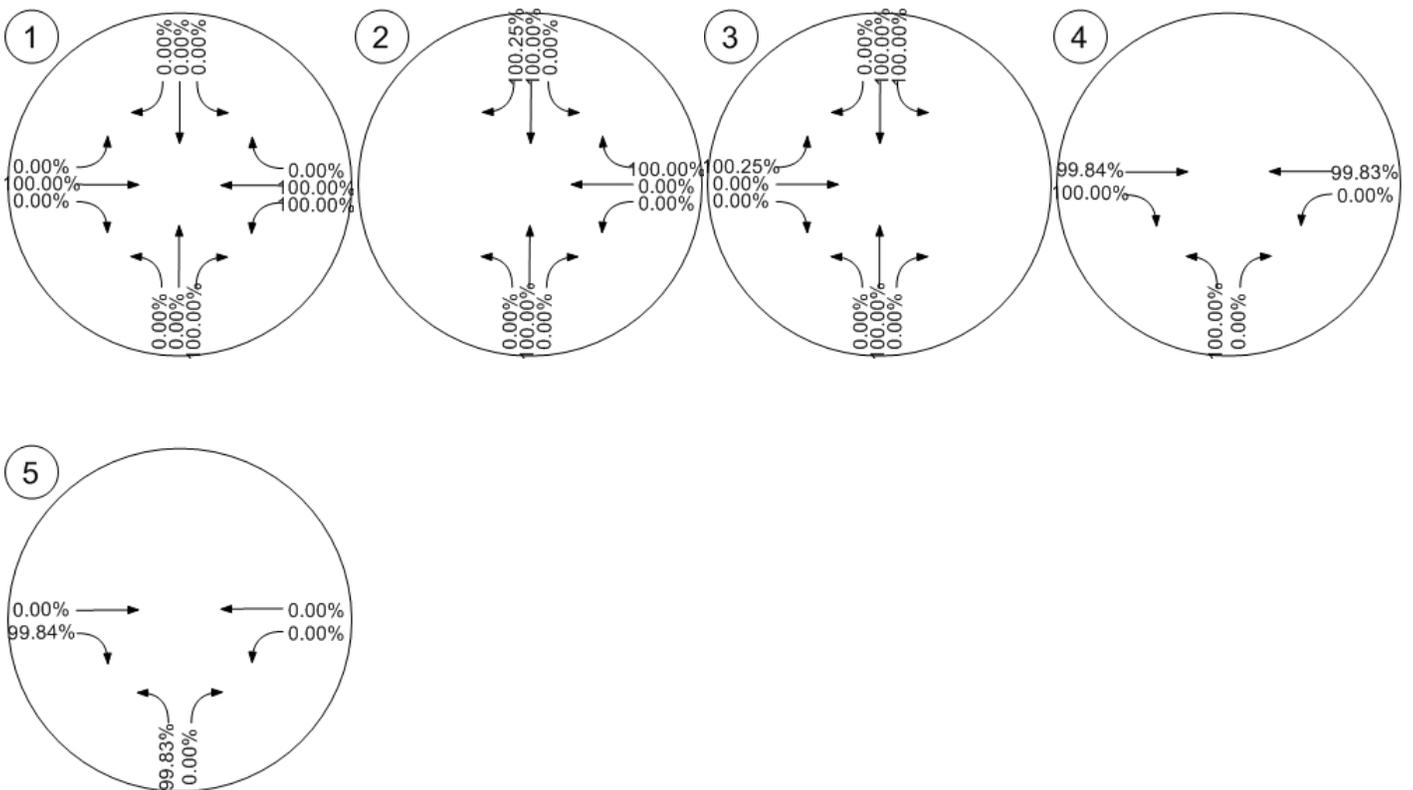
Traffic Conditions



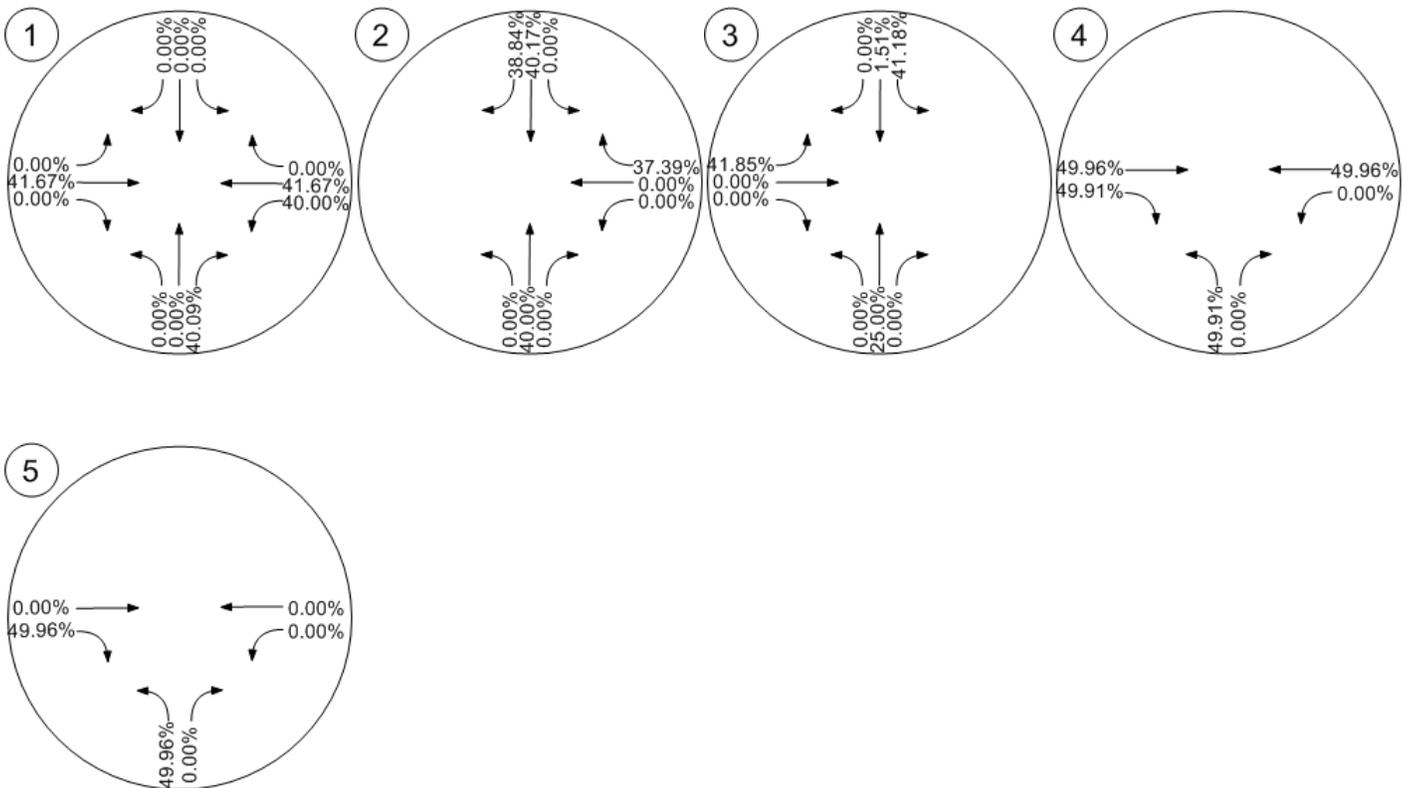
Fair Share - Fair Share Volumes - Zone 1: Project



Fair Share - Fair Share % of Net New Site - Zone 1: Project



Fair Share - Fair Share % of Total Analysis - Zone 1: Project



**Year 2035 Without Project**

## Newberry Springs Service Station

Vistro File: J:\...\LR Fri.vistro

Scenario 1: Future Year (2035) Without Project - Friday  
Evening Peak Hour

Report File: J:\...\LR Fri.pdf

6/23/2016

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	WB Thru	0.001	9.2	A
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.019	9.4	A
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.015	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	10	1	0	0	0	0	1	0	0	1	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	1	0	0	0	0	1	0	0	1	1	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	0	0	0	0	0	0	0	0	0	0
Total Analysis Volume [veh/h]	11	1	0	0	0	0	1	0	0	1	1	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.21	0.00	0.00	7.20	0.00	0.00	8.65	9.15	8.30	8.65	9.15	8.31
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
95th-Percentile Queue Length [ft]	0.55	0.55	0.55	0.00	0.00	0.00	0.08	0.08	0.08	0.16	0.16	0.16
d_A, Approach Delay [s/veh]	6.61			2.40			8.65			8.90		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	7.05											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.019

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	6	17	0	0	5	18	0	0	0	10	15	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	17	0	0	5	18	0	0	0	10	15	4
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	1.0000	1.0000	1.0000	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	4	0	0	1	5	0	0	0	3	4	1
Total Analysis Volume [veh/h]	6	18	0	0	5	19	0	0	0	11	16	4
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00
d_M, Delay for Movement [s/veh]	7.25	0.00	0.00	7.23	0.00	0.00	0.00	0.00	0.00	8.89	9.44	8.52
Movement LOS	A	A	A	A	A	A				A	A	A
95th-Percentile Queue Length [veh]	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11	0.11
95th-Percentile Queue Length [ft]	1.14	1.14	1.14	0.00	0.00	0.00	0.00	0.00	0.00	2.66	2.66	2.66
d_A, Approach Delay [s/veh]	1.81			0.00			0.00			9.13		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	4.13											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.015

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	12	8	1	30	0	8	12	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	12	8	1	30	0	8	12	0	0	0	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	3	2	0	8	0	2	3	0	0	0	0
Total Analysis Volume [veh/h]	0	13	8	1	32	0	8	13	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

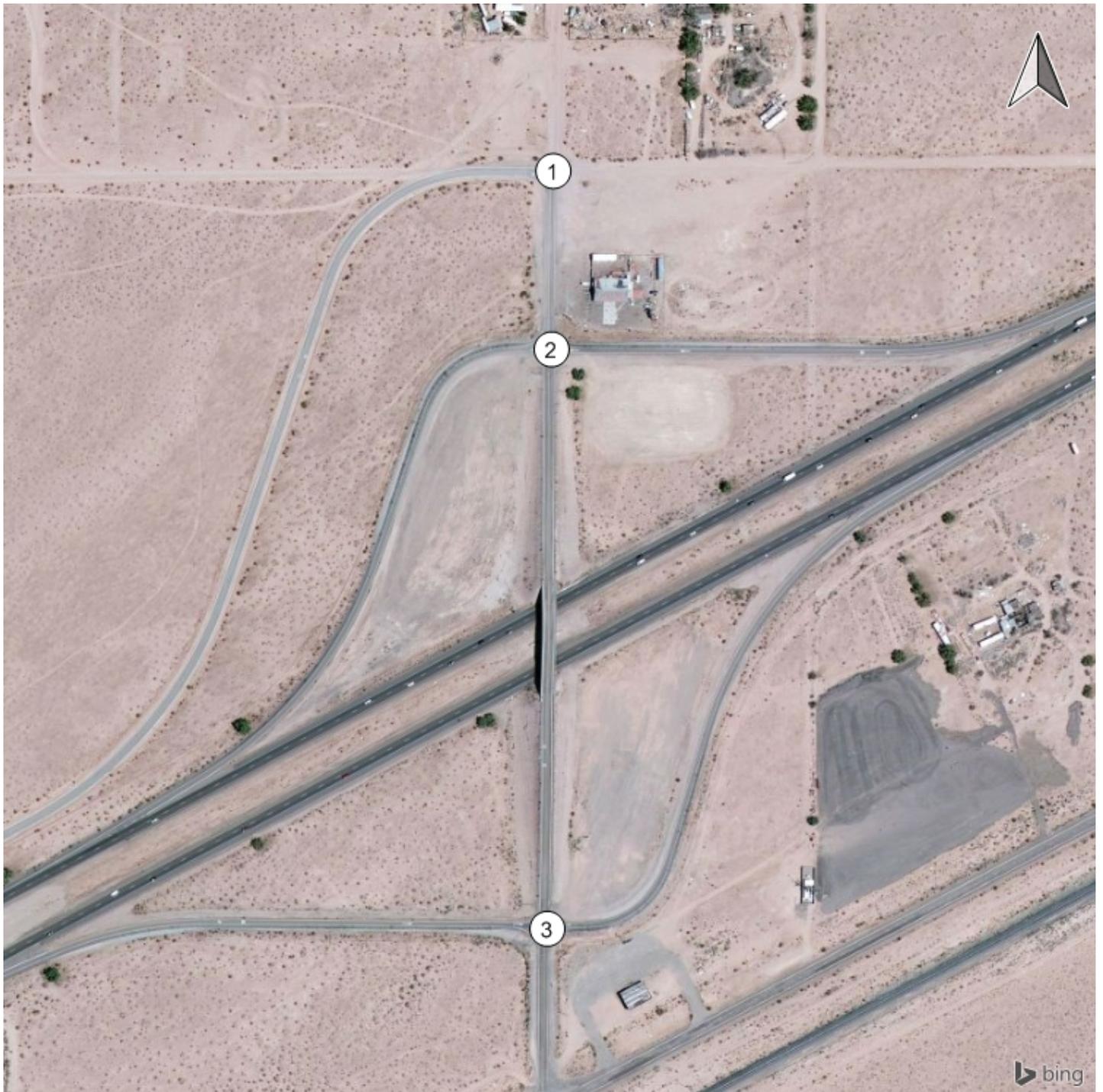
**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

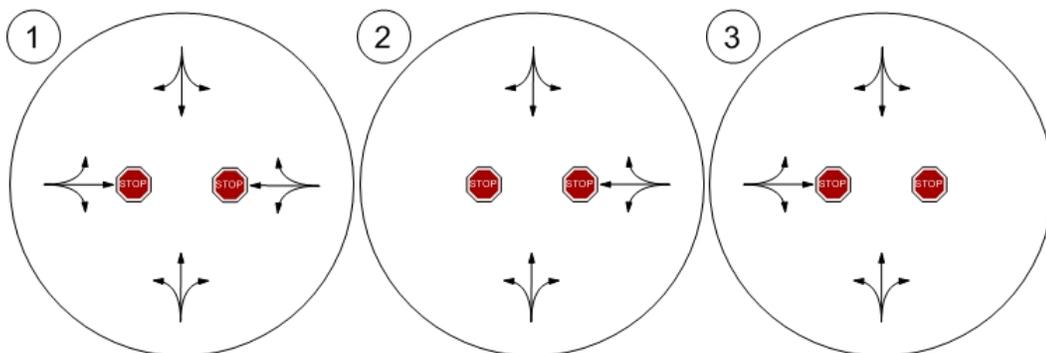
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	7.24	0.00	0.00	8.88	9.39	8.54	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	A	A	A			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.06	0.06	0.06	0.07	0.07	0.07	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	1.57	1.57	1.57	1.83	1.83	1.83	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.22			9.19			0.00		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	2.67											
Intersection LOS	A											

