F-2 Recirculated DEIR
Volumes I and II
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RECIRCULATED DRAFT
ENVIRONMENTAL IMPACT REPORT

FOR THE

HARPER CANYON (ENCINA HILLS) SUBDIVISION

SCH# 2003071157
PLN 000696

VOLUME I OF II
(VOLUME II ON CD ONLY)

PREPARED FOR:

COUNTY OF MONTEREY RESOURCE MANAGEMENT AGENCY
PLANNING DEPARTMENT
168 W. Alisal Street, 2nd Floor
Salinas, CA 93901

PREPARED BY:

PMC®

DECEMBER 2009

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Prepared for:

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PLANNING DEPARTMENT
168 W. ALISAL STREET, 2ND FLOOR
SALINAS, CA 93901
Contact: Taven Kinison Brown
Planning and Building Services Manager
(831) 755-5173

Prepared by:

PMC
585 Cannery Row, Suite 304
Monterey, California 93940
(831) 644-9174

DECEMBER 2009

This Recirculated Draft Environmental Impact Report (RDEIR) has been prepared by the County of Monterey Resource Management Agency - Planning Department (hereinafter "County of Monterey"), as lead agency, pursuant to applicable provisions of the California Environmental Quality Act (CEQA) and its implementing guidelines *(CEQA Guidelines)*. This RDEIR discloses revisions made to the Draft Environmental Impact Report (DEIR) prepared for the Harper Canyon/Encina Hills Subdivision (hereinafter "proposed project") pursuant to Section 15088.5 of the *CEQA Guidelines*. A lead agency is required to recirculate an EIR when significant new information is added to the DEIR after public notice is give of the availability of the DEIR but before certification of the document. This RDEIR specifically reflects changes made to **Section 3.10, Transportation and Circulation**.

1.1 BACKGROUND AND PURPOSE

The application for the proposed project was deemed complete by the Planning Department on November 22, 2002. To evaluate the environmental effects of the proposed project, an Initial Study/Mitigated Negative Declaration was prepared in July 2003 and was circulated to local, regional, and state agencies for a 30-day public review period from July 24, 2003 through August 22, 2003. The Monterey County Planning Commission considered the project at their January 12, 2005 meeting. A motion was made at that meeting to direct staff to proceed with an Environmental Impact Report (EIR). The project applicant appealed the decision by the Planning Commission; however, the Board of Supervisors referred the project back to the Monterey County Planning Department for preparation of an EIR.

The County of Monterey prepared and distributed a DEIR for the proposed project in October 2008. Upon completion of the DEIR, the County filed a Notice of Completion (NOC) with the State Office of Planning and Research, in accordance with Section 155085 of the CEQA Guidelines. This began a 45-day public review period (Public resources Code, Section 21161) for the DEIR, which ended on December 5, 2008. Following the end of the public review period for the DEIR, the County of Monterey determined that significant new information existed and decided to address traffic issues raised during the public review period by recirculating relevant portions of the DEIR pursuant to Section 15088.5 of the CEQA Guidelines.

The purpose of the RDEIR is to disclose the significant new information identified to address traffic issues or mitigation measures as raised during the public review period for the DEIR pursuant to Section 15088.5 of the CEQA Guidelines. These changes are specifically limited to **Section 3.10, Transportation and Circulation**. Therefore, only this technical section (and supporting traffic impact analysis) is included in the RDEIR. Significant new information addressed by the RDEIR includes, but is not limited to, the adoption of the Regional Development Impact Fee by the Transportation Agency of Monterey County (TAMC) and the language of traffic mitigation measures.

1.2 INTENDED USES OF THIS RDEIR

This RDEIR provides the updated environmental information and an evaluation of traffic and circulation necessary for the planning and construction of the proposed project. This document will be used by the County of Monterey, and any other responsible or reviewing agency, to identify and evaluate the significant environmental issues associated with traffic and/or circulation related to proposed project. Likewise, this RDEIR provides the environmental information and evaluation needed by responsible agencies acting on applicable permits relative to the proposed project and the project site.

1.3 ENVIRONMENTAL REVIEW PROCESS

The California Environmental Quality Act (CEQA) and the County of Monterey encourage public participation in the planning and environmental review process. Opportunities will be provided for the public to present comments and concerns regarding the CEQA and planning process through a CEQA public review and comment period and public hearings and/or meetings before the County of Monterey Planning Commission and Board of Supervisors. The review and certification process for the RDEIR will involve the following procedural steps:

PUBLIC NOTICE/PUBLIC REVIEW

Upon completion of the RDEIR, the County of Monterey will file a Notice of Availability (NOA) with the State Office of Planning and Research at the same time it sends a notice of completion (NOC), in accordance with Section 15086 of the CEQA Guidelines. In addition, the County of Monterey provides public NOA of the RDEIR for public review in accordance with CEQA Guidelines Sections 15087(a), and circulates the document to responsible and trustee agencies, other affected agencies, surrounding cities, and interested parties, as well as all parties requesting a copy of the DEIR or commented on the DEIR in accordance with Public Resources Code 21092(b) and 21092.1. During the 45-day public review period, the RDEIR is available for review at the County of Monterey Resource Management Agency – Planning Department located at 168 West Alisal, 2nd Floor, Salinas, CA, 93901.

All written comments should be limited to the traffic and circulation revisions included in the RDEIR and should be submitted to:

Taven Kinison Brown, Planning Services Manager
County of Monterey Resource Management Agency - Planning Department
168 West Alisal, 2nd Floor
Salinas, CA 93901
Tel: (831) 755-5173

Email comments to: ceqacomments@co.monterey.ca.us.
Fax comments to: (831) 757- 9516

Comments pertaining to the revised sections are welcome during the 45-day public review period. Comments previously submitted on sections other than those being recirculated do not need to be resubmitted. Comments may be submitted in hard copy to the name and address above. The Planning Department also accepts comments via e-mail or facsimile but requests that you follow these instructions to ensure that the Department has received your comments.

An e-mailed document should contain the name of the person or entity submitting the comments and contact information such as phone number, mailing address and/or e-mail address and include any and all attachments referenced in the e-mail. To ensure a complete and accurate record, we request that you also provide a follow-up hard copy to the name and address listed above. If you do not wish to send a follow-up hard copy, then please send a second e-mail requesting confirmation of receipt of comments with enough information to confirm that the entire document was received. If you do not receive e-mail confirmation of receipt of comments, then please submit a hard copy of your comments to ensure inclusion in the environmental record or contact the Monterey County Resource Management Agency - Planning Department to ensure they have received your comments.