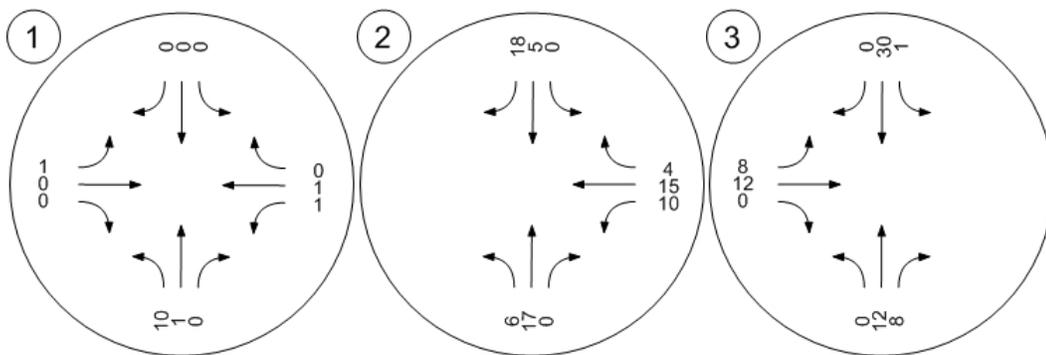
Study Intersections



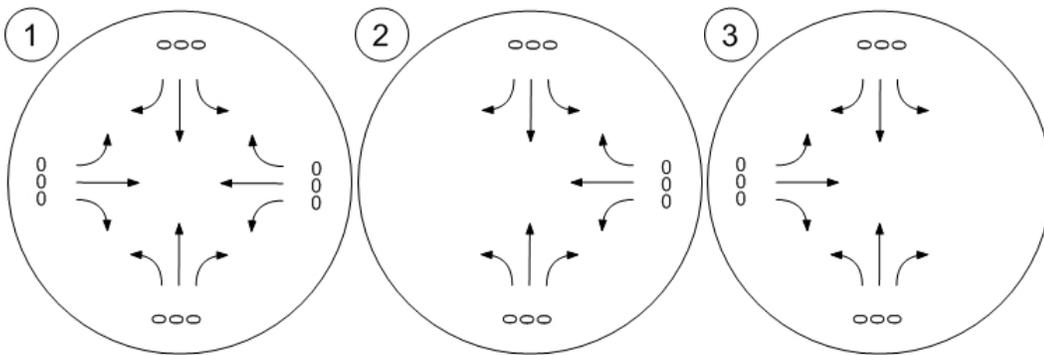
Lane Configuration and Traffic Control



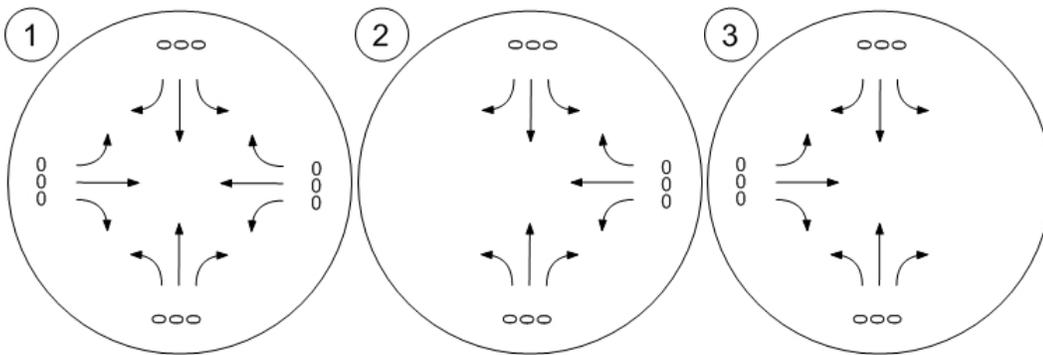
Traffic Volume - Base Volume



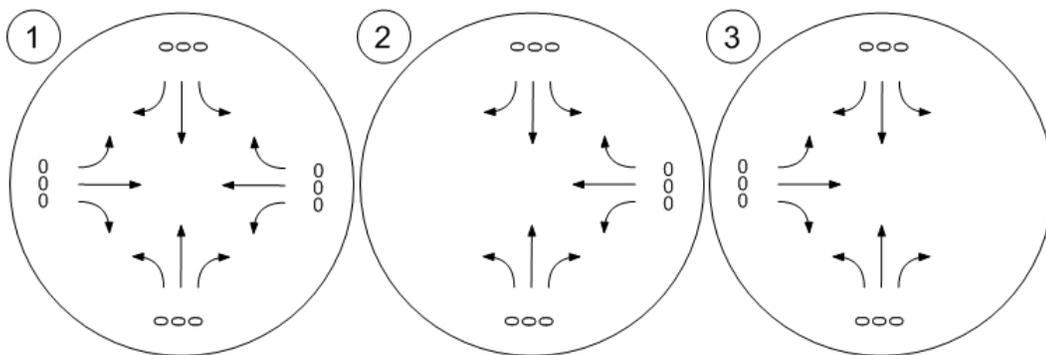
Traffic Volume - In-Process Volume



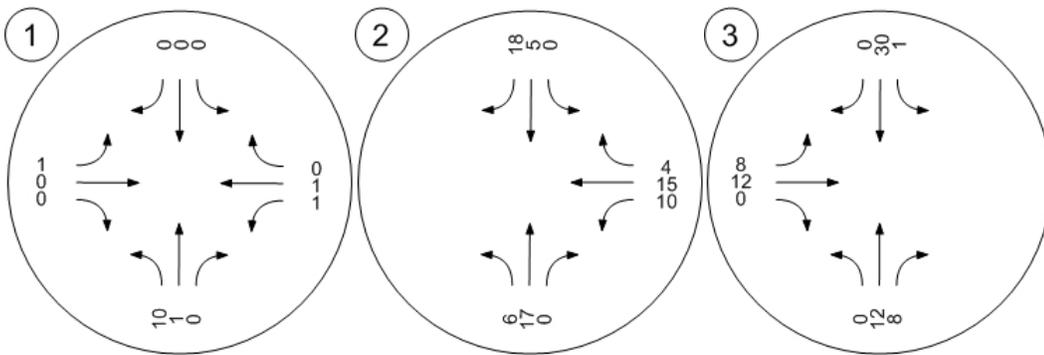
Traffic Volume - Net New Site Trips



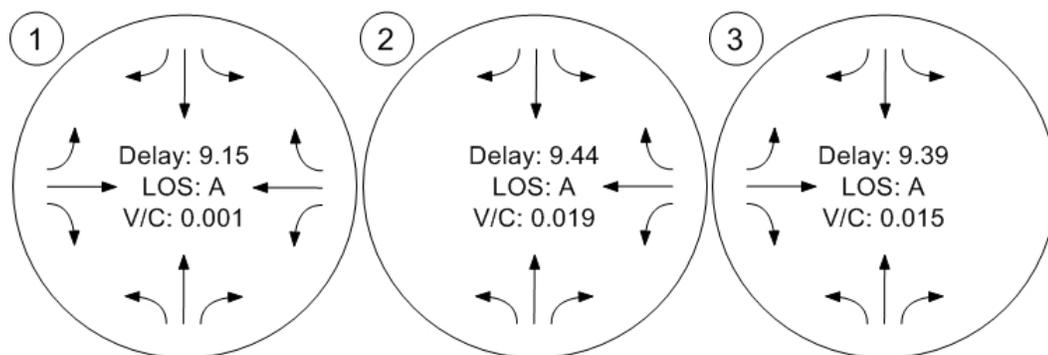
Traffic Volume - Other Volume



Traffic Volume - Future Total Volume



Traffic Conditions



## Newberry Springs Service Station

Vistro File: J:\...\LR Sun.vistro

Scenario 1: Future Year (2035) Without Project - Sunday  
Mid-Day Peak Hour

Report File: J:\...\LR Sun.pdf

6/23/2016

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	EB Thru	0.000	9.3	A
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.023	11.3	B
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.026	11.4	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	10	2	0	0	20	1	0	0	4	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	2	0	0	20	1	0	0	4	0	0	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	0	0	5	0	0	0	1	0	0	0
Total Analysis Volume [veh/h]	11	2	0	0	21	1	0	0	4	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	7.20	0.00	0.00	8.78	9.28	8.40	8.79	9.27	8.31
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.02	0.02	0.02	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.61	0.61	0.61	0.00	0.00	0.00	0.28	0.28	0.28	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	6.14			0.00			8.40			8.79		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	2.91											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	11.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.023

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	5	14	0	0	11	17	0	0	0	282	18	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	14	0	0	11	17	0	0	0	282	18	16
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	1.0000	1.0000	1.0000	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	4	0	0	3	4	0	0	0	74	5	4
Total Analysis Volume [veh/h]	5	15	0	0	12	18	0	0	0	297	19	17
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.02	0.02
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	7.23	0.00	0.00	0.00	0.00	0.00	10.76	11.30	10.37
Movement LOS	A	A	A	A	A	A				B	B	B
95th-Percentile Queue Length [veh]	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	1.57	1.57	1.57
95th-Percentile Queue Length [ft]	0.95	0.95	0.95	0.00	0.00	0.00	0.00	0.00	0.00	39.33	39.33	39.33
d_A, Approach Delay [s/veh]	1.82			0.00			0.00			10.77		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	9.46											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	11.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.026

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	12	8	8	279	0	8	14	9	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	12	8	8	279	0	8	14	9	0	0	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	3	2	2	73	0	2	4	2	0	0	0
Total Analysis Volume [veh/h]	0	13	8	8	294	0	8	15	9	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

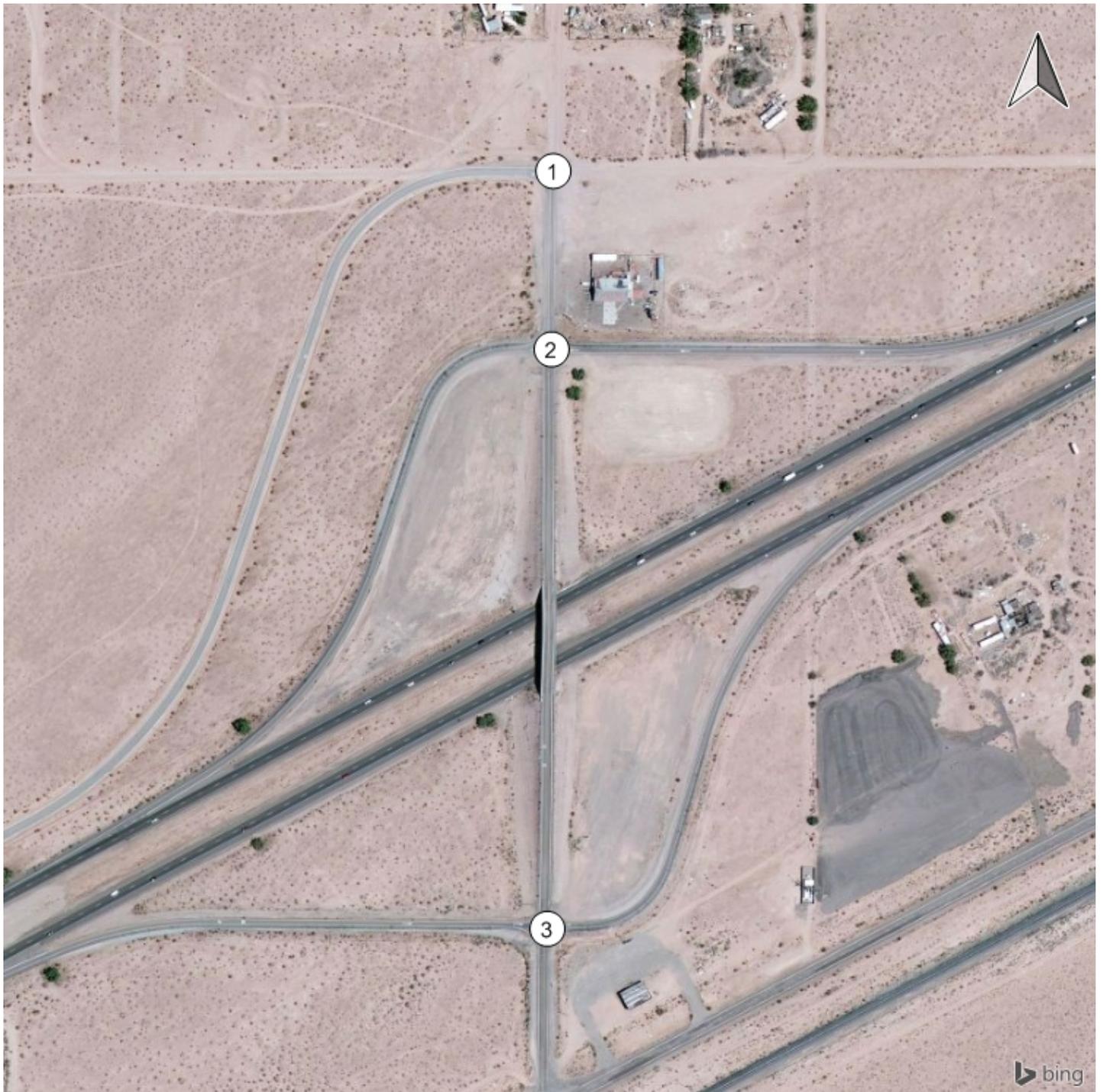
**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

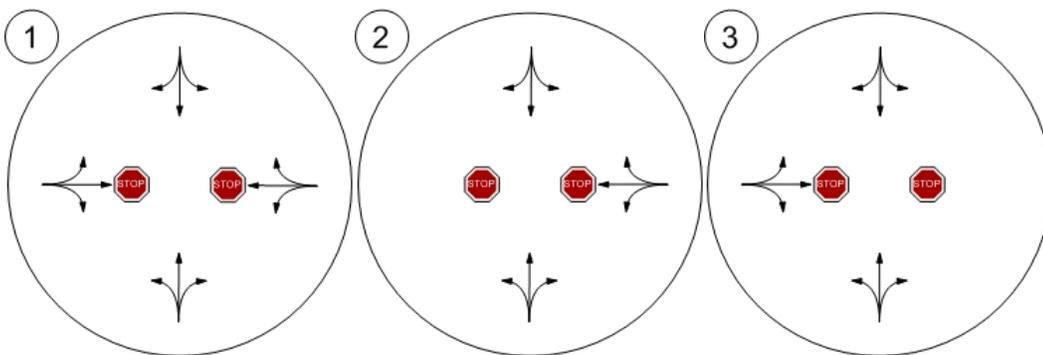
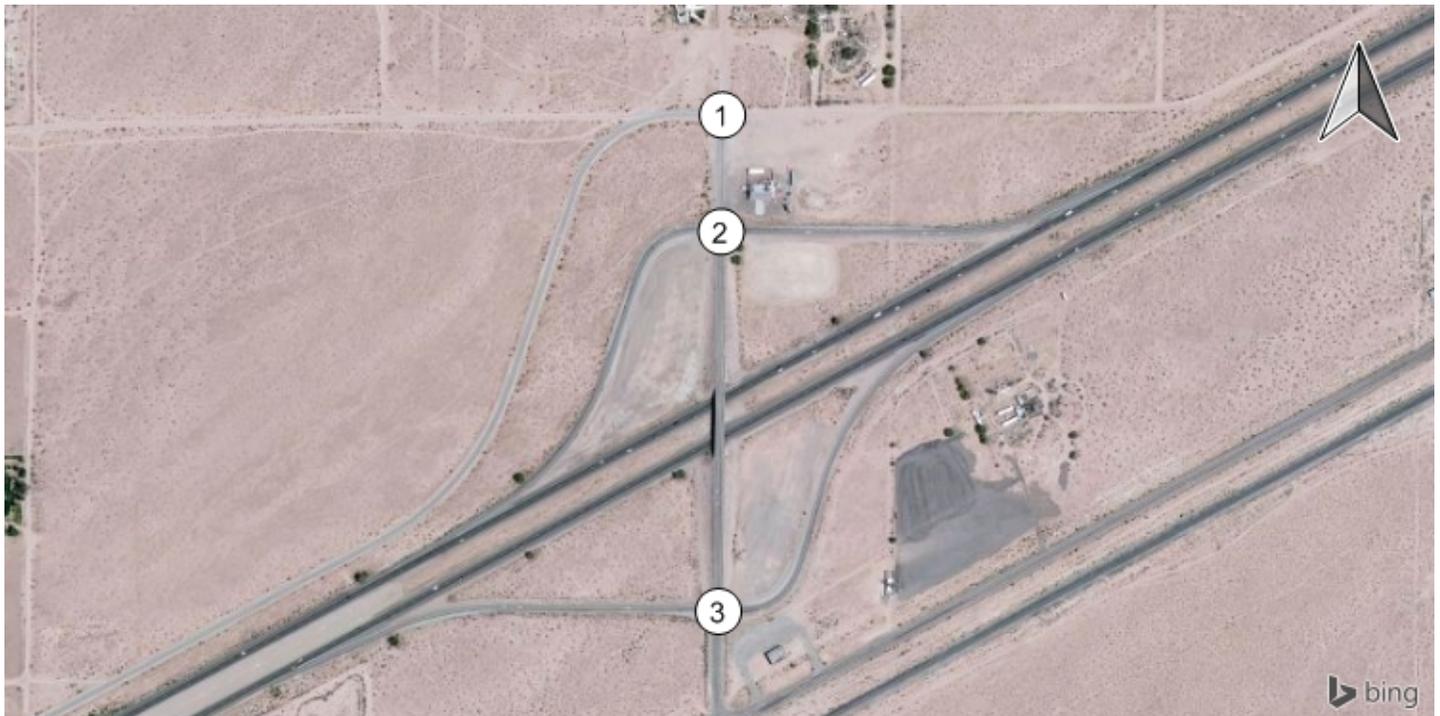
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.81	0.00	0.00	7.25	0.00	0.00	11.04	11.42	10.10	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	B	B	B			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.69	0.69	0.69	0.16	0.16	0.16	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	17.27	17.27	17.27	3.96	3.96	3.96	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.19			10.95			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	1.15											
Intersection LOS	B											

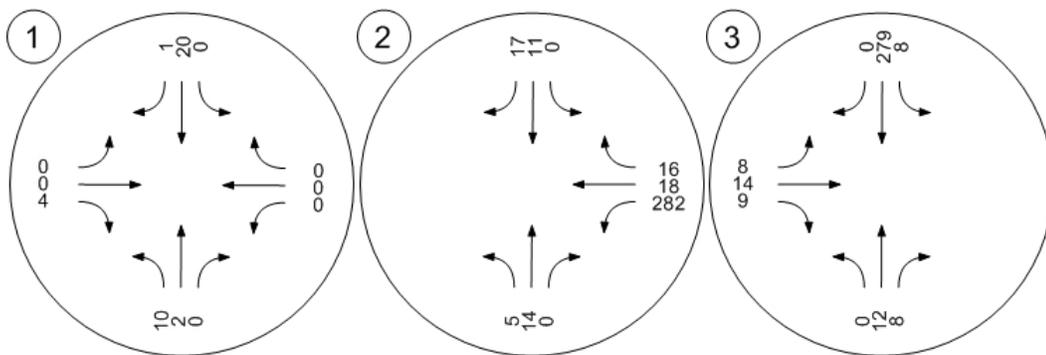
Study Intersections



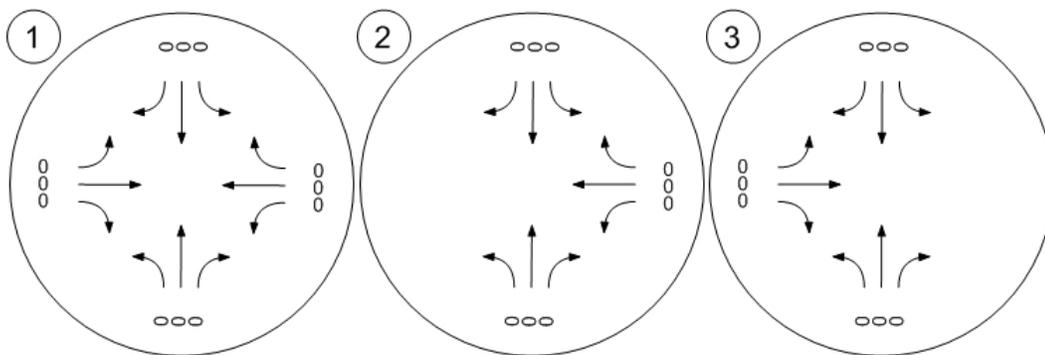
Lane Configuration and Traffic Control



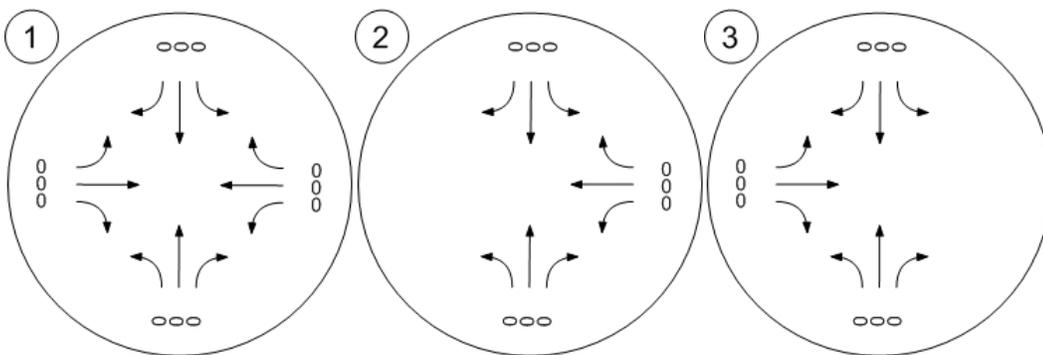
Traffic Volume - Base Volume



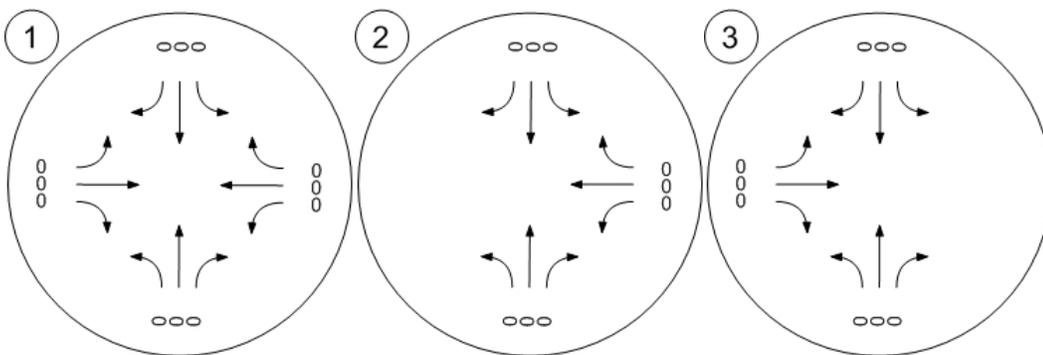
Traffic Volume - In-Process Volume



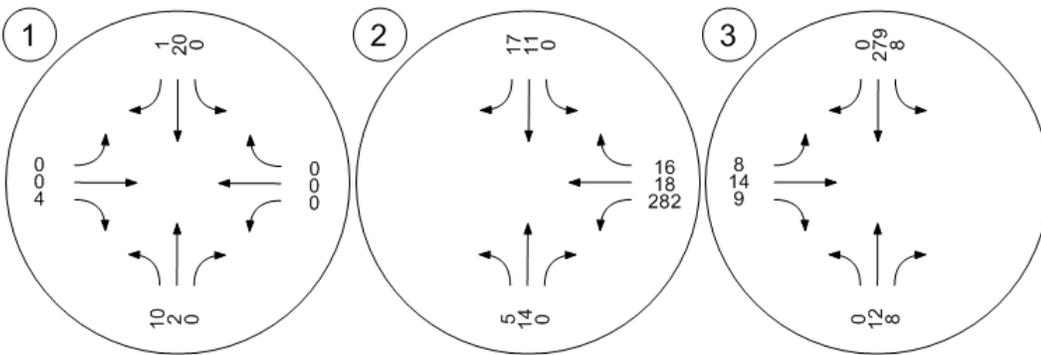
Traffic Volume - Net New Site Trips



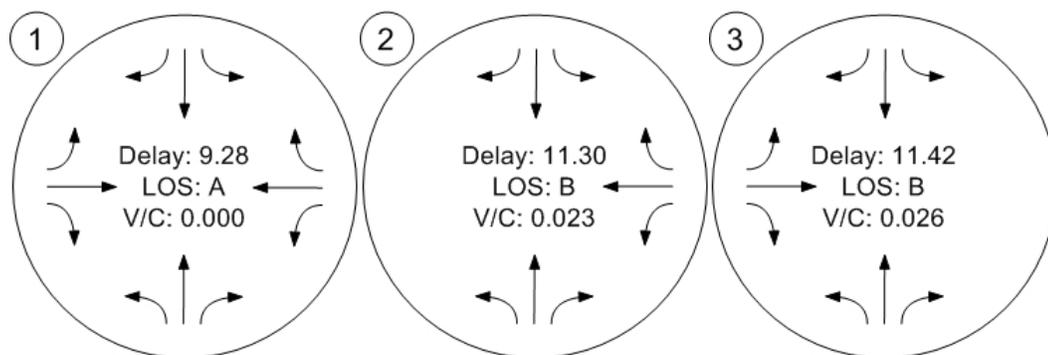
Traffic Volume - Other Volume



Traffic Volume - Future Total Volume



Traffic Conditions



**Year 2035 With Project**

## Newberry Springs Service Station

Vistro File: J:\...\LR Fri.vistro

Scenario 2: Future Year (2035) With Project - Friday  
Evening Peak Hour

Report File: J:\...\LRP Fri.pdf

6/23/2016

**Intersection Analysis Summary**

<b>ID</b>	<b>Intersection Name</b>	<b>Control Type</b>	<b>Method</b>	<b>Worst Mvmt</b>	<b>V/C</b>	<b>Delay (s/veh)</b>	<b>LOS</b>
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	WB Thru	0.007	9.9	A
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.023	10.5	B
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.018	10.4	B
4	Project West Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.037	9.4	A
5	Project East Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.070	8.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.007

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	10	1	0	0	0	0	1	0	0	1	1	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	91	0	0	0	0	5	0	90	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	1	91	0	0	0	1	5	0	91	6	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	24	0	0	0	0	1	0	24	2	0
Total Analysis Volume [veh/h]	11	1	96	0	0	0	1	5	0	96	6	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.11	0.01	0.00
d_M, Delay for Movement [s/veh]	7.21	0.00	0.00	7.39	0.00	0.00	8.99	9.71	8.33	9.45	9.91	9.01
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.21	0.21	0.21	0.00	0.00	0.00	0.02	0.02	0.02	0.38	0.38	0.38
95th-Percentile Queue Length [ft]	5.29	5.29	5.29	0.00	0.00	0.00	0.57	0.57	0.57	9.48	9.48	9.48
d_A, Approach Delay [s/veh]	0.73			2.46			9.59			9.48		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.11											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	10.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.023

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	6	17	0	0	5	18	0	0	0	10	15	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	48	0	0	47	43	0	0	0	0	0	43
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	65	0	0	52	61	0	0	0	10	15	47
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	1.0000	1.0000	1.0000	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	17	0	0	14	16	0	0	0	3	4	12
Total Analysis Volume [veh/h]	6	68	0	0	55	64	0	0	0	11	16	49
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.05
d_M, Delay for Movement [s/veh]	7.44	0.00	0.00	7.33	0.00	0.00	0.00	0.00	0.00	9.89	10.54	8.98
Movement LOS	A	A	A	A	A	A				A	B	A
95th-Percentile Queue Length [veh]	0.16	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.28
95th-Percentile Queue Length [ft]	3.94	3.94	3.94	0.00	0.00	0.00	0.00	0.00	0.00	7.01	7.01	7.01
d_A, Approach Delay [s/veh]	0.60			0.00			0.00			9.44		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	2.83											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.018

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	12	8	1	30	0	8	12	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	5	0	42	5	0	43	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	17	8	43	35	0	51	12	0	0	0	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	2	11	9	0	13	3	0	0	0	0
Total Analysis Volume [veh/h]	0	18	8	45	37	0	54	13	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.00	0.07	0.02	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.27	0.00	0.00	7.31	0.00	0.00	9.89	10.42	8.88	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	A	B	A			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.16	0.16	0.16	0.28	0.28	0.28	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	4.04	4.04	4.04	6.95	6.95	6.95	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			4.01			10.00			0.00		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.71											
Intersection LOS	B											

**Intersection Level Of Service Report**

**Intersection 4: Project West Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.037

**Intersection Setup**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	29	0	67	29	0	66
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	67	29	0	66
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	0	18	8	0	17
Total Analysis Volume [veh/h]	31	0	71	31	0	69
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.45	8.85	0.00	0.00	7.40	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.11	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	2.87	2.87	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.45		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.45					
Intersection LOS	A					

**Intersection Level Of Service Report**

**Intersection 5: Project East Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.070

**Intersection Setup**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	66	0	0	67	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	0	0	67	0	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	0	0	18	0	0
Total Analysis Volume [veh/h]	69	0	0	71	0	0
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

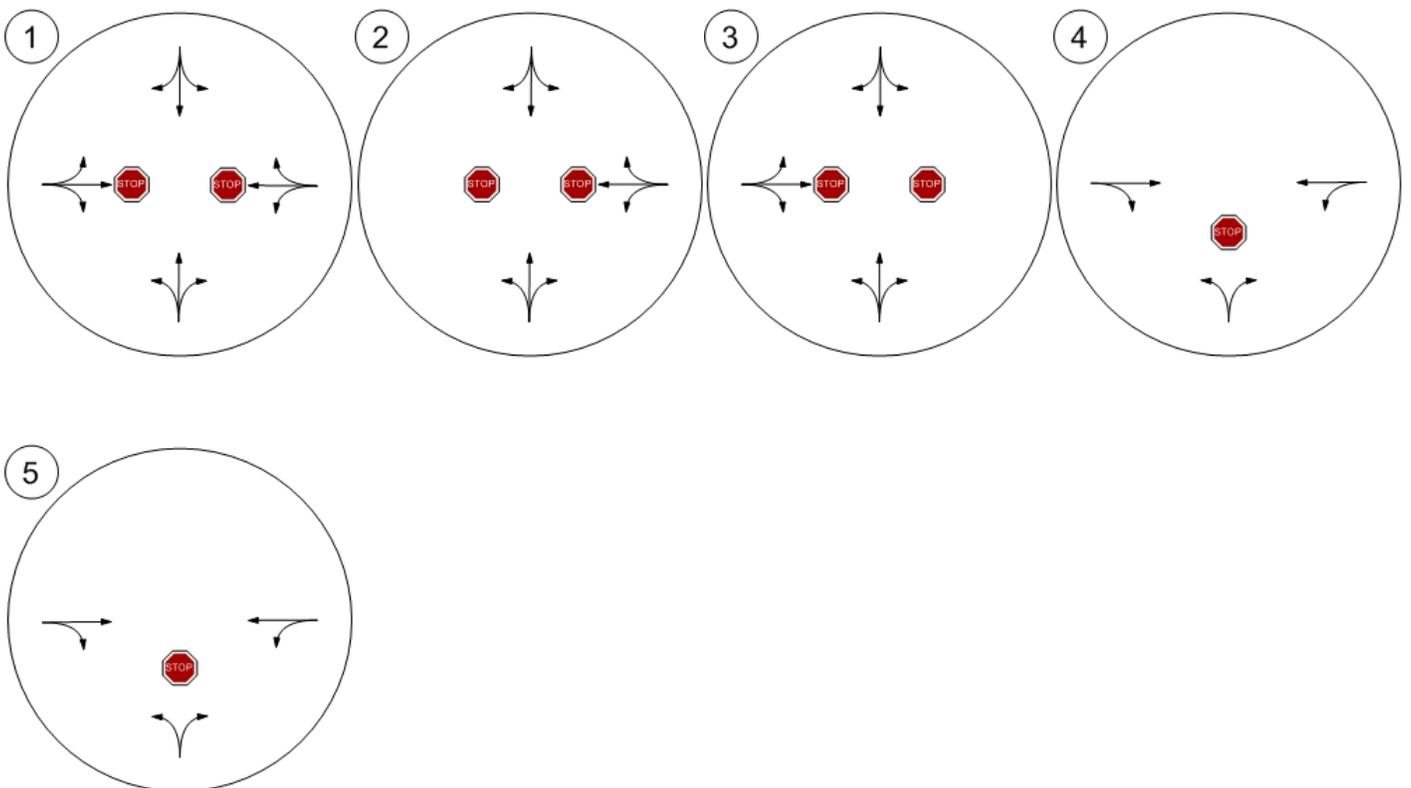
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.94	8.73	0.00	0.00	7.33	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.23	0.23	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	5.65	5.65	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.94		0.00		3.67	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.41					
Intersection LOS	A					