Facsimile (fax) copies will be accepted with a cover page describing the extent (e.g. number of pages) being transmitted. A faxed document must contain a signature and all attachments referenced therein. Faxed document should be sent to the contact noted above. To ensure a complete and accurate record, we request that you also provide a follow-up hard copy to the name and address listed above. If you do not wish to send a follow-up hard copy, then please contact the Monterey County Planning Department to confirm that the entire document was received.

RESPONSE TO COMMENTS/FINAL EIR

Upon completion of the 45-day public review period, written responses to all significant environmental issues raised will be addressed in the Final EIR (FEIR). The FEIR will be made available for review at least 10 days prior to the public hearing before the final decision-making body, at which time the certification of the Final EIR will be considered. The FEIR will consist of the DEIR, RDEIR, comments received, responses to comments on both the DEIR and RDEIR, and any resulting text changes.

The RDEIR consists primarily of a revised Traffic and Circulation section. Comments on the revised section are welcome and will be responded to. As this revised section replaces the traffic section in the DEIR in its entirety, previous comments received on the DEIR related to traffic will not be addressed.

CERTIFICATION OF THE EIR

If the County of Monterey finds that the FEIR is "adequate and complete," the County may certify the FEIR. The rule of adequacy generally holds that the EIR can be certified if: 1) it shows a good faith effort at full disclosure of environmental information, and 2) provides

sufficient analysis to allow decisions to be made regarding the project in contemplation of environmental considerations.

PROJECT CONSIDERATION

Upon review and consideration of the FEIR, the County of Monterey may act upon the proposed project. A decision to approve the proposed project would be accompanied by written Findings in accordance with CEQA Guidelines Section 15091 and, if applicable, Section 15093 (Statement of Overriding Considerations).

MITIGATION MONITORING

The County of Monterey must also adopt a Mitigation Monitoring and Reporting Program (MMRP) for mitigation measures that have been incorporated into or imposed upon the project to reduce or avoid significant effects on the environment (Public Resources Code Section 21081.6(a)). This program will be designed to ensure that these measures are carried out during project implementation. The specific reporting or monitoring program required by CEQA is not required to be included in the EIR. Throughout the EIR, however, mitigation measures have been clearly identified and presented in language that will facilitate establishment of a monitoring and reporting program. Any mitigation measures adopted by the County of Monterey as part of the certified FEIR will be considered as conditions for approval of the project and will be included in the Mitigation Monitoring and Reporting Program to ensure and verify compliance.

1.4 SCOPE AND ORGANIZATION

As mentioned above, the only technical section that has been revised and therefore included in the RDEIR is:

SECTION 3.0 - ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

This section describes the existing project setting, discusses the environmental impacts of the proposed project, describes cumulative impacts, and identifies mitigation measures for the environmental impacts examined in this EIR. This document reflects changes made to the following subsection:

- **3.10 Transportation and Circulation:** This subsection examines potential impacts on the area roadway network, including roadway segments and intersections along State Route 68. Existing roadway conditions, existing conditions plus the project conditions, and cumulative conditions are evaluated herein. The conclusions are based on a traffic impact analysis prepared by Hatch Mott MacDonald (formerly Higgins Associates), as updated in December 2009. The report was revised to address comments received on the DEIR and to reflect adoption of the Regional Development Impact Fee by the TAMC.

APPENDICES

Appendix I has been updated to reflect a revised Traffic Impact Analysis prepared by Hatch Mott MacDonald (formerly Higgins Associates) in December 2009. This updated report has been included in Volume II.

This section of the RDEIR evaluates the potential traffic and circulation impacts along the State Route 68 corridor resulting from implementation of the proposed project. The analysis is largely based on a project-specific traffic impact analysis prepared by Higgins Associates (now Hatch Mott MacDonald) in May 2008 under contract with PMC as part of the EIR, as updated in December 2009. The traffic impact analysis analyzes Existing Conditions; Background Conditions; Background Plus Project Conditions; and Cumulative Conditions. The results of this traffic impact analysis are summarized herein. For detailed supporting analysis, the reader is referred to the traffic impact analysis included in **Appendix I**.

3.10.1 ENVIRONMENTAL SETTING

EXISTING ROADWAY SYSTEM

Monterey County's roadway system is a network of 2,274 miles of county roads, State highways and city streets. The 1,278 miles of county roads are the largest component of the roadway network. The major State highways include Highways 1, 68, 101 and 156 providing travel between cities while minor Highways 25, 146, 183, 198 and 218 serve minor arterial functions similar to county roads. The Daily Vehicle Miles of Travel (VMT) and Average Daily Traffic (ADT) have increased steadily since the 1970s, with the highest levels of increase in the State Route 68 corridor between Salinas and Monterey, along Carmel Valley Road and Highway 1.

The roadway system within the project vicinity stretches from the State Route 68 at State Route 218 intersection in the west to the State Route 68 at San Benancio Road intersection in the east. The following is a brief description of each of the roadways in the project vicinity:

State Route 68 (Monterey-Salinas Highway)

State Route 68 is a two-lane rural highway connecting State Route 1 in Monterey and State Route 101 in Salinas. The speed limit on State Route 68 is 55 miles per hour. It serves as a commuter route between the City of Salinas and the Monterey Peninsula, provides access to the low-density developments along it, and functions as a scenic tourist route to the Monterey Peninsula.

State Route 218 (Canyon Del Rey Boulevard)

State Route 218 is a two-lane highway that connects State Route 68 and State Route 1. It provides access to the cities of Del Rey Oaks, Sand City, and Seaside. The intersection of State Route 218 and State Route 68 is signal controlled.

York Road

York Road provides access to some single-family housing developments and a private school, as well as the Laguna Seca Office Park and Ryan Ranch Business Park located to

the north of State Route 68. The speed limit on York Road is 25 miles per hour. The intersection of State Route 68 and York Road is signal controlled.

Pasadera Drive

Pasadera Drive is a private road to the north side of State Route 68 providing access to the Pasadera Country Club and its associated single-family housing development. The speed limit on Pasadera Drive is 25 miles per hour. The intersection of State Route 68 and Pasadera Drive is signal controlled.

Boots Road

Boots Road provides access to a small number of residential developments to the south of State Route 68 at the same intersection where Pasadera Drive serves development to the north. The speed limit on Boots Road is 25 miles per hour. The intersection of State Route 68 and Boots Road is signal controlled.

Laureles Grade Road

Laureles Grade Road is a two-lane north/south County road that connects State Route 68 with Carmel Valley Road. The speed limit on Laureles Grade Road is 45 miles per hour and it also provides access to several residential developments. The intersection of State Route 68 and Laureles Grade Road is signal controlled.

Corral de Tierra Road

Corral de Tierra Road is located to the west of San Benancio Road. It is a two-lane collector street with a speed limit of 35 miles per hour. The intersection of State Route 68 and Corral Del Tierra Road is signal controlled.

San Benancio Road

San Benancio Road is a two-lane collector street with a speed limit of 35 miles per hour and it provides access to several residential developments. The intersection of State Route 68 and San Benancio Road is signal controlled.

Meyer Road

Meyer Road is a two-lane privately maintained road owned by Harper Canyon Realty LLC. The San Benancio Road / Meyer Road intersection is controlled by a stop sign on westbound Meyer Road.

LEVEL OF SERVICE

Performance of the County's roads and highways is evaluated based on level of service (LOS) calculations. There are six levels of service representing varying roadway conditions ranging from ideal, LOS "A" to forced flow, LOS "F." Level of Service A represents free

flow, un-congested traffic conditions. Level of Service F represents highly congested traffic conditions with unacceptable delay to vehicles at intersections. The intermediate Levels of Service represent incremental levels of congestion and delay between these two extremes. The level of service definitions are presented in **Table 3.10-1**, **Level of Service Definitions**.

All of the intersections and road segments that were analyzed are located along State Route 68. Monterey County has established LOS C as the acceptable level of operation for this major thoroughfare. CalTrans has identified this roadway as having a level of service standard of LOS C/D, which is considered to be LOS C, conservatively. Therefore, LOS C was used as the acceptable level of service standard for State Route 68.

TABLE 3.10-1
LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Signalized Intersection	Roadway Segments
		Average Control Delay Per Vehicle (Seconds)	Average Travel Speed (mph)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0	> 55
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1	50.1-55
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1	45.1-50
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1	40.1-45
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1	25.1-40
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0	≤25mph

Source: HatchMott MacDonald 2009

For purposes of the traffic impact analysis, six intersections and five roadway segments listed in **Table 3.10-2, Intersection and Roadway Segments Studied** were evaluated in the traffic impact analysis. These intersections are shown in **Figure 3.10-1, Intersections** with the intersection locations on the figure keyed to the numbering assigned below. Intersections were analyzed for the weekday A.M. (i.e., 7:00 to 9:00 A.M.) and P.M. (i.e.,

4:00 to 6:00 P.M.) peak periods. All intersections are signalized and allow right turns on red (RTOR). Three of the intersections experience high volumes of right-turns on the northbound approach, which include the intersections of State Route 68 with Laureles Grade Road, Corral de Tierra Road, and San Benancio Road.

TABLE 3.10-2
INTERSECTION AND ROADWAY SEGMENTS STUDIED

Intersections	Roadway Segments
1. State Route 218 at State Route 68	State Route 68 between:
2. York Road at State Route 68	1. State Route 218 and York Road
3. Pasadera Drive-Boots Road at State Route 68	2. York Road and Pasadera Drive-Boots Road
4. Laureles Grade at State Route 68	3. Pasadera Drive-Boots Road and Laureles Grade
5. Corral de Tierra Road at State Route 68	4. Laureles Grade and Corral de Tierra Road
6. San Benancio Road at State Route 68	5. Corral de Tierra Road and San Benancio Road

Source: HatchMott MacDonald 2009

The study analyzed traffic conditions under the following development scenarios:

- **Existing Conditions** - Existing volumes obtained from traffic counts.
- **Background Conditions** - Existing peak-hour traffic volumes plus traffic generated from approved, but not yet constructed developments in the larger study area.
- **Background Plus Project Conditions** – Background peak-hour traffic volumes plus traffic generated by the proposed project.
- **Cumulative Conditions** - Existing traffic volumes plus the estimated traffic generated by all approved and cumulative projects in the vicinity of the project site, as well as the proposed project. Cumulative projects are developments that are in the review process but have not yet been approved.

Insert Figure 3.10-1 (Intersections)

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Existing Conditions

Existing conditions analyzes traffic volumes for the study intersections and roadway segments, which were obtained from traffic counts conducted by Higgins Associates in August 2006.

Intersections

Five of the six study intersections currently operate at unacceptable levels of service for Existing Conditions as shown in **Table 3.10-3**, **Intersection Level of Service for Existing Conditions** during the A.M. peak hour. During the P.M. peak hour, four out of six intersections operate at unacceptable levels of service.

TABLE 3.10-3
INTERSECTION LEVEL OF SERVICE FOR EXISTING CONDITIONS

Intersection	LOS Standard	AM Peak Hour		PM Peak Hour	
		Delay (Seconds)	LOS	Delay (Seconds)	LOS
1. State Route 218 at State Route 68	C/D	21.0	C	24.0	C
2. York Road at State Route 68	C/D	63.6	E	76.3	E
3. Pasadera Drive-Boots Road at State Route 68	C/D	36.8	D	29.5	C
4. Laureles Grade at State Route 68	C/D	38.8	D	82.6	F
5. Corral de Tierra Road at State Route 68	C/D	35.5	D	68.2	E
6. San Benancio Road at State Route 68	C/D	71.7	E	116.5	F

Notes: To be conservative, a level of service of LOS C is considered acceptable along State Route 68.

Source: HatchMott MacDonald 2009

Roadway Segments

To determine the existing road segment operating conditions along the State Route 68 corridor, the average travel speed was determined along an approximate 6.5 mile section starting at a point just west of the State Route 68 at State Route 218 intersection and ending at a point just east of the State Route 68 at San Benancio Road intersection. There is no distinct directional flow of traffic during the A.M. and P.M. periods along State Route 68. There are segments of the corridor where the flows are fairly even in both directions during the A.M. and P.M. peak hours.

The LOS standard for the roadway segments is LOS C. During the A.M. peak hour all of the study roadway segments operate at unacceptable levels of service in both the eastbound direction and westbound direction. During the P.M. peak hour, the following State Route roadway segments operate at unacceptable levels of service in the eastbound direction:

- State Route 68 between State Route 218 and York Road
- State Route 68 between York Road and Pasadera Drive/Boots Road
- State Route 68 between Pasadera Drive/Boots Road and Laureles Grade Road
- State Route 68 between Laureles Grade Road and Corral de Tierra Road
- State Route 68 between Corral de Tierra Road and San Benancio Road

In the westbound direction, the following roadway segments operate at unacceptable levels of service during the P.M. peak hour:

- State Route 68 between State Route 218 and York Road
- State Route 68 between Pasadera Drive/Boots Road and Laureles Grade Road
- State Route 68 between Corral de Tierra Road and San Benancio Road

Existing roadway segment operations, during the A.M. and P.M. peak periods summarized in **Table 3.10-4, Roadway Segment Level of Service for Existing Conditions** are briefly discussed below in terms of travel time.