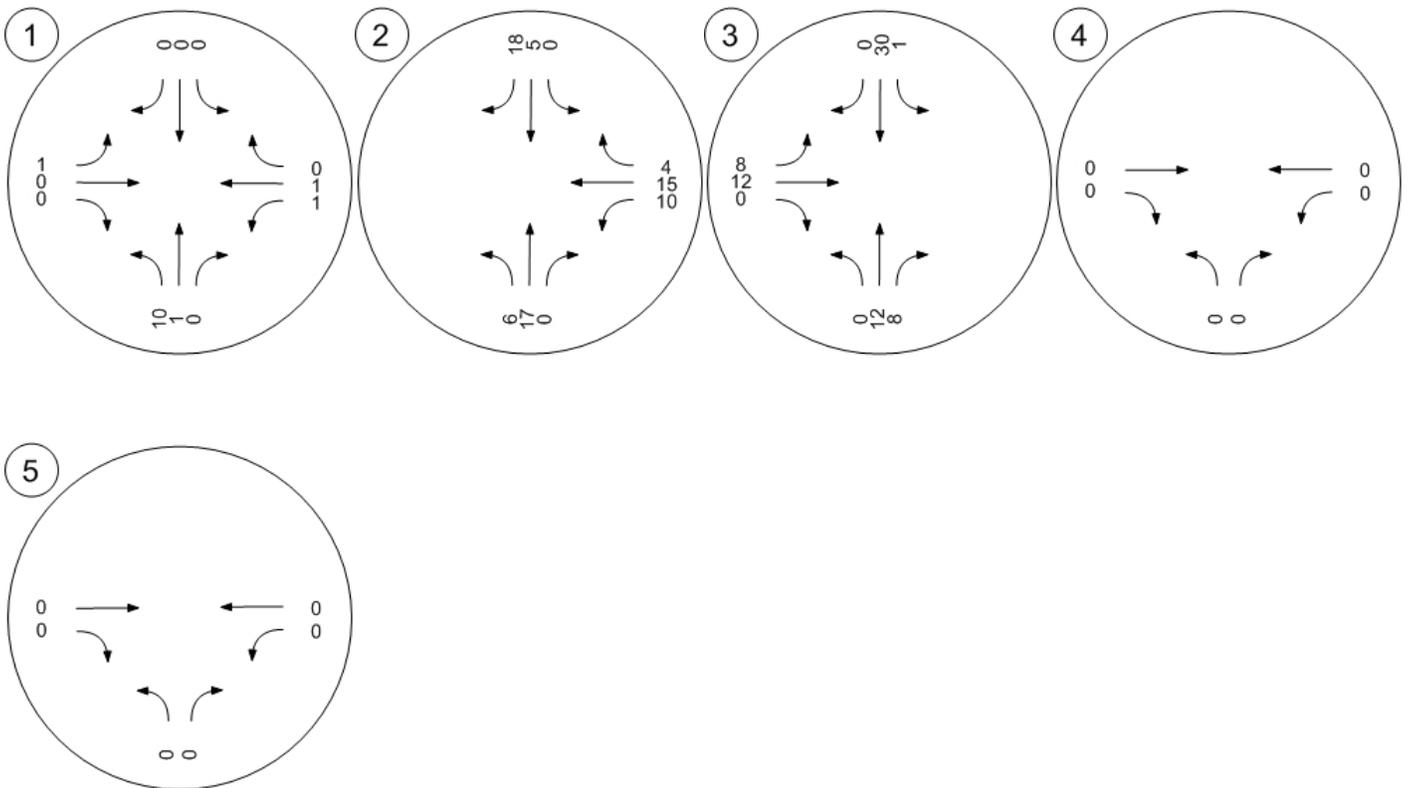
Study Intersections



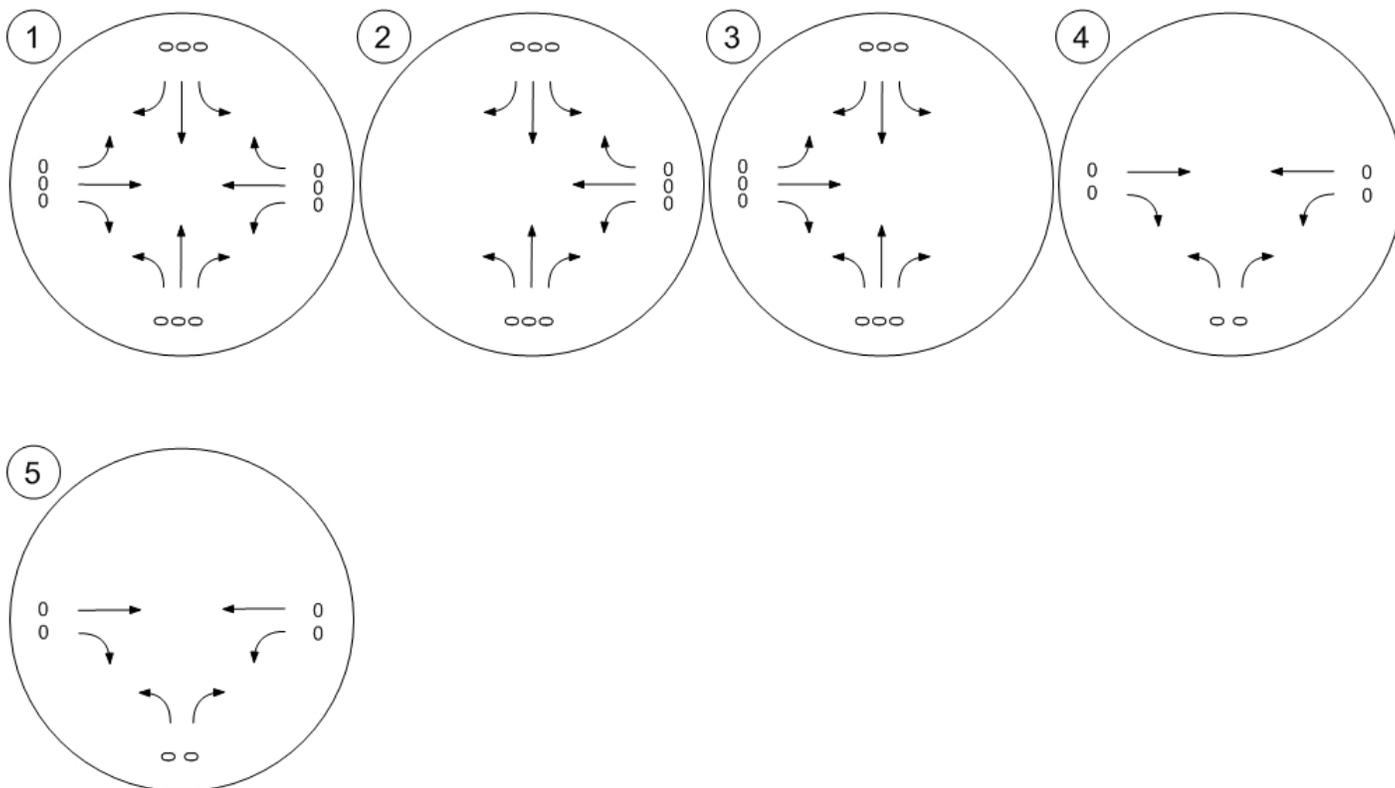
Lane Configuration and Traffic Control



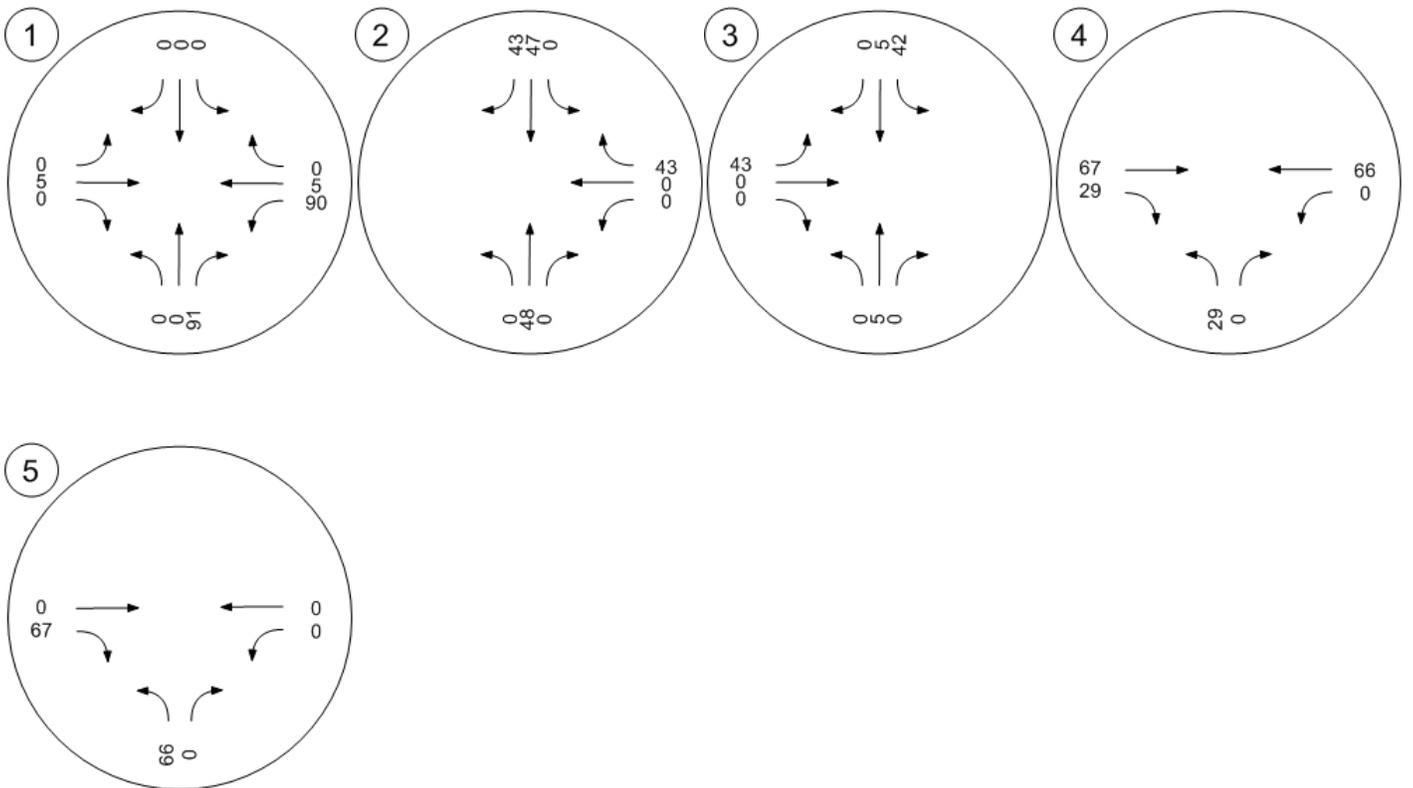
Traffic Volume - Base Volume



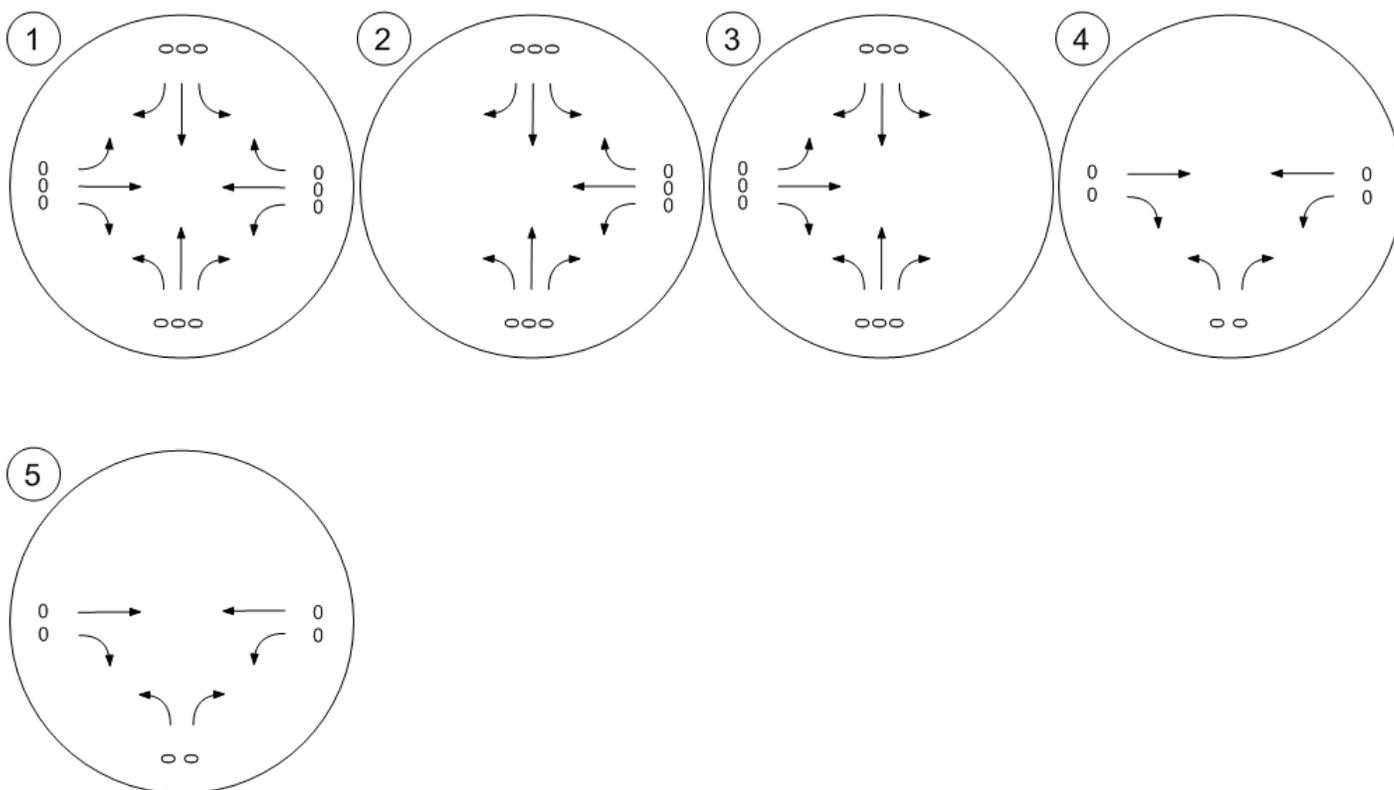
Traffic Volume - In-Process Volume



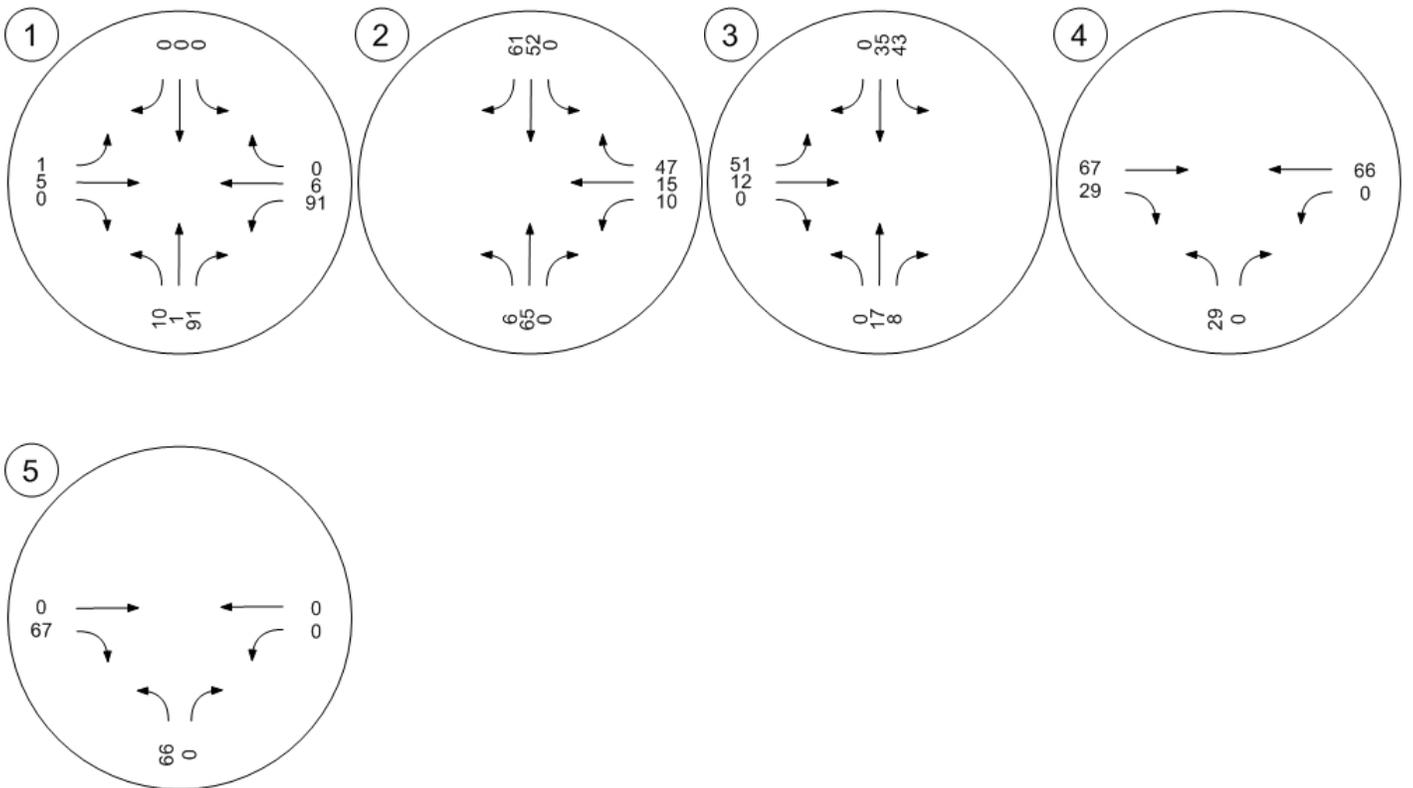
Traffic Volume - Net New Site Trips



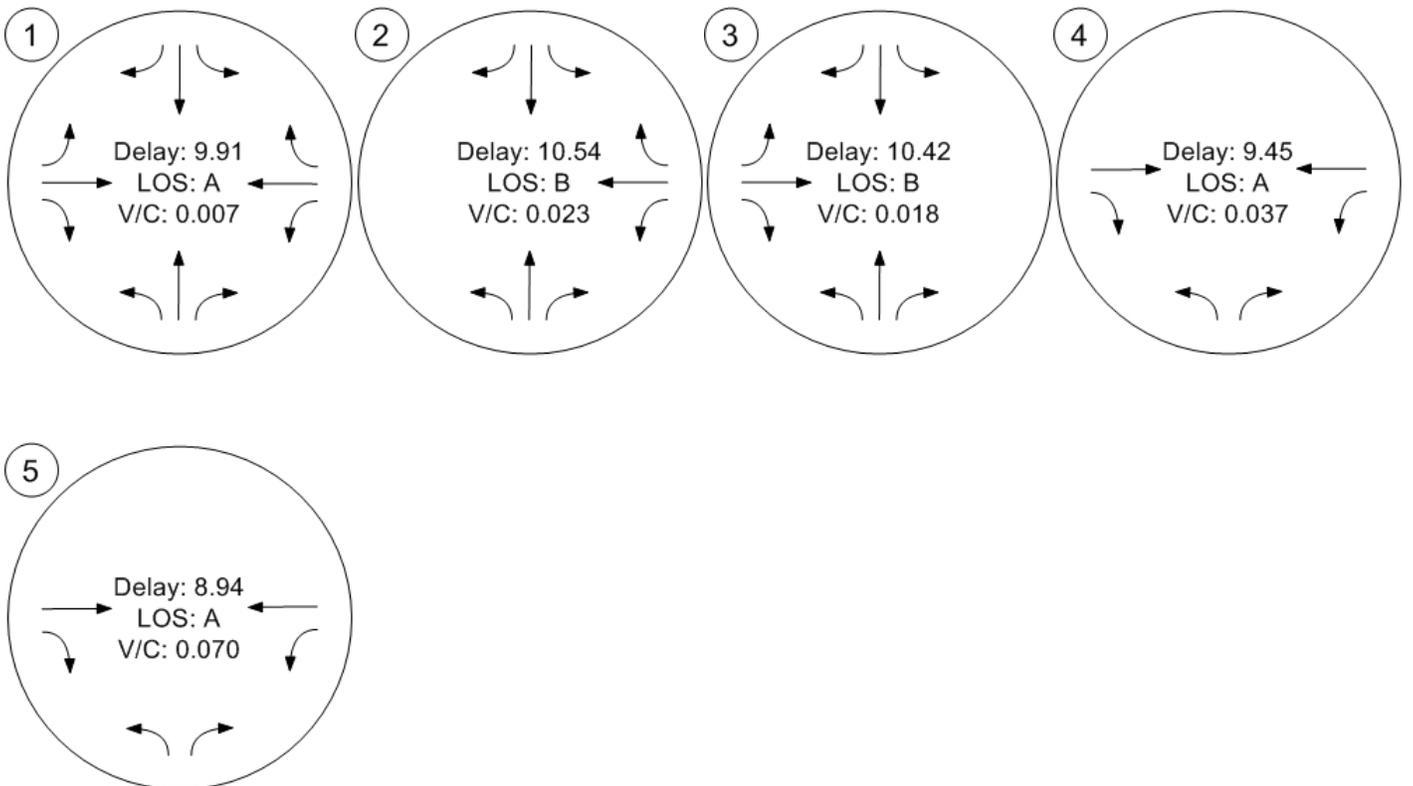
Traffic Volume - Other Volume



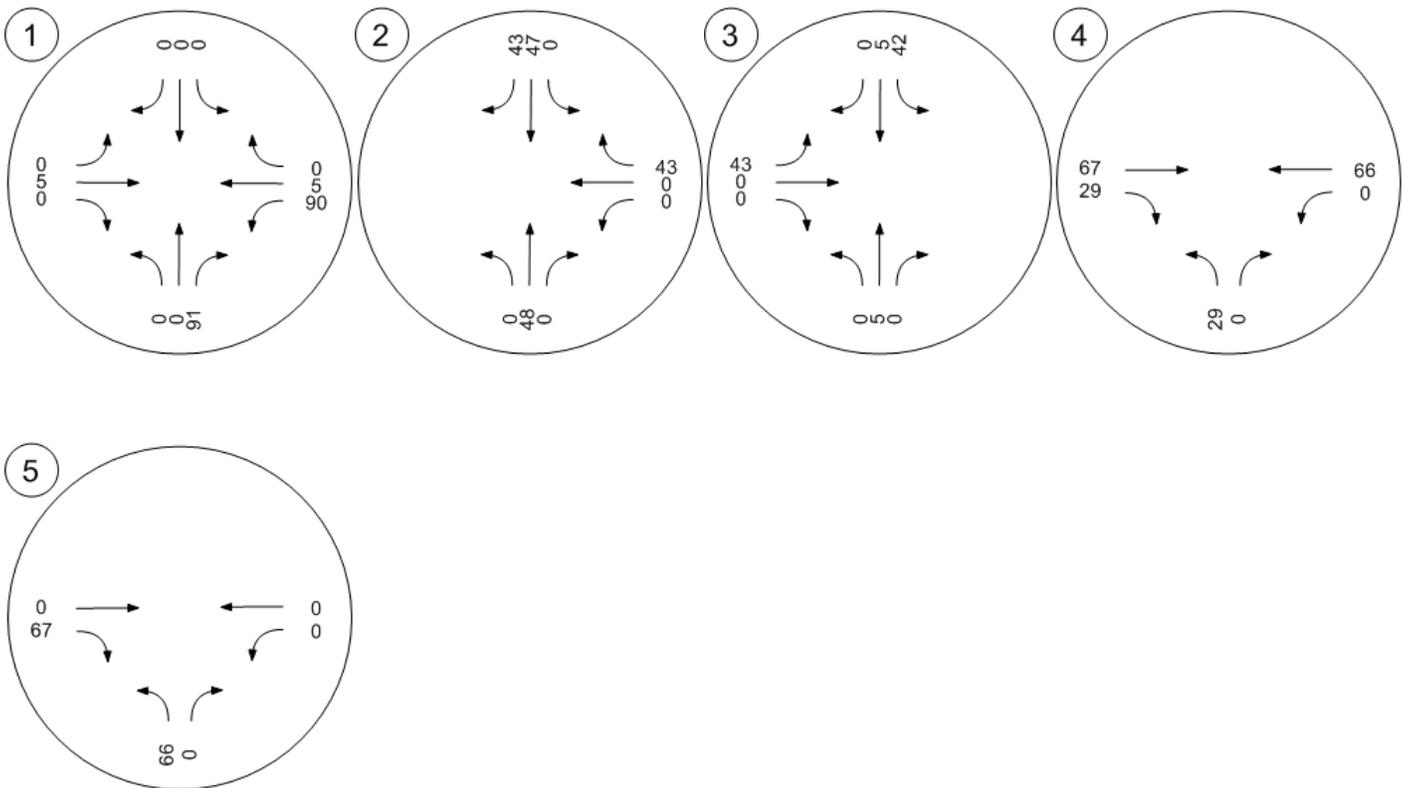
Traffic Volume - Future Total Volume



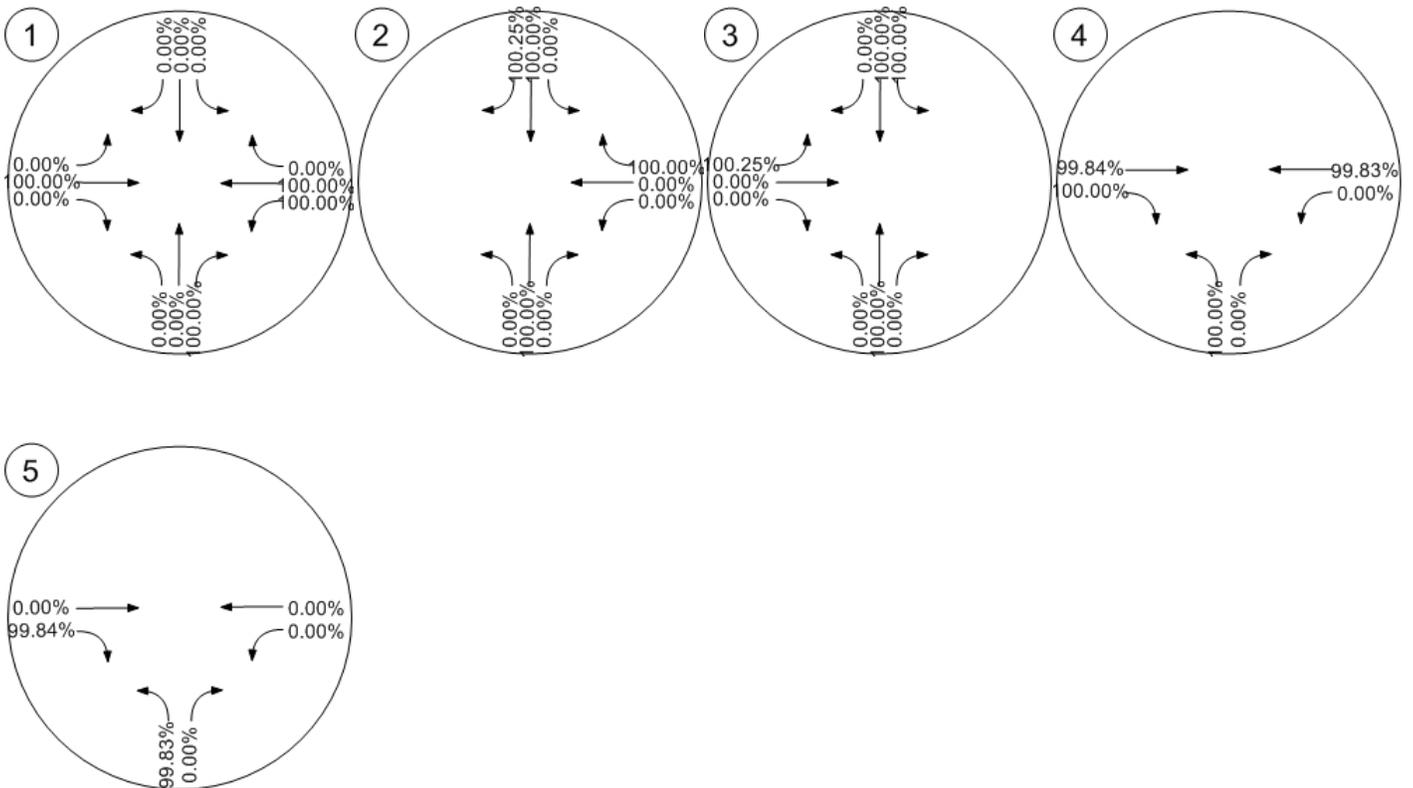
Traffic Conditions



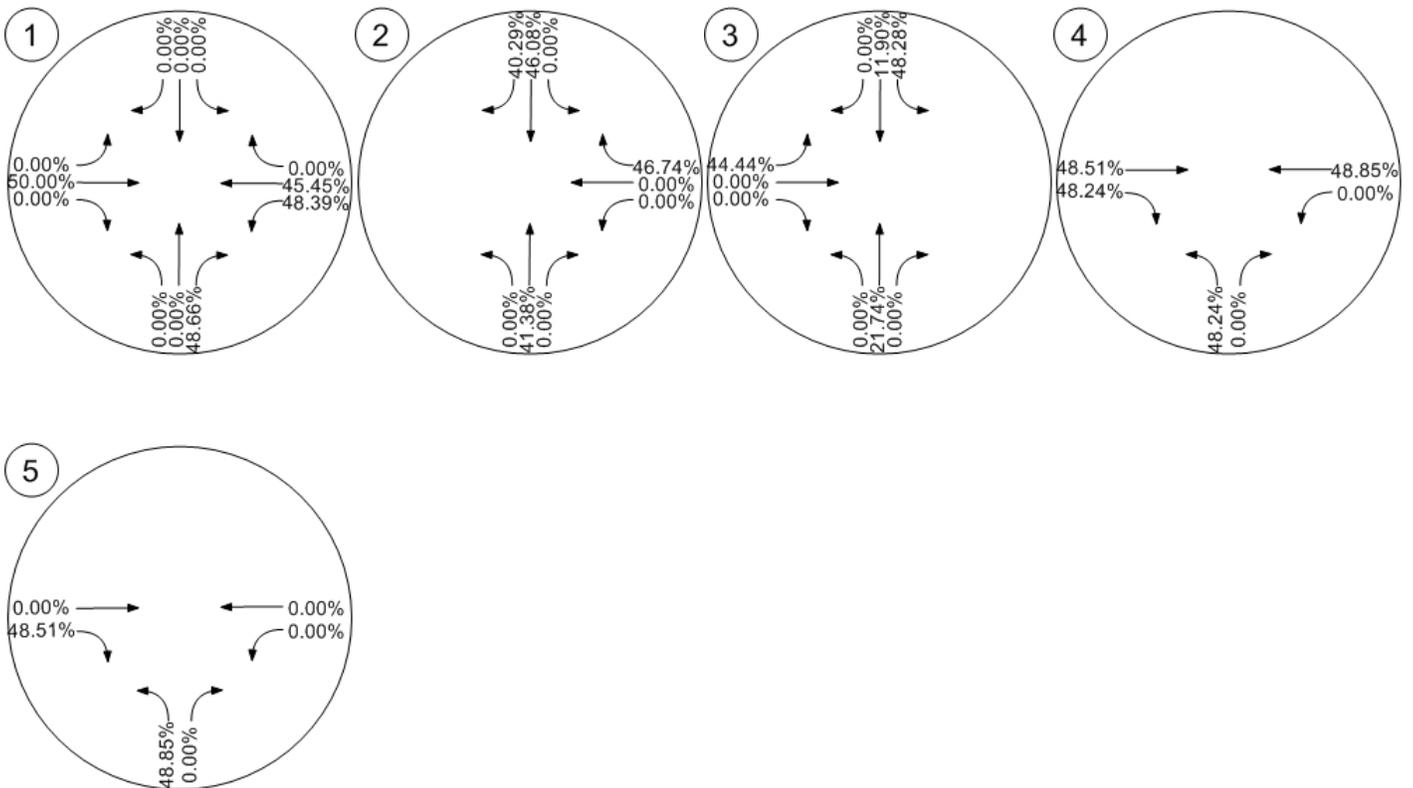
Fair Share - Fair Share Volumes - Zone 1: Project



Fair Share - Fair Share % of Net New Site - Zone 1: Project



Fair Share - Fair Share % of Total Analysis - Zone 1: Project



## Newberry Springs Service Station

Vistro File: J:\...\LR Sun.vistro

Scenario 2: Future Year (2035) With Project - Sunday Mid-Day Peak Hour

Report File: J:\...\LRP Sun.pdf

6/23/2016

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Harvard Road (NS) at Barrett Road / Hacienda Road (EW)	Two-way stop	HCM 2010	WB Thru	0.006	10.1	B
2	Harvard Road (NS) at I-15 SB Ramps	Two-way stop	HCM 2010	WB Thru	0.027	13.9	B
3	Harvard Road (NS) at I-15 NB Ramps (EW)	Two-way stop	HCM 2010	EB Thru	0.030	13.3	B
4	Project West Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.037	9.4	A
5	Project East Access (NS) at Hacienda Road (EW)	Two-way stop	HCM 2010	NB Left	0.070	8.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**

**Intersection 1: Harvard Road (NS) at Barrett Road / Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	10.1
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.006

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			Barrett Road (EW)			Hacienda Road (EW)		
Base Volume Input [veh/h]	10	2	0	0	20	1	0	0	4	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	91	0	0	0	0	5	0	90	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	2	91	0	20	1	0	5	4	90	5	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	24	0	5	0	0	1	1	24	1	0
Total Analysis Volume [veh/h]	11	2	96	0	21	1	0	5	4	95	5	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.11	0.01	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	7.39	0.00	0.00	9.12	9.86	8.44	9.64	10.07	9.05
Movement LOS	A	A	A	A	A	A	A	A	A	A	B	A
95th-Percentile Queue Length [veh]	0.22	0.22	0.22	0.00	0.00	0.00	0.03	0.03	0.03	0.39	0.39	0.39
95th-Percentile Queue Length [ft]	5.45	5.45	5.45	0.00	0.00	0.00	0.79	0.79	0.79	9.68	9.68	9.68
d_A, Approach Delay [s/veh]	0.73			0.00			9.23			9.66		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	4.71											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 2: Harvard Road (NS) at I-15 SB Ramps**

Control Type:	Two-way stop	Delay (sec / veh):	13.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.027

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+						+		
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 SB Ramp (EW)			I-15 SB Ramp (EW)		
Base Volume Input [veh/h]	5	14	0	0	11	17	0	0	0	282	18	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	48	0	0	47	43	0	0	0	0	0	43
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	62	0	0	58	60	0	0	0	282	18	59
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	1.0000	1.0000	1.0000	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	16	0	0	15	16	0	0	0	74	5	16
Total Analysis Volume [veh/h]	5	65	0	0	61	63	0	0	0	297	19	62
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.03	0.06
d_M, Delay for Movement [s/veh]	7.45	0.00	0.00	7.32	0.00	0.00	0.00	0.00	0.00	13.20	13.85	12.28
Movement LOS	A	A	A	A	A	A				B	B	B
95th-Percentile Queue Length [veh]	0.15	0.15	0.15	0.00	0.00	0.00	0.00	0.00	0.00	2.45	2.45	2.45
95th-Percentile Queue Length [ft]	3.73	3.73	3.73	0.00	0.00	0.00	0.00	0.00	0.00	61.35	61.35	61.35
d_A, Approach Delay [s/veh]	0.53			0.00			0.00			13.08		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	8.71											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 3: Harvard Road (NS) at I-15 NB Ramps (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	13.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.030

**Intersection Setup**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+					
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

**volumes**

Name	Harvard Road (NS)			Harvard Road (NS)			I-15 NB Ramp (EW)			I-15 NB Ramp (EW)		
Base Volume Input [veh/h]	0	12	8	8	279	0	8	14	9	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	5	0	42	5	0	43	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	17	8	50	284	0	51	14	9	0	0	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	2	13	75	0	13	4	2	0	0	0
Total Analysis Volume [veh/h]	0	18	8	53	299	0	54	15	9	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.00	0.10	0.03	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.83	0.00	0.00	7.33	0.00	0.00	12.99	13.34	10.96	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A	B	B	B			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.84	0.84	0.84	0.50	0.50	0.50	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	21.02	21.02	21.02	12.61	12.61	12.61	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			1.10			12.82			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	3.05											
Intersection LOS	B											

**Intersection Level Of Service Report**

**Intersection 4: Project West Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.037

**Intersection Setup**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project West Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	29	0	67	29	0	66
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	67	29	0	66
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	0	18	8	0	17
Total Analysis Volume [veh/h]	31	0	71	31	0	69
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.45	8.85	0.00	0.00	7.40	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.11	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	2.87	2.87	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.45		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.45					
Intersection LOS	A					

**Intersection Level Of Service Report**

**Intersection 5: Project East Access (NS) at Hacienda Road (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.070

**Intersection Setup**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

**volumes**

Name	Project East Access (NS)		Hacienda Road (EW)		Hacienda Road (EW)	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	66	0	0	67	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	0	0	67	0	0
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	0	0	18	0	0
Total Analysis Volume [veh/h]	69	0	0	71	0	0
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

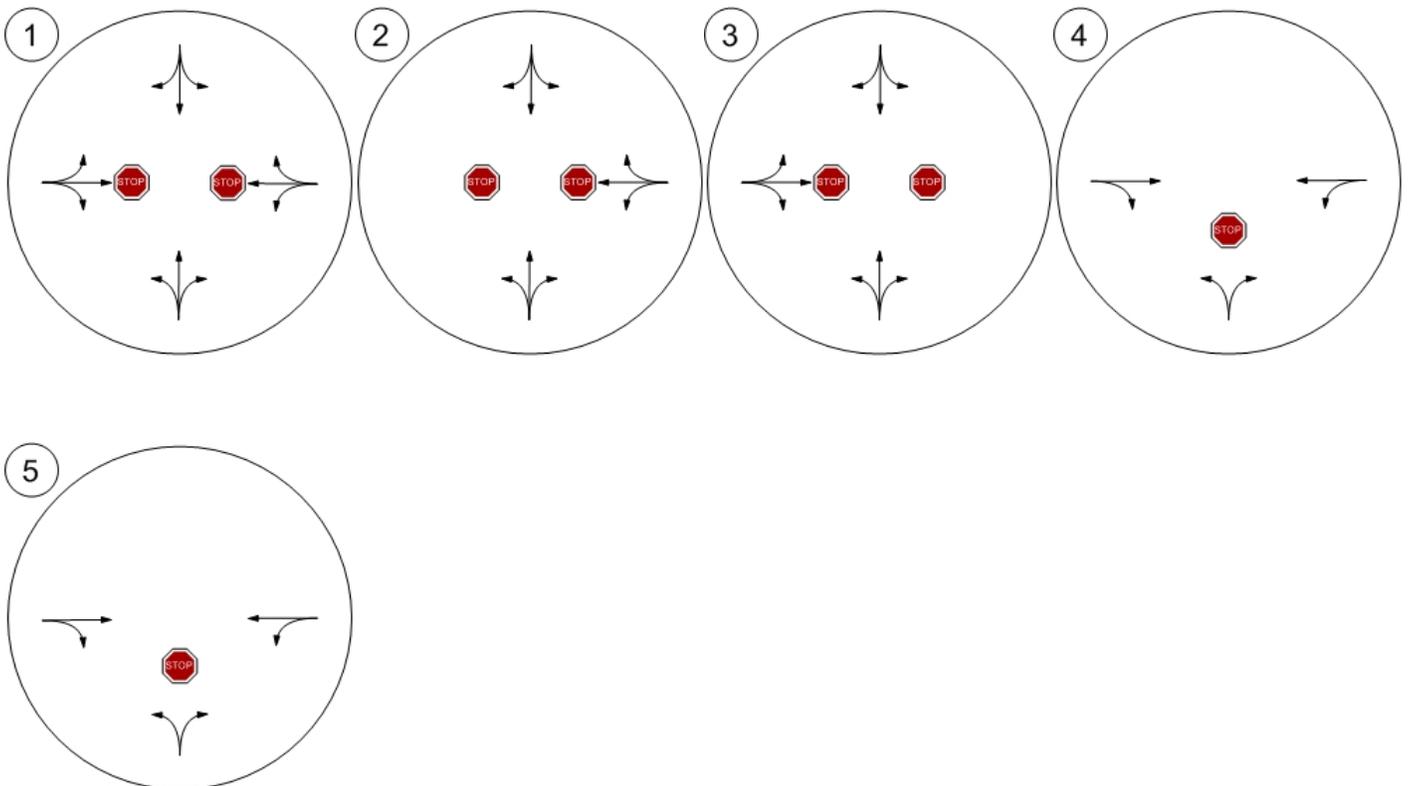
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.94	8.73	0.00	0.00	7.33	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.23	0.23	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	5.65	5.65	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.94		0.00		3.67	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.41					
Intersection LOS	A					