TABLE 3.10-4
ROADWAY SEGMENT LEVEL OF SERVICE FOR EXISTING CONDITIONS

Roadway Segment	Direction	LOS Standard	AM Peak Hour			PM Peak Hour		
			Volume (Veh/hr)	Average Speed[1] (mph)	LOS	Volume (Veh/hr)	Average Speed[1] (mph)	LOS
State Route 68 between:								
1. SR 218 and	EB	C/D	1,432	37.0	E	1,067	39.0	E
York Road	WB	C/D	1,345	34.0	E	1,726	42.0	D
2. York Rd. and	EB	C/D	788	40.0	E	1,133	23.0	F
Pasadera Drive/Boots Road	WB	C/D	1,415	39.0	E	1,205	51.0	B
3. Pasadera Drive/Boots Road and	EB	C/D	772	40.0	E	1,090	11.0	F
Laureles Grade	WB	C/D	1,351	40.0	E	1,102	40.0	E
4. Laureles Grade and	EB	C/D	876	44.0	D	1,309	21.0	F
Corral de Tierra Road	WB	C/D	1,373	35.0	E	1,074	52.0	B
5. Corral de Tierra Road and	EB	C/D	1,020	26.0	E	1,365	21.0	F
San Benancio Road	WB	C/D	1,305	31.0	E	1,149	28.0	E

Notes: 1. Average travel speed obtained from data collection in the field using GPS technology.
SR = State Route
EB = Eastbound
WB = Westbound

Veh/hr = vehicles per hour
Mph = miles per hour

Source: HatchMott MacDonald 2009

Travel Times

AM Peak Period

Eastbound: During the A.M. peak period, the longest travel time for the 6.5 mile section of the corridor was 9 minutes, 36 seconds with the average travel speed ranging between 26 mph (LOS E) and 44 mph (LOS D), in the eastbound travel direction. The most congested sections of the corridor identified were between York Road and San Benancio Road.

Westbound: During the A.M. peak period, the longest travel time for the 6.5 mile section of the corridor was 10 minutes with the average travel speed ranging between 31 mph (LOS E) and 40 mph (LOS E), in the westbound travel direction. The most congested sections of the corridor identified were east of the Corral de Tierra Road and Laureles Grade Road.

PM Peak Period

Eastbound: During the P.M. peak period, the longest travel time for the 6.5 mile section of the corridor was 19 minutes with the average travel speed ranging between 11 mph (LOS F) and 39 mph (LOS E), in the eastbound travel direction. The most congested sections of the corridor identified were between Corral de Tierra Road and Pasadera Drive.

Westbound: During the P.M. peak period, the longest travel time for the 6.5 mile section of the corridor was 9 minutes, 30 seconds with the average travel speed ranging between 28 mph (LOS E) and 52 mph (LOS B), in the westbound travel direction. The most congested sections of the corridor identified were east of Corral de Tierra Road.

Off-Peak Period

Eastbound: During the off-peak period, the longest travel time for the 6.5 mile section of the corridor was 8 minutes, 36 seconds with the average travel speed ranging between 26 mph (LOS E) and 55 mph (LOS A), in the eastbound travel direction. The most congested sections of the corridor identified were between Pasadera Drive and Laureles Grade Road and between Corral de Tierra Road and San Benancio Road.

Westbound: During the off-peak period, the longest travel time for the 6.5 mile section of the corridor was 9 minutes with the average travel speed ranging between 20 mph (LOS F) and 53 mph (LOS A), in the westbound travel direction. The

most congested sections of the corridor identified were east of State Route 218 and west of San Benancio Road.

The results show that congestion is experienced on State Route 68 during both and A.M. and P.M. peak hours, with the most critical congestion occurring in the eastbound direction during the P.M. peak hour. The longest eastbound travel time along the 6.5 mile section of the State Route 68 corridor was 9 minutes 36 seconds during the A.M. peak hour and 19 minutes during the P.M. peak hour.

Recommended Improvements - Existing Conditions

Widening State Route 68

As shown in **Table 3.10-4, Roadway Segment Level of Service for Existing Conditions**, certain segments along State Route 68 currently operate below the LOS C/D standard established by Caltrans. In order to achieve acceptable levels of service for all of the State Route 68 study intersections and road segments under Existing Conditions (and maintain this level of service through the cumulative scenario), the roadway would require widening to four lanes between Toro Park and State Route 1. The widening of State Route 68 has been discussed and debated for several years.

Alternatively, a four-lane freeway parallel to the State Route 68 corridor was considered as part of the Fort Ord Reuse Plan. The County of Monterey and Caltrans have considered this "South Fort Ord Bypass" along an alignment approximately one-half mile north of the existing State Route 68 roadway. However, there are no short or long-term funding sources available for either one of these alternatives.

Furthermore, there are no feasible interim improvements that could be implemented along the corridor that would achieve and maintain the acceptable level of service standards, and widening the entire corridor to a four-lane facility is not feasible at this time.

State Route 68 Improvement Advisory Committee

In 2001, the State Route 68 Improvement Advisory Committee (sponsored by the County of Monterey) identified and prioritized a list of improvements for existing and future traffic conditions that would facilitate a slight reduction in the travel time along the corridor. These improvements included several projects that are either completed, or contained in the Transportation Agency of Monterey County's (TAMC) Regional Development Impact Fee (RDIF) program.

Subsequent to the 2001 State Route 68 Improvement Advisory Committee recommendations, the Transportation Agency for Monterey County (TAMC) prepared a *Nexus Study for a Regional Development Impact Fee* (RDIF) dated May 14, 2004. Most of the Advisory Committee's recommendations for State Route 68 were identified within the project list used to establish the TAMC RDIF.

Regional Impact Fee Nexus Study Update

In March 2008, TAMC updated the *Nexus Study for a Regional Development Impact Fee*. The project list in the *Regional Impact Fee Nexus Study Update* includes a project referred to as "State Route 68 Commuter Improvements," which would widen a 2.3-mile section of State Route 68 to four lanes between the existing 4-lane section adjacent to Toro Park and Corral de Tierra Road. This potential improvement is discussed later in this section.

In addition, TAMC anticipates programming the fee revenue as part of its periodic Regional Transportation Plan update process, which is done every three to five years. The fee program itself will be updated to reflect changes in land use plans or shifts in transportation planning priorities to better mitigate the impacts of future growth. The proposed improvements along State Route 68 will be re-evaluated as part of the update process. This update process will involve the following actions:

- Tracking status of construction, including percent complete and fee expended;
- Updating cost estimate of each project annually;
- Adding or deleting projects as conditions warrant, based on adopted transportation plans;
- Using an adopted travel forecast model to conduct deficiency plan and select link analyses;
- Recalculating maximum fee by zones;
- Recalculating revenue from regional fee program; and
- Assessing potential for adopting a revised fee structure in light of political feasibility and other funding sources.

Other Minor Improvements Recommended

In addition to the Advisory Committee's recommendations, individual study reports for other local projects have also recommended several minor improvements.

1. Re-striping of the San Benancio Road northbound and southbound approaches at the State Route 68/San Benancio Road intersection to provide a left-turn/through lane and a right-turn lane on both approaches.

2. Install a right-turn overlap phase at the traffic signal on the northbound approach of the State Route 68 /San Benancio Road intersection.

3. Install a right-turn overlap phase at the traffic signal on the northbound approach of the State Route 68/Corral de Tierra Road intersection.

4. Install a right-turn overlap phase on the traffic signal on the southbound approach of the State Route 68/State Route 218 intersection.

Transit

Monterey-Salinas Transit (MST) provides fixed-route bus service in Monterey County and Peninsula cities. MST Line 21 provides service between Monterey and Salinas via State Route 68 with stops at various locations along State Route 68. MST has reduced Line 21 service in recent years due to a lack of ridership on the route. In August 2003, weekday mid-day service was eliminated, and on July 30, 2005 service was further reduced to the current schedule which includes only one weekday morning round trip and a single westbound one-way trip on weekday afternoons. According to MST, most passengers traveling between Monterey and Salinas use MST's Line 20, which travels through Marina, due to the poor on-time performance of Line 21.

Pedestrian Facilities and Bicycle Facilities

Pedestrian facilities include sidewalks, crosswalks and pedestrian signals. There is not a significant amount of foot-traffic in the vicinity of the project site and therefore sidewalks are not provided along State Route 68, San Benancio Road or Meyer Road. Crosswalks and pedestrian signal phasing are provided at the signalized study intersections.

There are three basic types of bicycle facilities recognized in the County of Monterey:

- Bike path (Class I) - A completely separate right-of-way designed for the exclusive use of cyclists and pedestrians, with minimal crossings for motorists.

- Bike lane (Class II) - A lane on a regular roadway, separated from the motorized vehicle right-of-way by paint striping, designated for the exclusive or semi-exclusive use of bicycles. Bike lanes allow one-way bike travel. Through travel by motor vehicles or pedestrians is prohibited, but crossing by pedestrians and motorists is permitted.

- Bike route (Class III) - Provides shared use of the roadway, designated by signs or permanent markings and shared with motorists.

In May 2005, the *2005 General Bikeways Plan* was adopted by TAMC. According to the *2005 General Bikeways Plan*, the vicinity of the project site there is a Class III bike route within the Toro Estates subdivision that connects to Toro Regional Park via the Portola Drive interchange. However, the County of Monterey has listed a Class II bike lane along State Route 68 between the City of Salinas and Olmstead Road as a high priority and a Class II bike lane along River Road between the State Route 68 and Arroyo Seco Road as a medium priority.

Background Conditions (Existing Plus Approved Projects)

The assignment of approved project trips combined with existing traffic is used to obtain "Background Conditions" (or "Existing Plus Approved Projects") traffic volumes. This

scenario assesses the proposed project's impact combined with those projects approved but not yet constructed to determine the impact on the roadway network. The timeframe for the inclusion of "approved" projects under "Background Conditions" was determined to be within five years from the date of the preparation of the traffic study.

The list of relevant approved projects was developed in consultation with the County of Monterey Planning and Public Works staff. It is anticipated that the trips generated by the approved projects will affect the surrounding roadway network prior to impacts experienced by the proposed project. It is assumed that the State Route 68 Improvements Advisory Committee's recommended improvements discussed above have been fully funded and in place under "Background Conditions." In addition, it is assumed that the following improvement projects are to be in place under "Background Conditions":

1. York Road / State Route 68 Intersection
   - The addition of a fourth (south) York Road leg (to be implemented by the Monterra Ranch development).
   - A second York Road southbound left-turn lane and eastbound acceleration lane (to be implemented by the Laguna Villas Condominium development).
2. Laureles Grade Road / State Route 68 Intersection
   - A second State Route 68 westbound left-turn lane (State Route 68 Advisory Committee improvement).
   - Extension of the eastbound right-turn lane (State Route 68 Advisory Committee improvement).
3. Corral de Tierra Road / State Route 68 Intersection
   - The addition of a fourth (north) Corral de Tierra Road leg (to be implemented by the Cypress Church access modification).
   - A second State Route 68 westbound left-turn lane (State Route 68 Advisory Committee improvement).
4. San Benancio Road / State Route 68 Intersection
   - A second State Route 68 westbound left-turn lane (State Route 68 Advisory Committee improvement).

The approved projects would generate an estimated total of 173,596 daily trips with 10,411 trips (5,036 in, 5,375 out) during the A.M. peak hour, and 16,314 trips (8,612 in, 7,702 out) during the P.M. peak hour as shown in **Table 3.10-5, Trip Generation for Approved Projects**.