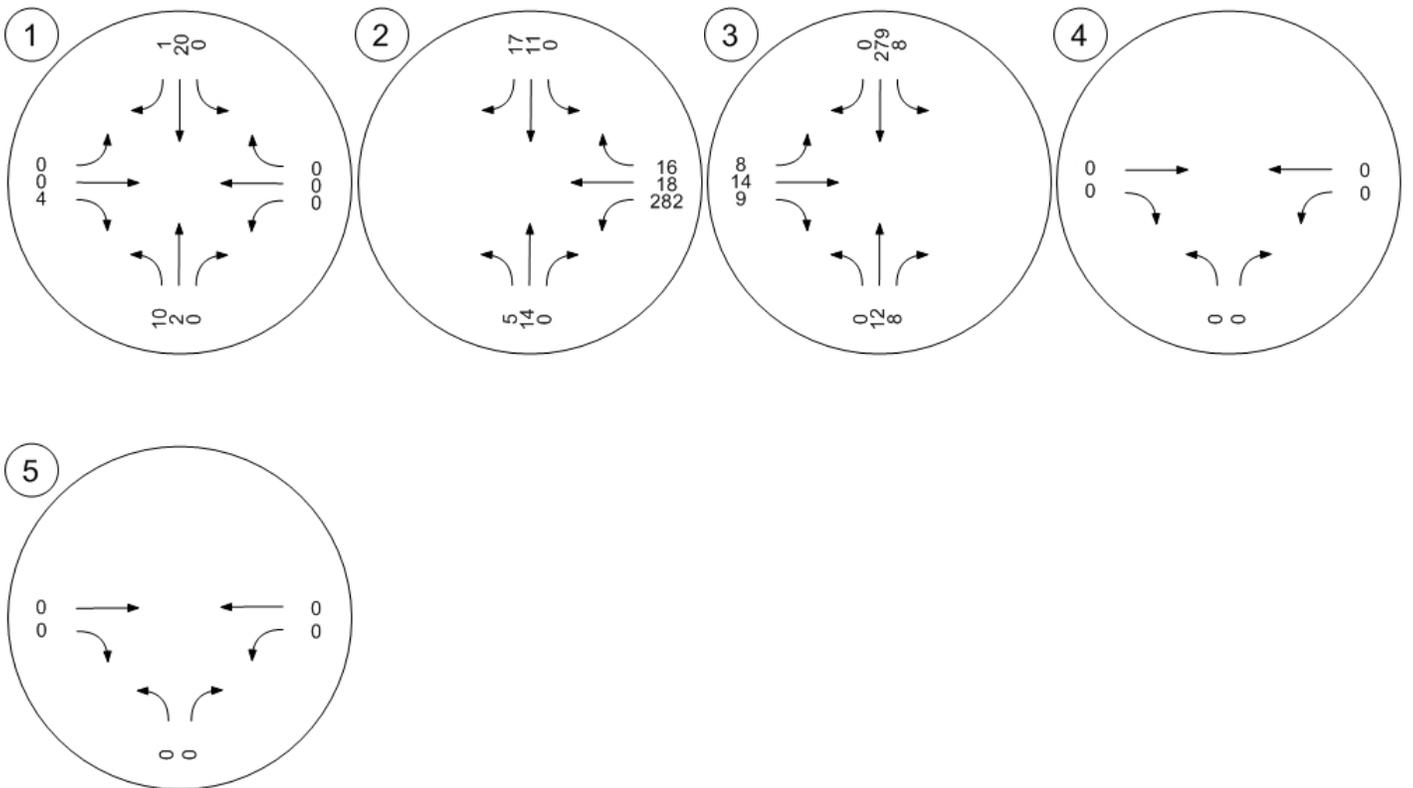
Study Intersections



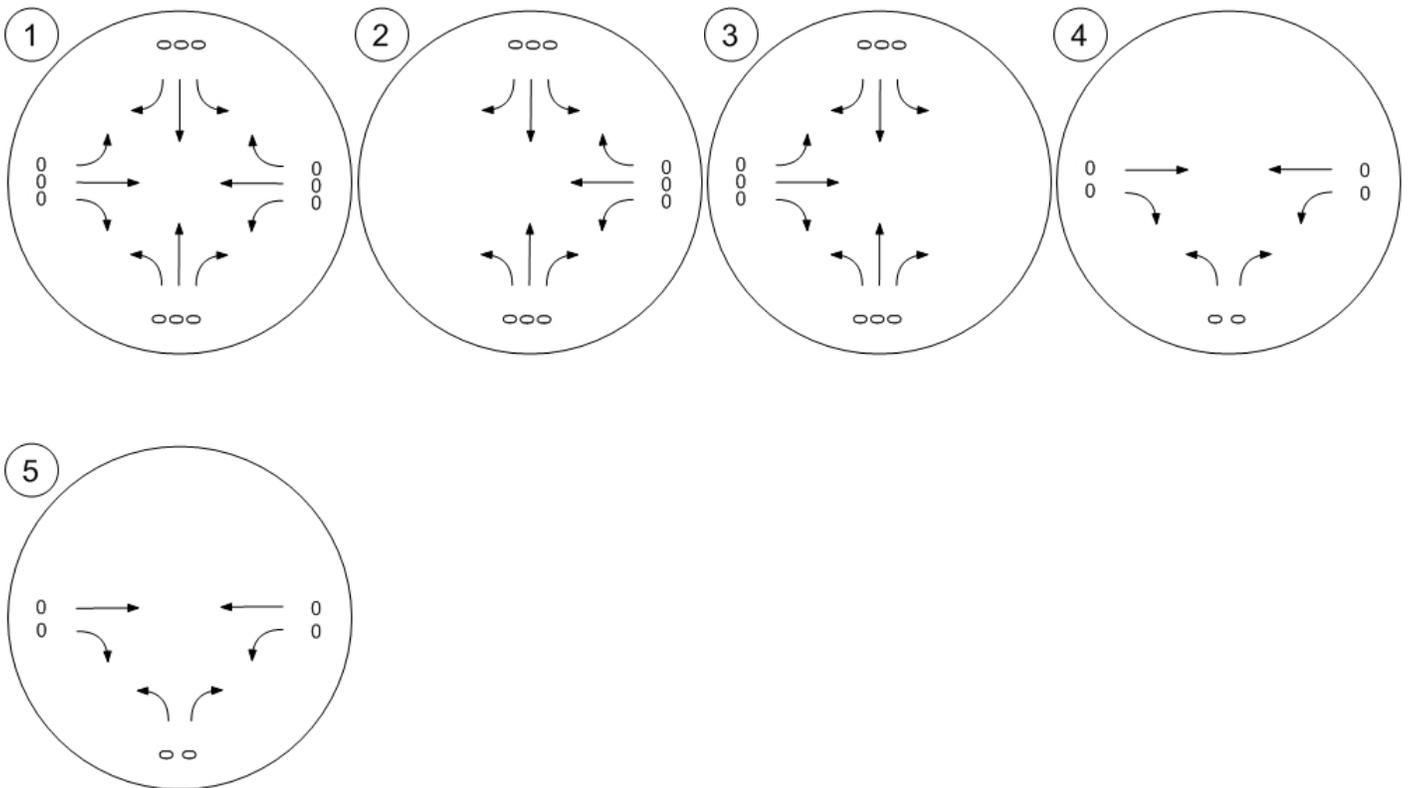
Lane Configuration and Traffic Control



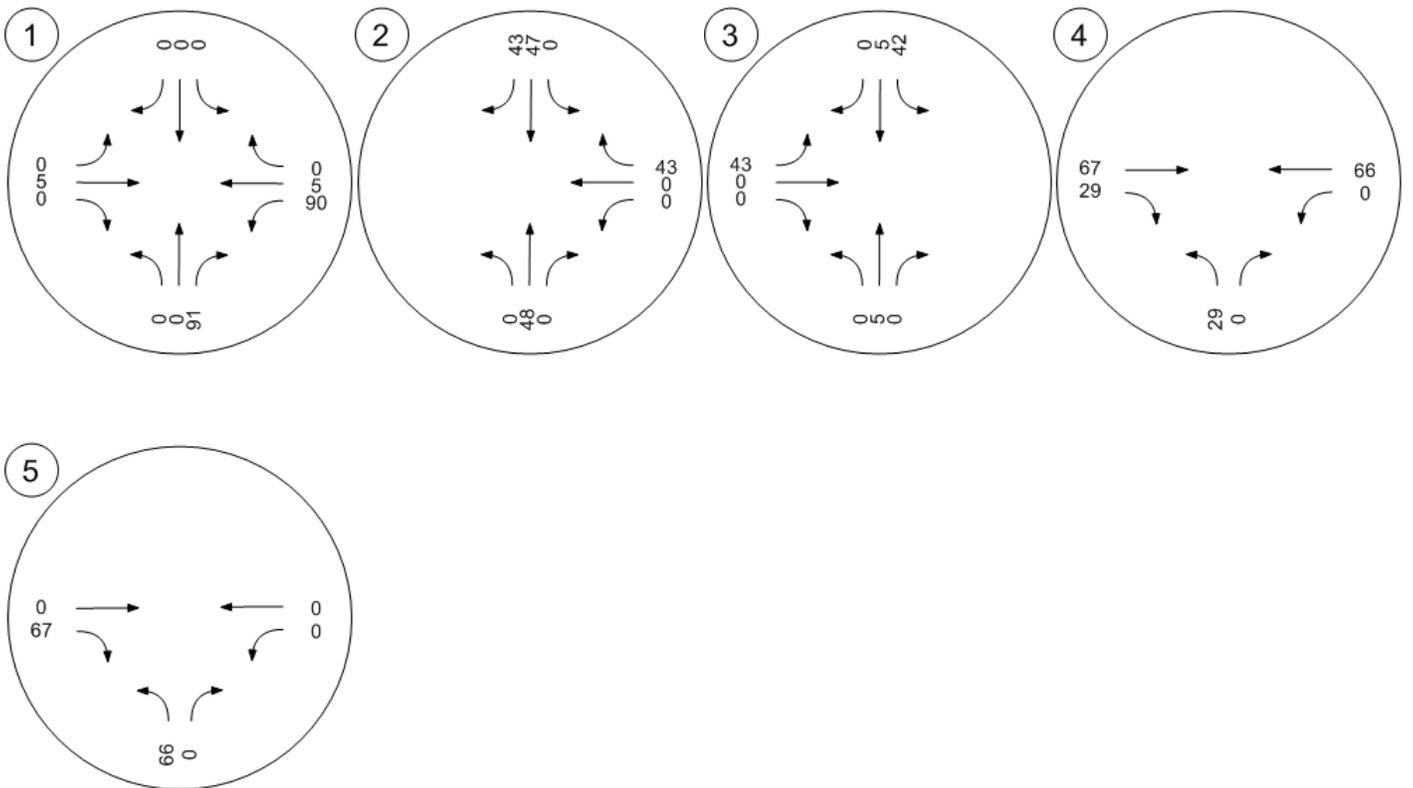
Traffic Volume - Base Volume



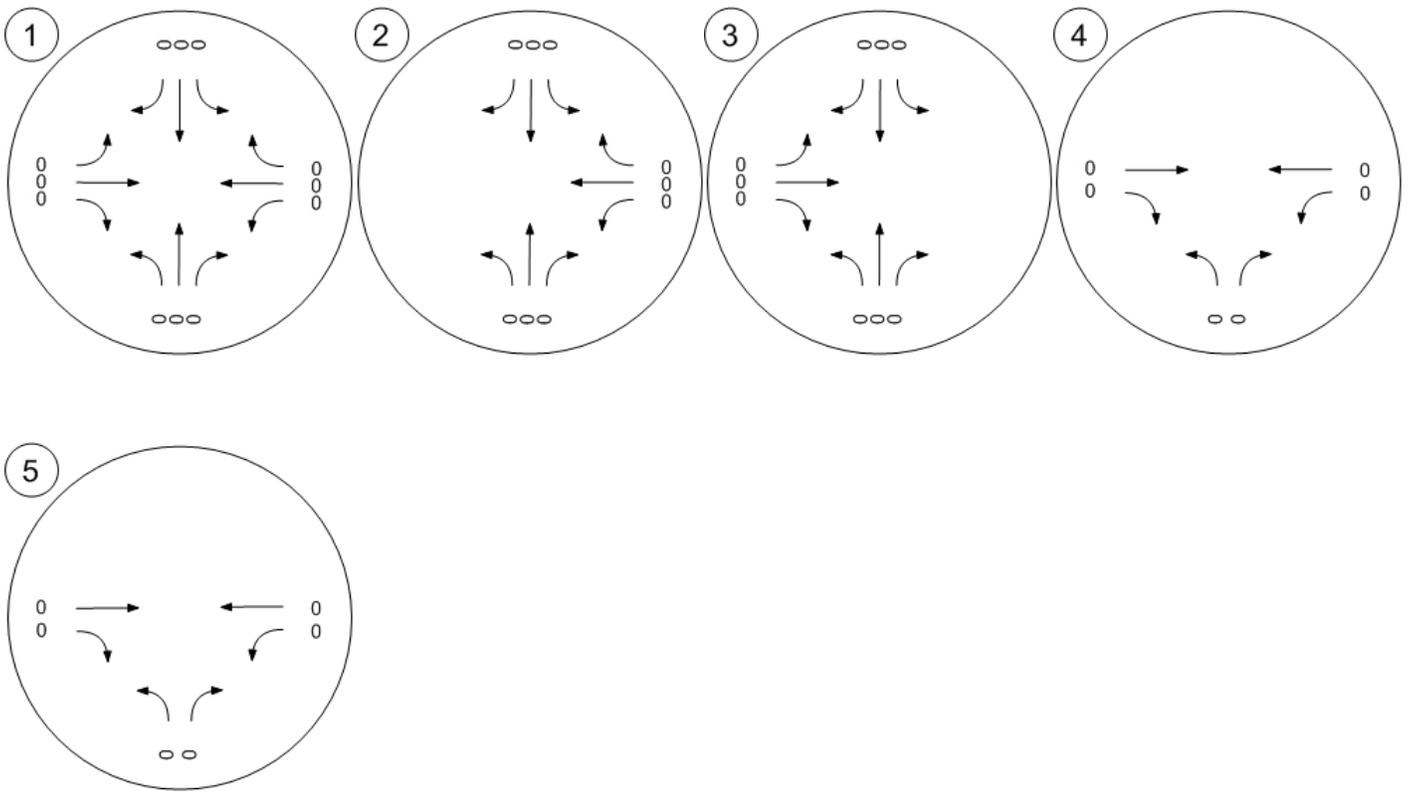
Traffic Volume - In-Process Volume



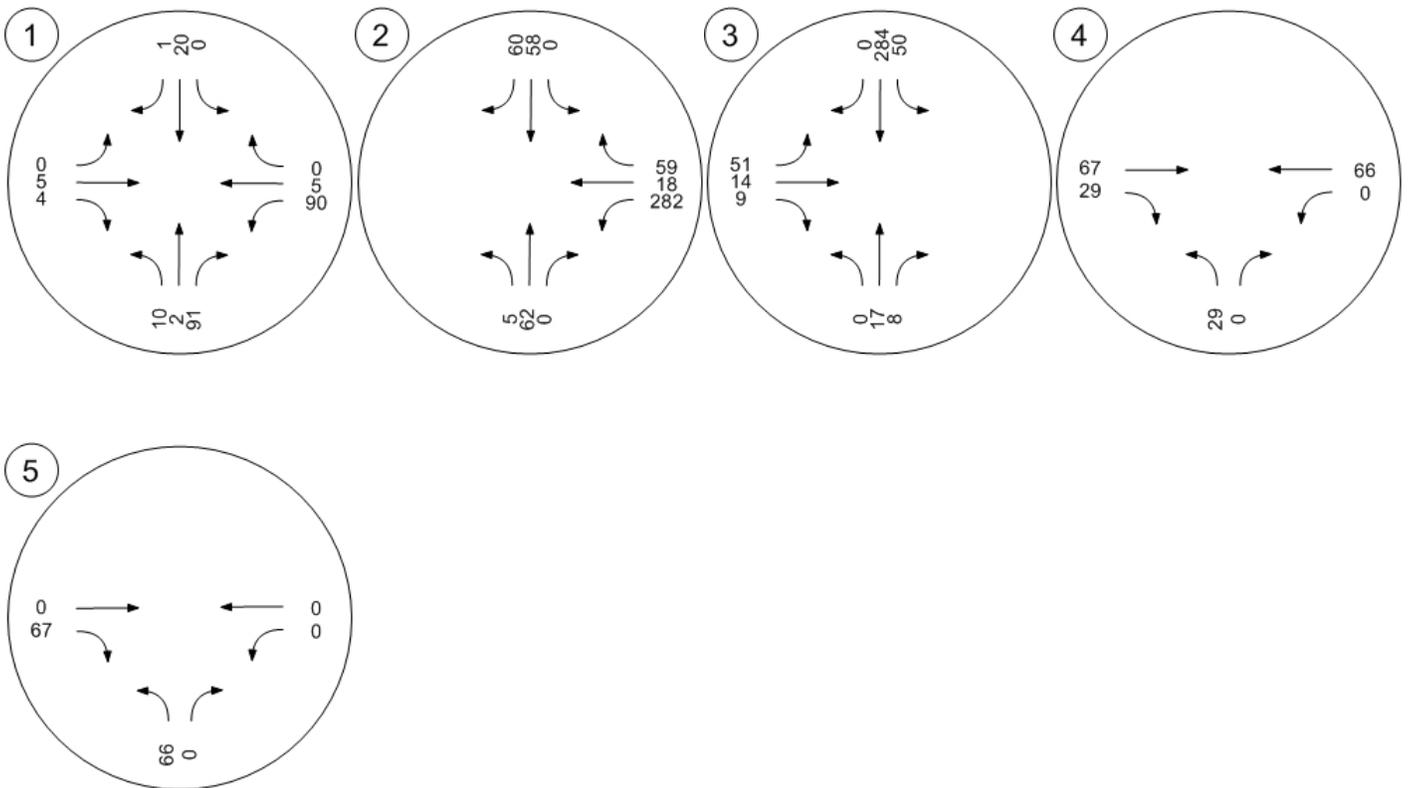
Traffic Volume - Net New Site Trips



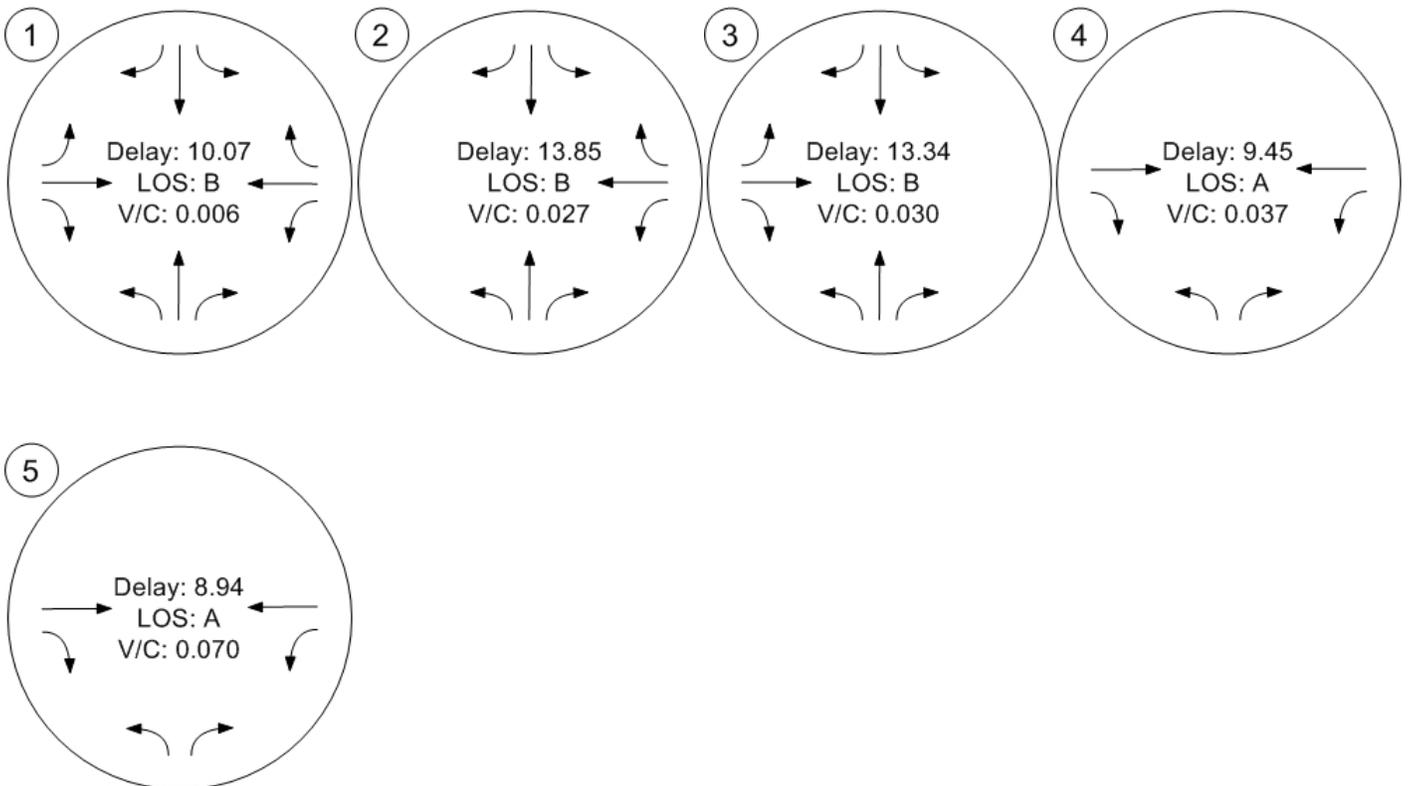
Traffic Volume - Other Volume



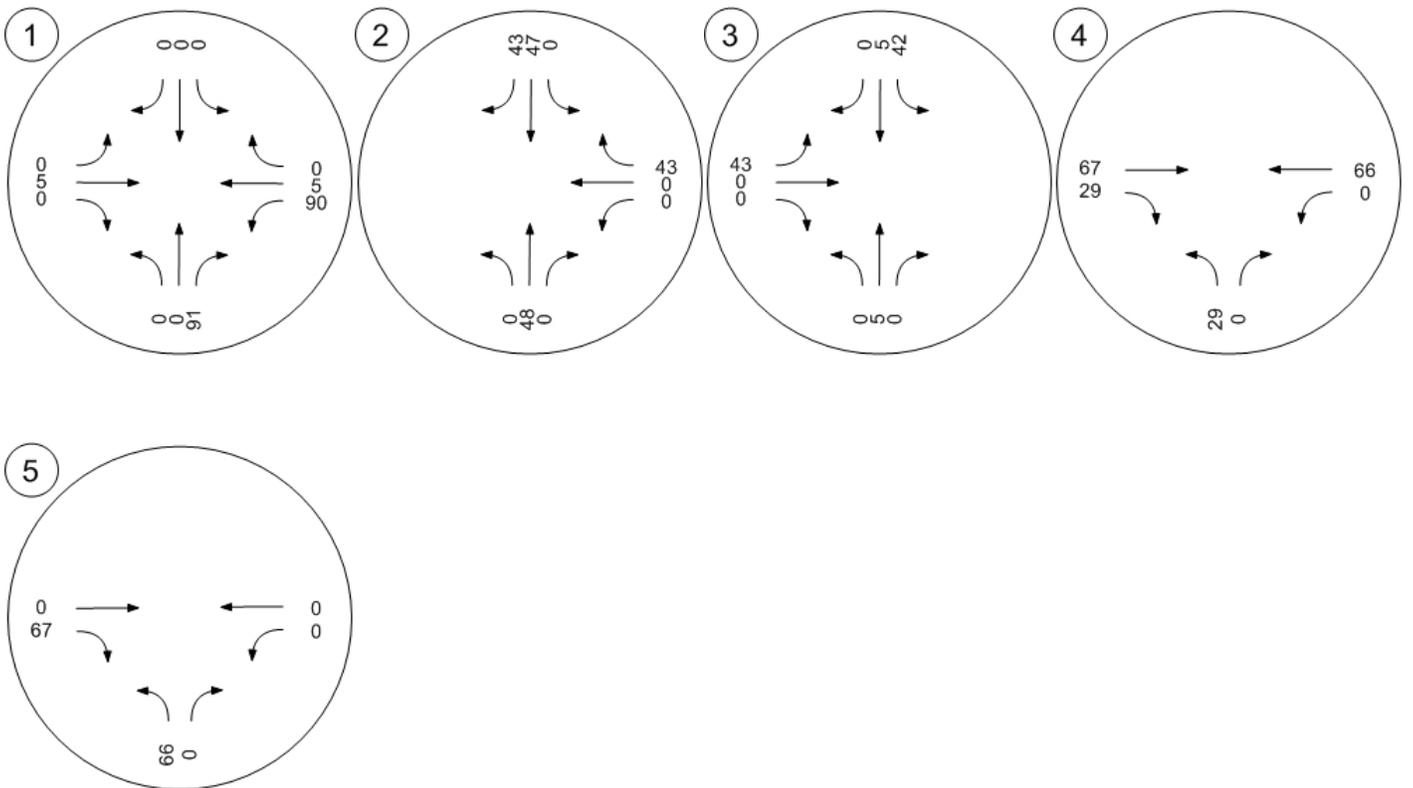
Traffic Volume - Future Total Volume



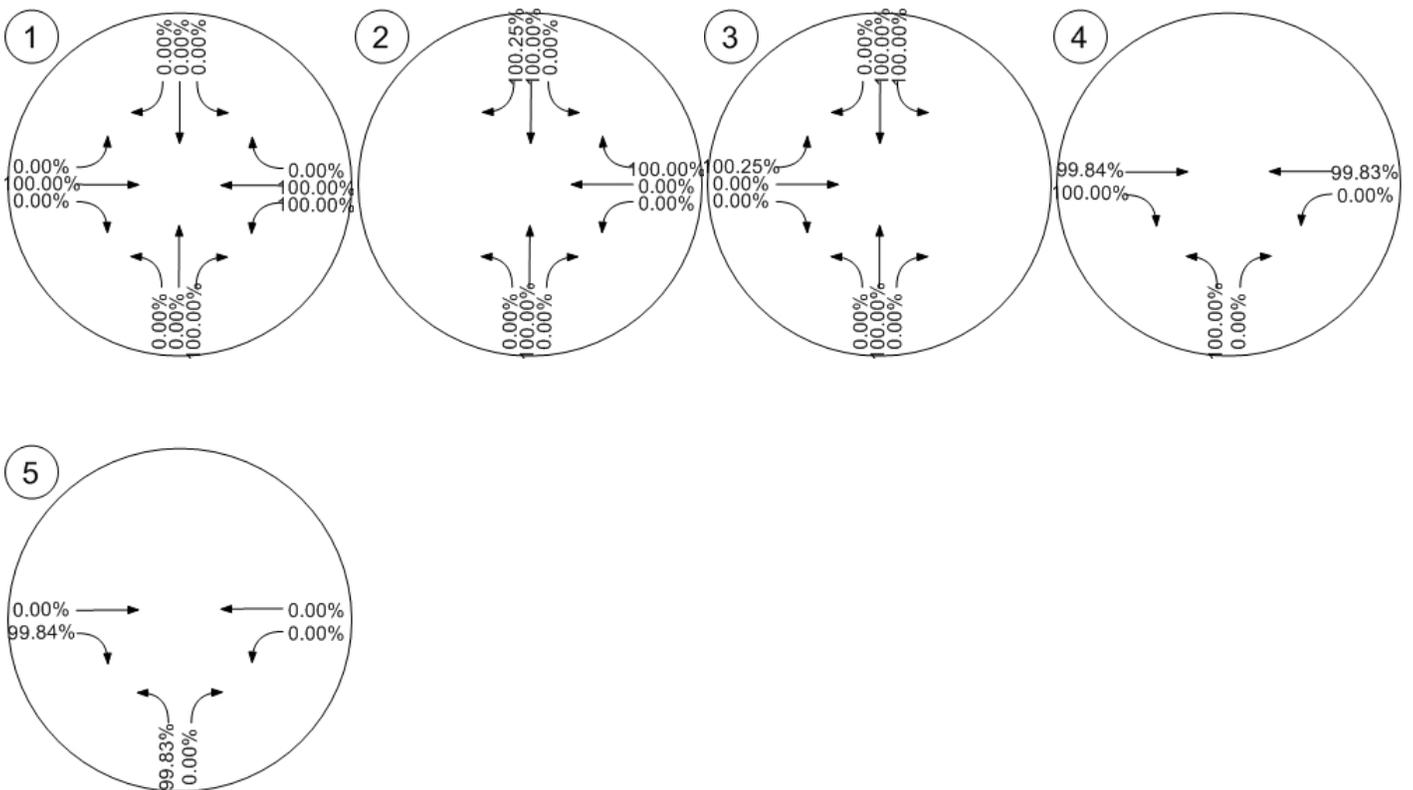
Traffic Conditions



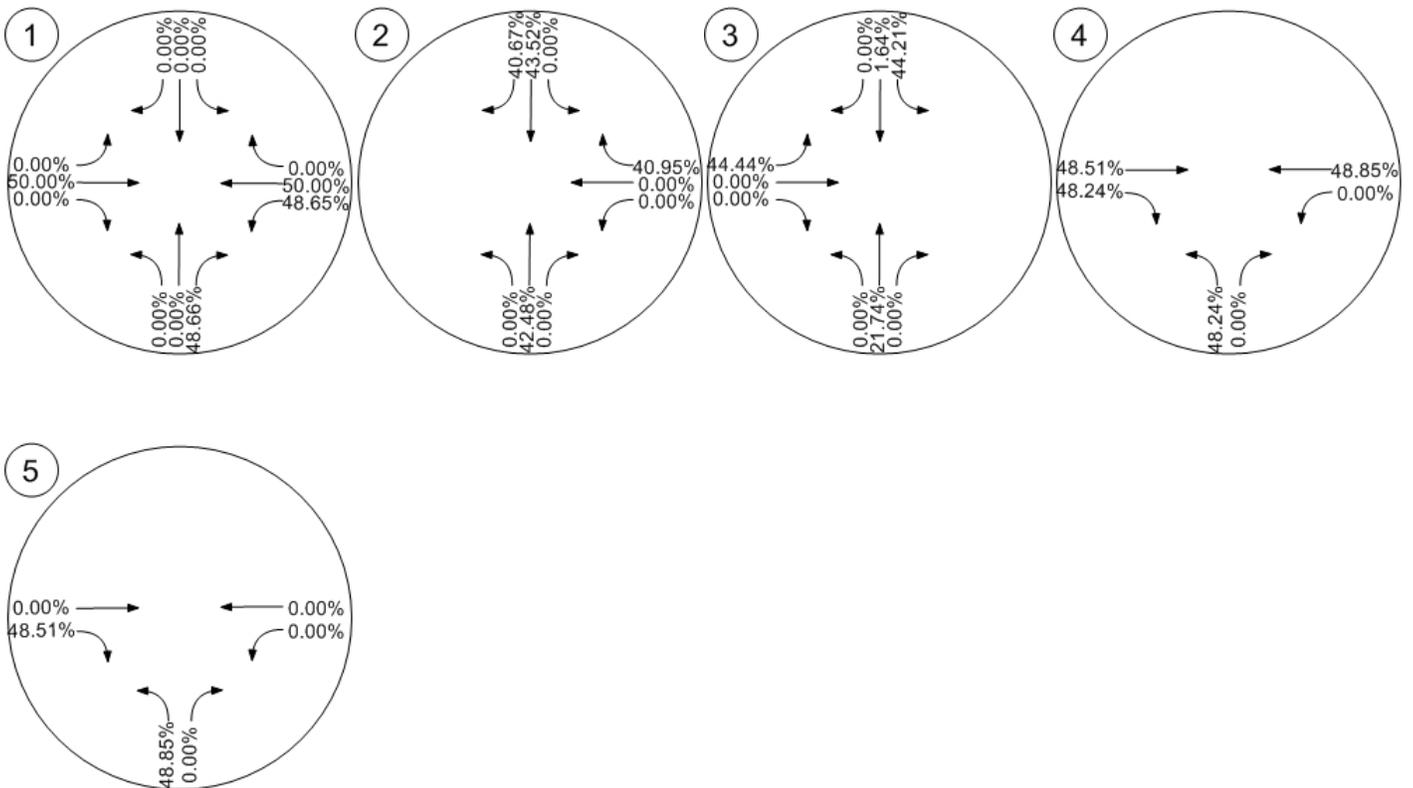
Fair Share - Fair Share Volumes - Zone 1: Project



Fair Share - Fair Share % of Net New Site - Zone 1: Project



Fair Share - Fair Share % of Total Analysis - Zone 1: Project



**APPENDIX G**

**PASS-BY TRIPS**

# Pass-by, Primary, and Diverted Linked Trips

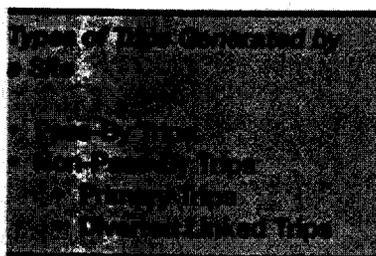
## 5.1 Background

The trip generation rates and equations contained in *Trip Generation* are derived from actual measurements of traffic generated by individual sites. These rates and equations represent vehicles entering and exiting a site at its driveways. Therefore, these volumes are appropriate for determining the total traffic to be accommodated by site driveways.

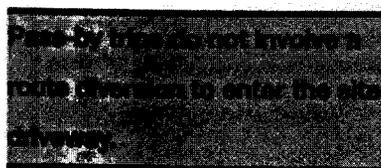
The pass-by trip-making phenomenon, if estimated to be significant, should be recognized when examining the traffic impact of a development on the adjacent street system.