TABLE 3.10-5
TRIP GENERATION FOR APPROVED PROJECTS

Approved Project	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
City of Marina			
Marina Heights Subdivision[2]	598	45	55
Town homes	9,072	711	958

Approved Project	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Single-Family Detached Housing			
CSUMB North Campus Housing[3]	2,627	204	261
CSUMB Students (2010)[3]	2,103	186	186
Reservation Road Condominiums	82	6	7
Paddon Place Subdivisions	144	11	15
249 Carmel	96	8	10
Crescent/Carmel Subdivision	134	11	14
Hotel – 323 Reservation Road[4]	348	26	27
Dunes at Monterey Bay (University Villages) – Phase I[5]	48,241	1,958	4,282
Marina Landing Redevelopment[6]	11,886	357	1,044
3200 Seaside			
Single-Family Detached Housing	163	13	17
Carriage Units	81	6	7
3110 Seacrest	67	5	7
MPC Satelite Campus	840	84	84
FORA Business Park[7]	326	46	45
MST Transit Station[8]	2,793	56	104
Cypress Knolls[9]	5,088	299	396
Marina Station[10]	25,837	2,276	2,605
City of Seaside			
Seaside Resort[11]	5,672	267	362
City Center			
Sit-Down Restaurants	2,678	25	227
Bank	986	49	183
Commercial/Retail[12]	679	20	42
MPC Satelite Campus	480	48	48
The Pointe			
Condominiums	35	3	3
Commercial/Retail[12]	133	4	8
Lexus Service Center[13]	102	15	17
Georis Building (commercial)[12]	176	5	11
Dentistry for Children	175	12	18
First National Bank	773	20	164
Ord Military Housing (RCI)	7,200	536	691
City of Sand City			
Costco Expansion	941	14	85

Approved Project	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Design Center[14]			
Apartments	202	15	19
Commercial/Retail[12]	886	27	54
Office	220	31	30
City of Del Rey Oaks			
Safeway Supermarket	5,521	176	564
City of Monterey			
Ryan Ranch Business Park			
CHOMP Medical Offices	5,443	343	426
6 & 8 Lower Ragsdale Drive	704	99	95
Del Monte Beach Tract 2 Re-subdivision	163	13	17
St. John the Baptist Greek Orthodox Church	76	6	5
Calvary Chapel Expansion	236	19	17
City of Salinas			
Tynan Village Mixed Use Development[15]	2,758	173	233
Hartnell College Expansion[16]	4,620	420	510
Monte Bella Subdivision	5,264	413	556
Unincorporated Monterey County			
CSUMB East Campus Housing[17]	1,196	94	126
East Garrison[18]	12,391	975	1,315
Monterra Ranch	1,445	113	153
Pasadera	412	32	43
Harper 14 Lots of Record	134	11	14
Oaks Subdivision	105	8	11
Laguna Seca Office Park			
York Road Office Building[19]	220	31	30
Jessen Office Building[20]	345	31	39
Tanimura Family Residential	699	55	74
TOTAL APPROVED PROJECTS	**173,596**	**10,411**	**16,314**

Notes:

1. Traffic volumes are based on trip generation rates quoted by the Institute of Transportation Engineers, Trip Generation , 6th Edition, 1997, and 7th Edition, 2003, unless otherwise noted.

2. Trip generation from Marina Heights Environmental Impact Report Traffic Study, Higgins Associates, April 2003.

3. Trip generation from California State University at Monterey Bay (CSUMB) 2007 Master Plan Update Traffic Impact Study Report, Higgins Associates, November 5, 2007.

4. Trip generation for hotel land use assumes 100% occupancy.

5. Trip generation from Marina University Villages Mixed Use Development Traffic Impact Study Report, Higgins Associates, December 17, 2004.

6. Daily and P.M. peak hour trip generation from Environmental Impact Report For The Proposed Marina Landing Shopping Center Project, Earth Metrics Inc., February 1998. A.M. peak hour trip generation derived based upon same derivation assumptions as utilized in said report.

7. Trip generation takes into account office tenants that would relocate to this new office space from existing office space off of Second Avenue north of Imjin Parkway that would be removed as part of the second phase of the Marina University Villages development.

Approved Project	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips

8. Trip generation for Marina Transit Center from Letter to E. Spencer, "Marina Transit Station Traffic Study, Marina, California – Revised Project Definition, Higgins Associates, September 14, 2006. Project includes upgraded transit facility, commercial space, and apartments.
9. Trip generation from Cypress Knolls Traffic Impact Analysis, Higgins Associates, November 2006.
10. Trip generation from Marina Station Transportation Impact Analysis, Higgins Associates, December 6, 2006. Project includes residential, commercial, office and industrial uses.
11. Trip generation from Transportation Impact Analysis for Seaside Resort, Fehr & Peers, May 2004.
12. ITE does not provide A.M. peak hour trip rates for the "specialty retail" land use. Rates used here are published by San Diego Association of Governments, Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region. , July 1998.
13. ITE does not provide weekday daily trip rates for the "automobile care center" land use. Rates used here are published by San Diego Association of Governments, Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region., July 1998.
14. City of Sand City describes project as 80,000 square feet over 4 floors, with commercial/retail and office space on first two floors. Assumed each floor equal in size.
15. Trip generation from Tynan Village Mixed Use Development Traffic Impact Study Report, Higgins Associates, November 2004.
16. Trip generation from Hartnell College Master Plan TIA, Fehr & Peers, September 2005.
17. Trip generation from CSUMB East Campus Housing Traffic Study, Wilbur Smith Associates, January 2004.
18. Full buildout of East Garrison development will not occur until 2030. Fifty percent of the development is assumed to be constructed by the year 2010. Trip generation represents trips external to the development itself.
19. Size of building unknown – square footage used to derive trip generation is assumed, based upon other buildings within business park.
20. Trip generation from Letter to J. Jessen, "Trip Generation Study for Jessen Office Building Project, Laguna Seca Office Park Lot #13," Higgins Associates, June 6, 2006. Project includes both standard and medical office space.
21. Daily, A.M. peak hour, and P.M. peak hour trip generation for the Laguna Seca Villas project taken from Laguna Seca Villas Initial Study, Monterey County Planning and Building Inspection Department, March 2006. Inbound and outbound distributions derived from ITE's Trip Generation (Source #1), above.

Source: HatchMott MacDonald 2009

Intersections

The traffic that would be generated by the approved projects was combined with the existing traffic volumes to obtain volumes for Background Conditions. Five of the six study intersections (not the State Route 218 at State Route 68 intersection) would operate at unacceptable levels of service for Background Conditions as shown in **Table 3.10-6, Intersection Level of Service for Background Conditions** during both the A.M. and P.M. peak hour.

TABLE 3.10-6
INTERSECTION LEVEL OF SERVICE FOR BACKGROUND CONDITIONS

Intersection	LOS Standard	AM Peak Hour		PM Peak Hour	
		Delay (Seconds)	LOS	Delay (Seconds)	LOS
1. State Route 218 at State Route 68	C/D	22.5	C	32.9	C
2. York Road at State Route 68	C/D	87.5	F	81.7	F
3. Pasadera Drive-Boots Road at State Route 68	C/D	73.8	E	44.4	D
4. Laureles Grade at State Route 68	C/D	60.3	E	91.2	F
5. Corral de Tierra Road at State Route 68	C/D	127.6	F	143.7	F
6. San Benancio Road at State Route 68	C/D	82.5	F	135.2	F

Notes: Assumes improvements completed prior to implementation of the proposed project.