There are instances, however, when the total number of trips generated by a site is different from the amount of new traffic added to the street system by the generator. For example, retail-oriented developments such as shopping centers, discount stores, restaurants, banks, service stations, and convenience markets often locate adjacent to busy streets in order to attract the motorists already on the street. These sites attract a portion of their trips from traffic passing the site on the way from an origin to an ultimate destination. These retail trips may not add new traffic to the adjacent street system.

Trip-making can be broken down into two major categories: **pass-by trips** and **non-pass-by trips**. In some traffic impact study applications, it is necessary to further subdivide non-pass-by trips into **primary trips** and **diverted linked trips**. These trip types are illustrated in figure 5.1 and are defined below.



*Pass-by trips* are made as intermediate stops *on the way* from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site *on an adjacent street* or roadway that offers direct access to the generator. **Pass-by trips are not diverted from another roadway.**



*Non-pass-by trips* are simply all trips generated by a site that are not pass-by trips. This term is sometimes used when diverted linked trips are not tabulated separately from primary trips.

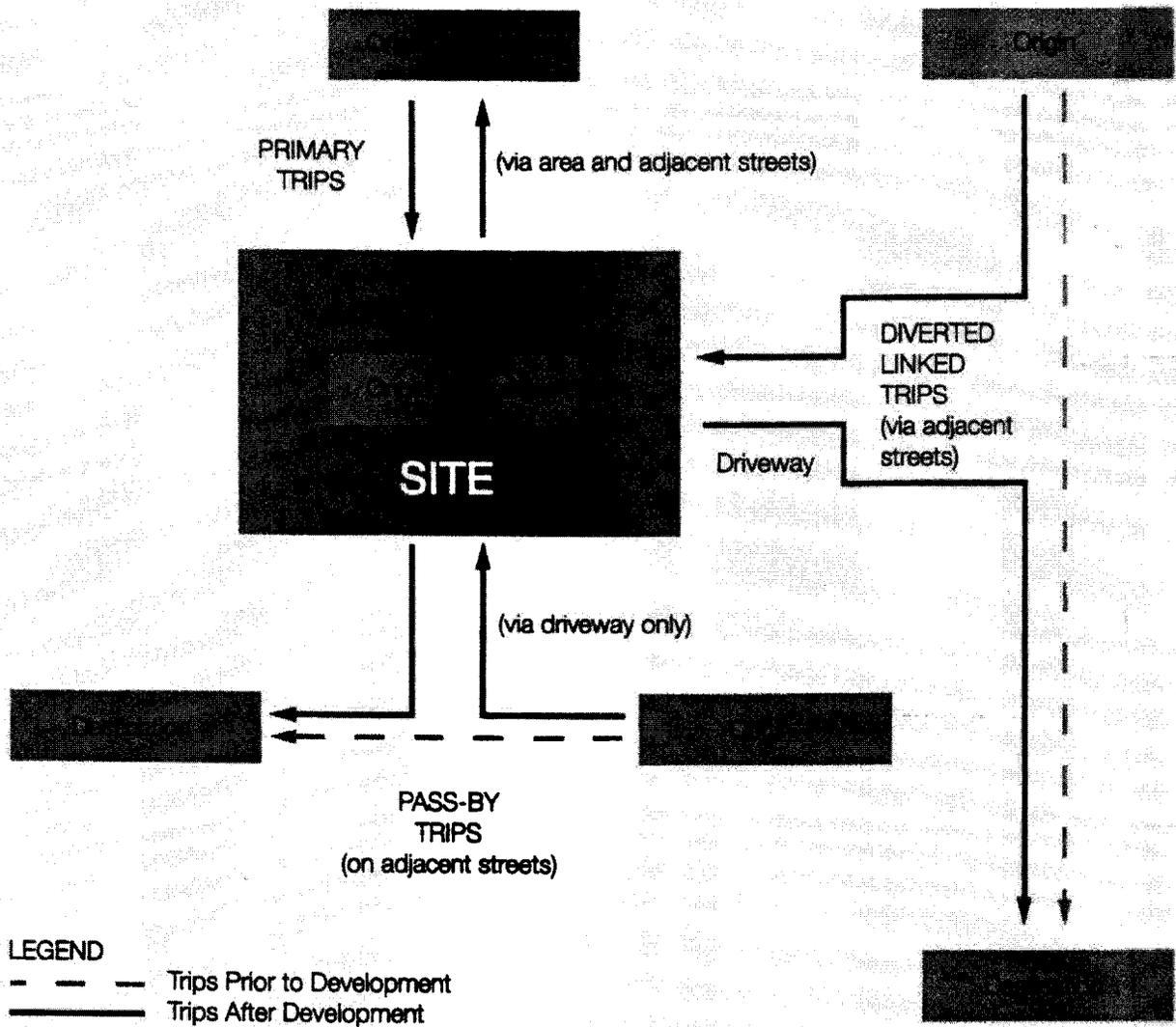
*Primary trips* are trips made for the specific purpose of visiting the generator. The stop at the generator is the primary reason for the trip.