Source: HatchMott MacDonald 2009

Roadway Segments

Those roadway segments along State Route 68 that are currently operating at unacceptable levels of service under Existing Conditions would continue to operate at unacceptable levels of service under Background Conditions. The level of service for the road segments, as well as A.M. and P.M. peak period volumes under Background Conditions are summarized in **Table 3.10-7, Roadway Segment Level of Service for Background Conditions**.

TABLE 3.10-7
ROADWAY SEGMENT LEVEL OF SERVICE FOR BACKGROUND CONDITIONS

Roadway Segment	Direction	LOS Standard	AM Peak Hour			PM Peak Hour		
			Volume (Veh/hr)	Average Speed[1] (mph)	LOS	Volume (Veh/hr)	Average Speed[1] (mph)	LOS
State Route 68 between:								
1. State Route 218 and York Road	EB	C/D	1,612	36.6	E	1,224	38.8	E
	WB	C/D	1,464	33.5	E	1,951	36.8	E
2. York Rd. and Pasadera Drive/Boots Road	EB	C/D	869	39.9	E	1,296	22.2	F
	WB	C/D	1,548	34.1	E	1,323	46.9	C
3. Pasadera Drive/Boots Road and Laureles Grade	EB	C/D	858	41.7	D	1,242	10.9	F
	WB	C/D	1,472	26.8	E	1,223	34.9	E
4. Laureles Grade and Corral de Tierra Road	EB	C/D	976	38.7	E	1,483	15.7	F
	WB	C/D	1,508	28.8	E	1,218	51.6	B
5. Corral de Tierra Road and San Benancio Road	EB	C/D	1,125	36.1	E	1,536	20.3	F
	WB	C/D	1,444	14.9	F	1,296	16.4	F

Notes: *1 Average travel speed calculated in Synchro software.*
EB = Eastbound
WB = Westbound
Veh/hr = vehicles per hour
Mph = miles per hour

Source: HatchMott MacDonald 2009

Recommended Improvements - Background Conditions

As under "Existing Conditions," widening State Route 68 and making associated intersection improvements would improve operations to acceptable levels of service under "Background Conditions" with one exception. As discussed previously, no funds are available for the implementation of the complete widening of State Route 68 to four lanes

or the South Fort Ord Bypass, nor have these improvements been included in any Capital Improvement Program (CIP). Therefore, the improvements are not considered feasible.

3.10.2 Regulatory Setting

COUNTY OF MONTEREY

The County of Monterey has two primary planning documents, the *Monterey County General Plan* (Monterey County 1982), *Toro Area Plan* (Monterey County 1986), that provide goals, objectives and policies related to transportation and circulation.

Monterey County General Plan

Goal 37 To promote a safe, effective, and economical transportation system that will service the existing and future land uses of the county.

Policies

37.2.1 Transportation demands of proposed development shall not exceed an acceptable level of service for existing transportation facilities, unless appropriate increases in capacities are provided for.

37.5.1 The design and location of new development shall consider and incorporate provisions for appropriate transportation modes.

Toro Area Plan

Policies

39.1.1.1 The county shall be encouraged to work with the state, local agencies, and citizens groups to alleviate traffic congestion on, and still maintain the scenic beauty of, State Route 68. With the goal of eventually constructing a scenic four-lane divided highway, the County shall support the following interim measures:

1. extension of Portola Drive through Serra Village in order to alleviate the traffic load on State Route 68 and traffic hazards at the Toro Park intersection;

2. construction of a two-lane bypass in the area north of the present Corral de Tierra/San Benancio State Route 68 intersection within the present plan lines;

3. methods of easing congestion at Toro Regional Park including, but not limited to, relocating entrance facilities, relocating the bus stop, and providing additional parking spaces;

4. construction of a divided four-lane segment between River Road and Torero Drive and a low profile interchange (or other acceptable traffic solutions) at Toro Park; and

5. construction of bus stops, pull-outs, and shelters where needed.

39.1.1.2 Improvement of State Route 68 intersections, replacement of the Toro Creek bridge, construction of alternate passing lanes, public transit roadway improvements, and improved bicycle safety measures should be undertaken at the earliest time that funding becomes available.

39.1.1.3 The County shall require significant financial contributions from each new subdivision in the Toro Planning Area in order to expedite funding and construction of State Route 68.

39.2.2.1 Improvements to Corral de Tierra and San Benancio Roads shall be designed to accommodate bicycles, horses, and people.

39.2.5.1 To minimize traffic safety hazards, creation of new direct access points should be prohibited from single-family residences onto State Route 68 and discouraged onto Laureles Grade, River Road, Corral de Tierra Road, and San Benancio Road.

41.2.3 The County shall encourage a study of the feasibility of increasing the accessibility of Toro residents to mass transit, either through park and ride lots or new bus service, particularly in the Corral de Tierra, San Benancio, and River Road areas.

Monterey County Regional Transportation Plan

The Transportation Agency for Monterey County (TAMC) is responsible for periodically completing a long-range transportation planning document known as the Regional Transportation Plan (RTP). The purpose of the RTP is to provide policy guidelines regarding planning and programming of transportation projects in Monterey County for the next twenty years. The RTP identifies existing and future needs, evaluates modes and alternatives, and determines what can be completed with anticipated funding. As required by the California Transportation Commission Guidelines, each Regional Transportation Agency shall develop and update goals, objectives and policies for inclusion in the Policy Element of the RTP.

3.10.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The following thresholds for measuring a project's environmental impacts are based on CEQA Guidelines and standards used by the County of Monterey. For the purposes of this

EIR, impacts are considered significant if the following could result from implementation of the proposed project:

1) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e. result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);

2) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;

3) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;

4) Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);

5) Result in inadequate emergency access;

6) Result in inadequate parking capacity; or

7) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks).

In accordance with the California Environmental Quality Act (CEQA) and agency and professional standards, specific impact criteria have been applied to the study intersections and road segments to determine if a significant impact would occur due to the implementation of the proposed project. According to the Monterey County Public Works Department's policies and professional standards, a significant impact is defined to occur under the following scenarios:

Signalized Study Intersection:

- The addition of project traffic causes operations to deteriorate from an acceptable level of service (in this case LOS C or better) to an unacceptable level (LOS D, LOS E or LOS F), or

- The addition of project traffic increases the critical movement's volume-to-capacity ratio by 0.01 or more at intersections operating at LOS D or LOS E, or

- The proposed project adds any traffic (one vehicle) to an intersection operating at LOS F.