The trip typically goes from origin to generator and then returns to the origin. For example, a home-to-shopping-to-home combination of trips is a primary trip set.

*Diverted linked trips* are trips that are attracted from the traffic volume on roadways within the vicinity of the generator but that require a diversion from that roadway to another roadway to gain access to the site. These trips could travel on highways or freeways adjacent to a generator, but without access to the generator.

**Diverted linked trips add traffic to streets adjacent to a site, but may not add traffic to the area's major travel routes** (see figure 5.1). Both pass-by and diverted linked trips may be part of a multiple-stop chain of trips.

**Figure 5.1 Types of Trips**



## 5.2 Sample Application of Pass-By Trip Assignment Process

In this example, the objectives are to (1) estimate the number of new trips added to the adjacent street traffic volume with the development of a shopping center with 580,000 square feet of gross leasable area, and (2) determine the turn movements at the shopping center driveway. The forecasted two-way evening peak hour traffic on a street adjacent to the proposed shopping center is 1,200 vehicles, as shown in figure 5.2(A)—1,000 traveling west and 200 traveling east.

### Objective of Assignment Process:

Determine (1) turn movements at a shopping center driveway and (2) trips added to the adjacent street traffic volume.

The shopping center is estimated to generate 2,000 evening peak hour trips (based on the fitted curve equation given for Land Use Code 820 on page 1,339 of *Trip Generation*, Sixth Edition). An assessment of the shopping center parking configuration and access points indicates that an estimated 20 percent of the site-generated traffic will use the driveway being analyzed in this example. Thus, the driveway volume is estimated to be 400 evening peak hour trips (i.e., 20 percent of 2,000 trips). For this

example, 50 percent enter and 50 percent exit the shopping center (as shown in figure 5.2(B)).

From data collected at other shopping centers, it is estimated (in this example) that about 15 percent of the driveway volume is pass-by (figure 5.2(B)). Therefore, 30 of the inbound vehicles (i.e., 15 percent of 200 vehicles) and 30 of the outbound vehicles are considered pass-by trips.

The assumed trip distribution for the non-pass-by trips is shown in figure 5.2(C). These values are based on local knowledge of expected trip patterns for primary and diverted linked trips to and from the shopping center (based on existing travel patterns, surrounding land uses, etc.). For example, 80 percent of the non-pass-by trips are expected to arrive from the east and to return to the east after the trip to the shopping center.

The distribution of the pass-by trips is based on the volume of traffic passing the driveway, as shown in figure 5.2(D). Because 83 percent of the traffic passing by the site comes from the east (i.e., 1,000 of the 1,200 shown previously in figure 5.2(A)), it is assumed that 83 percent of the pass-by trips will likewise arrive from the east and will depart toward the west.

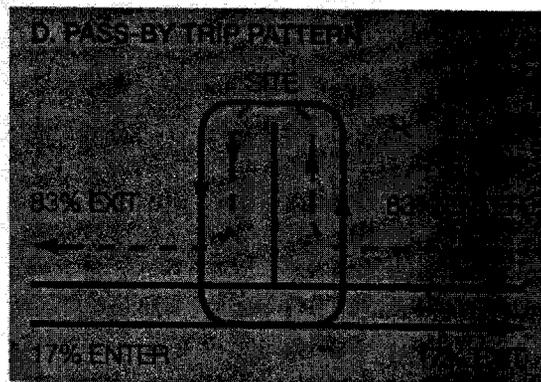
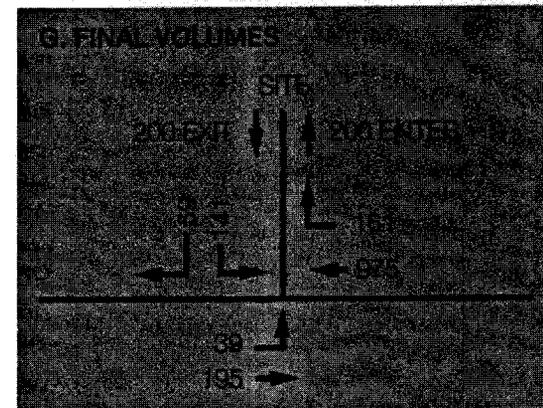
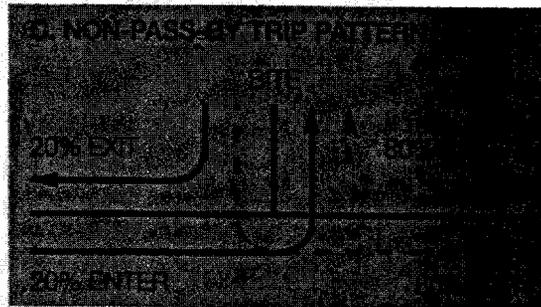
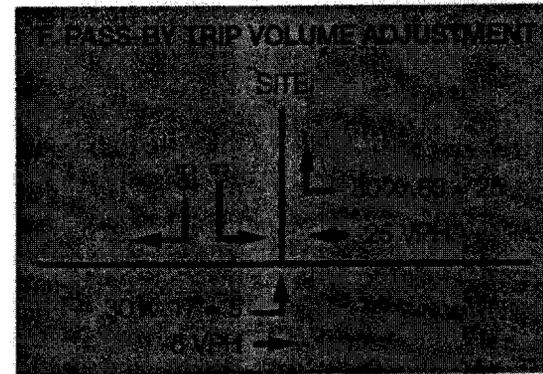
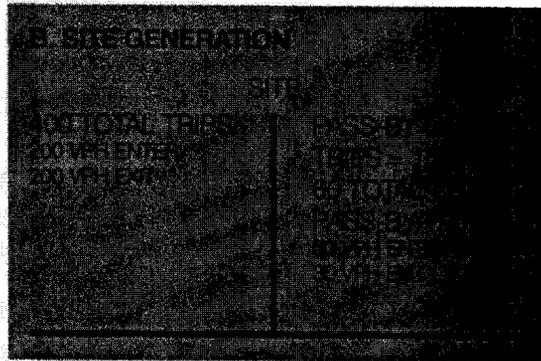
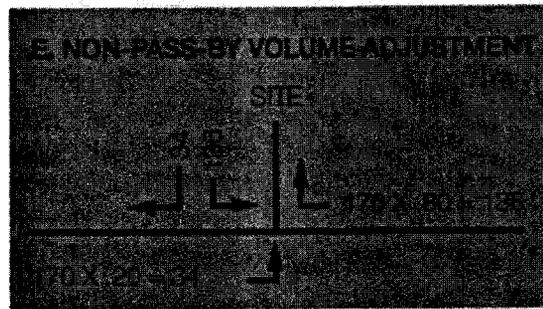
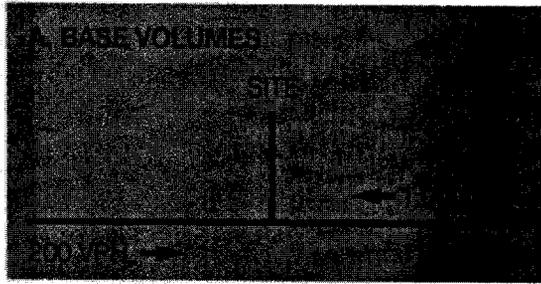
The assignment of the non-pass-by trips generated by the site is shown in figure 5.2(E). The total number

of non-pass-by trips destined to the site is 170 (the 200 total trips minus the 30 inbound pass-by trips shown earlier in figure 5.2(B)). Eighty percent (or 136) are expected to arrive from the east and to return to the east.

The assignment of the pass-by trips is shown in figure 5.2(F). Of the 30 pass-by trips, 83 percent (or 25) arrive from the east and depart to the west. Likewise, 17 percent (or 5) arrive from the west and depart to the east. Note that the calculation also shows the expected through-trip reductions as the trips passing the site turn into the new driveway. For example, the new westbound right-turn volume of 25 causes a reduction in the westbound through movement.

The final assignment of all trips entering and leaving the shopping center driveway, as well as passing the driveway, is shown in figure 5.2(G). These values are simply the sum of the base volumes (from figure 5.2(A)), the non-pass-by trips generated by the site (from figure 5.2(E)), and the pass-by trips generated by the site (from figure 5.2(F)). Note that the through-traffic volumes in both directions on the major street are reduced as a result of the pass-by trip analysis.

**Figure 5.2 Application of Pass-By Trips**



**LEGEND**  
 VPH = Vehicles per hour

### 5.3 Cautions

Statistical analysis and correlation of the pass-by data collected by the profession continue to evolve. However, due to the limited amount of pass-by data available and the inherent variability in surveyed site characteristics, it has still proven difficult to obtain high correlation indices.

Pass-by trips are closely linked to the size of the development and to the volume of traffic on the adjacent street that can deliver the pass-by trip. However, predictive mathematical relationships have been elusive.

Traditional pass-by trip analyses have attempted to correlate pass-by trip percentages (i.e., percent of the total number of trips generated by a site) with units of occupied site development (such as gross leasable area, gross floor area, seats in a restaurant, or fueling positions at a gas/service station). Limited results for some land uses show that this correlation can be enhanced further

by including the magnitude of the traffic passing the site on the adjacent roadways.

The analyst should exercise caution in the use of pass-by and diverted linked data presented in this chapter to ensure that the following aspects of pass-by trip characteristics are handled appropriately in the analysis process.

Diverted linked trips are clearly different from pass-by trips.

Diverted linked trips add trips to the adjacent roads at a proposed or expanded site, but may not add trips to nearby major highways or freeways.

Diverted linked trips are often difficult to identify. Therefore, **diverted linked trips should be treated similarly to primary trips**, unless: (1) all three (primary, pass-by, and diverted linked) categories are being analyzed and processed separately, and (2) the travel routes for diverted linked trips can be clearly established.

Pass-by trips are drawn from the passing traffic stream, **but are always included in the site driveway movements**. In traffic analyses, summation of driveway

volumes must equal the total external site generation (i.e., the sum of primary, pass-by, and diverted linked trips). Pass-by trips are not included in (and thus, subtracted from) the through-volumes passing a given site access point on an adjacent road. Standard methodologies for assessing the traffic impacts of site development typically require that diverted linked trips be included as additional trips within the confines of local impact assessment studies.

In a multi-use development, it is likely that there will be trips internal to the site (refer to chapter 7 for guidance). Before applying the pass-by reduction, the internal trips should be removed from the total number of trips generated by the multi-use site. **Pass-by trips are only applicable to trips that enter or exit the site, not internal trips.**

Overall, diverted linked trips represent a change in local area travel patterns but constitute no new increase on a *macroscopic* scale. Within the immediate study area, diverted linked trips do represent additional traffic on individual streets and should be analyzed that way.

## 5.4 Data Base on Pass-By, Primary, and Diverted Linked Trips

Listed in table 5.1 are 19 land uses for which ITE has received and compiled pass-by and diverted linked trip data. The table denotes whether the data are presented in this handbook in a table or a figure (in a data plot similar to those presented in *Trip Generation* for trip end data). Table 5.1 also identifies the time periods for which the data have been reported.

Tables 5.2 through 5.26 present the values for percentage of site generation that is accounted for by pass-by, non-pass-by, primary, and diverted linked trips.

Figures 5.3 through 5.15 plot the average *pass-by* trip percentages associated with the various land uses. No plots are provided for *diverted linked* trips. These figures are provided to enable the user to visualize the data scatter provided in tables 5.2 through 5.26.

Data plots are provided for each land use where nine or more data points are available for a specific independent variable.

For all land uses except shopping centers, data are plotted for only one independent variable. For shopping centers, data are plotted for GLA and peak hour traffic on adjacent streets for the weekday evening peak period; GLA is also used as the independent variable for shopping centers during the midday Saturday time period.

A regression equation is shown on the data plot if there are more than 10 points and the  $R^2$  is greater than 0.25 (which only occurs on two of the Land Use Code 820 data plots). Note that this threshold is less than the 0.5 threshold for  $R^2$  used for data plots in *Trip Generation*.

**Recommended guidelines for using the data presented in these figures and tables are provided in section 5.5 of this chapter. In particular, the guidelines recommend when to use the data and how to select a pass-by percentage.**

Users of the data are cautioned that the number and geographic distribution of sites are limited. Little or no data on adjacent street traffic volumes have been collected for uses other than shopping centers. The actual pass-by and diverted

The pass-by data listed in table 5.1 were collected during peak periods. These pass-by relationships may differ from those during the peak hour.

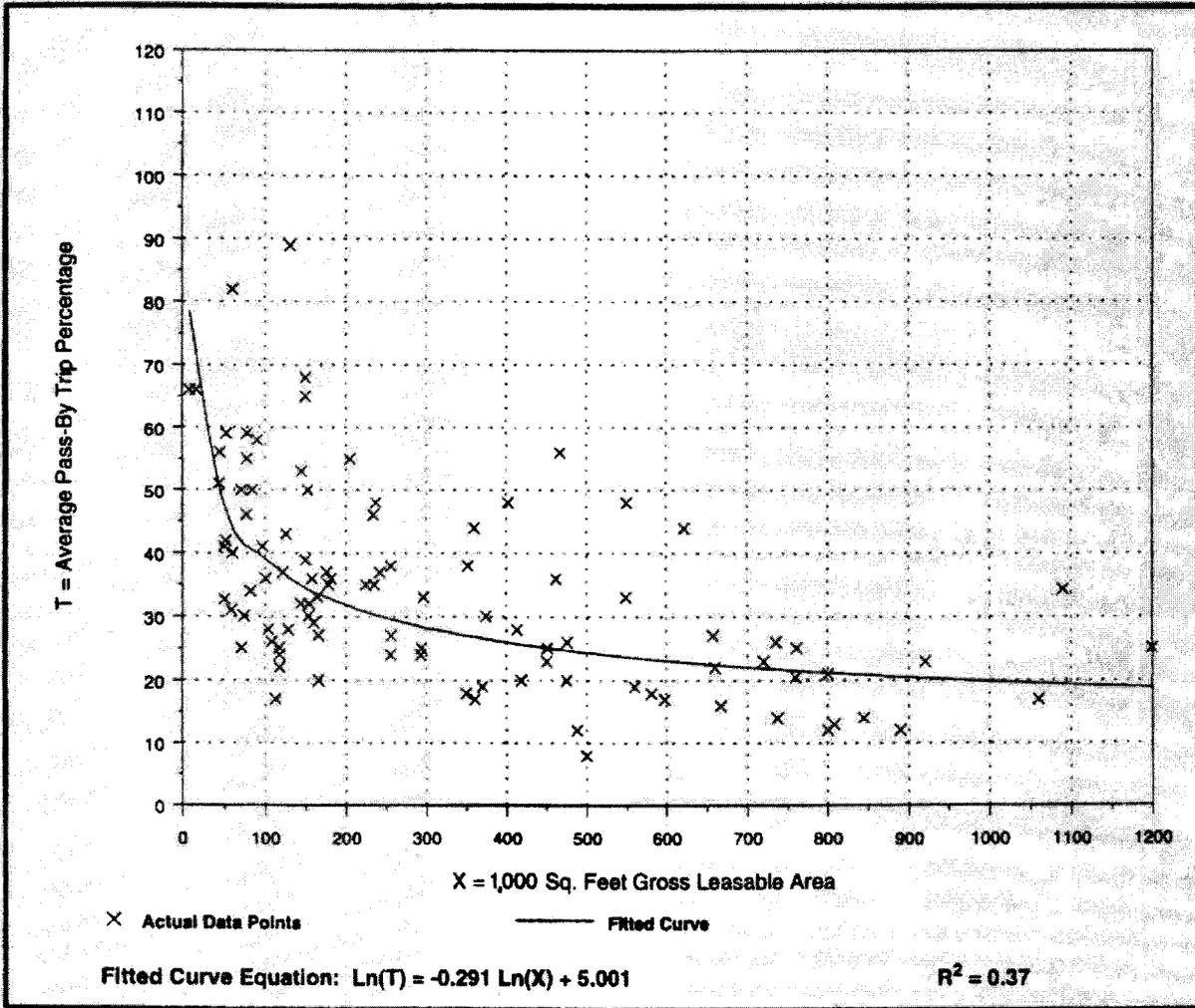
linked trip percentages may vary by site due to the specific influences of the characteristics of passing traffic, area roadway network patterns, specific businesses in the site being analyzed, other nearby development, and so forth. Surveys of similar developments near the analysis site are encouraged.

Because data are limited for many of the land uses, the analyst is encouraged to collect pass-by trip data and transmit the data to ITE. Section 5.6 of this chapter describes how to collect the appropriate data and provides sample forms to use.

**Figure 5.5 Shopping Center (820)**

**Average Pass-By Trip Percentage vs: 1,000 Sq. Feet Gross Leasable Area**  
**On a: Weekday, P.M. Peak Period**  
Number of Studies: 100  
Average 1,000 Sq. Feet GLA: 329

**Data Plot**





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