Un-signalized Study Intersection:

- The addition of project traffic causes any traffic movement to operate at LOS F, or any traffic signal warrant to be met.

Study Roadway Segment:

- The addition of project traffic causes a roadway segment operating at LOS A through LOS E to degrade to a lower level of service of LOS D, E or F, or

- The addition of one project trip to a segment already operating at LOS F.

The thresholds of significance listed above are recognized by Monterey County and are consistent with the County's analysis methods. It should be noted, however, that Caltrans uses a Corridor Management System Approach to develop the best solutions(s) that address congestion issues on State Route 68 and regional network facilities in general. Caltrans, TAMC, and Monterey County are currently exploring more meaningful methods by which to analyze regional corridors such as State Route 68, and to evaluate them in the context of corridor-wide effects rather than a series of impacts to individual roadway segments and intersections. Using this methodology, TAMC established a Regional Development Impact Fee (RDIF) for their 2005 Regional Transportation Plan (and 2010 update).

Monterey County recognizes that State Route 68 from Salinas to Monterey operates as a roadway corridor that is part of the larger regional transportation system. In addition, Monterey County recognizes that State Route 68 will not be widened to four lanes in its entirety for various reasons; and therefore, is not likely to fully operate at acceptable levels of service at all locations into the future. For this reason, this analysis includes a study of travel time, delay and recommendations to reduce travel delay along the corridor. Although conventional thresholds of significance are recognized and used in this report, the County considers the delay study to be an important discussion with respect to understanding corridor operations, and the relative net effect of the Harper Canyon/Encina Hills project on those operations.

METHODOLOGY

Intersection Methodologies

Intersection traffic operations were evaluated based on the Level of Service (LOS) concept. Quantitative Level of Service (LOS) analyses were performed for the study intersections, based on the *2000 Highway Capacity Manual* methodologies using the Synchro analysis software. A saturation flow rate of 1,600 vehicles per lane per hour was used for the eastbound and westbound through movements along State Route 68 per Caltrans District 5 recommendations.

Road Segment Methodologies

In the traffic impact analysis, quantitative Level of Service (LOS) analyses were performed for the study road segments and study corridor based on the latest Geographic Positioning System (GPS) and Geographic Information Systems (GIS) based technology. The GPS approach to determine travel speed, travel time, and delay along State Route 68 provided a more accurate sense of the existing traffic operations along State Route 68 than the other methodologies previously mentioned. The collected data is then used to determine the travel speed, travel time, and delays along the corridor. The GPS data obtained under Existing Conditions was used to calibrate the Synchro traffic analysis software in order to assess the roadway segment operations under background, project and Cumulative Conditions.

Safety Issues Evaluation

To evaluate safety issues at the San Benancio Road/Meyer Road intersection the following tasks were performed: San Benancio Road/Meyer Road intersection analysis; San Benancio Road traffic operation analysis; and Meyer Road traffic operations evaluation. These tasks included evaluation of sight distance; traffic volumes and level of service; and accident analysis.

Site Reconnaissance

To establish existing traffic flow conditions, intersection traffic counts were collected during the weekday A.M. (7:00 A.M. – 9:00 A.M.) and P.M. (4:00 P.M. – 6:00 P.M.) peak hours at the six study intersections. The traffic counts were conducted between August 15, 2006 and August 29, 2006. The traffic count dates are shown in **Table 3.10-8, Dates of Manual Traffic Counts at Study Intersections**. From the peak period traffic counts, the A.M. and P.M. peak hour turning movement volumes were identified.

TABLE 3.10-8
DATES OF MANUAL TRAFFIC COUNTS AT STUDY INTERSECTIONS

Intersection	Count Date
State Route 218 / State Route 68	August 15, 2006
York Road / State Route 68	August 16, 2006
Boots Road-Pasadera Drive / State Route 68	August 16, 2006
Laureles Grade / State Route 68	August 16, 2006 and August 29, 2006
Corral de Tierra Road / State Route 68	August 22, 2006
San Benancio Road / State Route 68	August 16, 2006

Source: HatchMott MacDonald 2009

PROJECT IMPACTS AND MITIGATION MEASURES

Level of Service Project-Level Impacts

Intersections

Impact 3.10-1a Under Background Plus Project Conditions, five of the six study intersections would continue to operate at unacceptable levels of service (LOS E or worse) during the A.M. and/or P.M. peak hour. However, only four the intersections would continue to operate at LOS F. The proposed project would contribute at least one traffic trip the four intersections operating at LOS F, which would be considered a **significant impact** at the following intersections: York Road /State Route 68 Intersection; Laureles Grade/State Route 68 Intersection; Corral de Tierra Road and State Route 68 Intersection; and San Benancio Road and State Route 68 Intersection.

The proposed project would generate an estimated 163 daily trips, with 13 trips generated during the A.M. peak hour (3 in, 10 out) and 17 trips generated during the P.M. peak hour (11 in, 6 out).

The traffic generated by the proposed project was combined with the background traffic volumes to obtain Background Plus Project Conditions. The A.M. and P.M. peak hour project trips and intersection levels of service are summarized in **Table 3.10-9, Intersection Level of Service for Background Plus Project Conditions.**

TABLE 3.10-9
INTERSECTION LEVEL OF SERVICE FOR BACKGROUND PLUS PROJECT CONDITIONS

Intersection	LOS Standard	AM Peak Hour		PM Peak Hour	
		Delay (Seconds)	LOS	Delay (Seconds)	LOS
1. State Route 218 at State Route 68	C/D	23.1	C	33.0	C
2. York Road at State Route 68	C/D	88.4	F	82.1	F
3. Pasadera Drive-Boots Road at State Route 68	C/D	74.8	E	44.9	D
4. Laureles Grade at State Route 68	C/D	60.9	E	91.9	F
5. Corral de Tierra Road at State Route 68	C/D	128.5	F	145.2	F
6. San Benancio Road at State Route 68	C/D	84.6	F	137.1	F

Notes: Assumes that recommended improvements assumed under Background Conditions completed prior to implementation of the proposed project.

Source: HatchMott MacDonald 2009

As shown in **Table 3.10-9**, **Intersection Level of Service for Project Conditions,** five of the six study intersections would continue to operate at unacceptable levels of service (LOS D

or worse) under Background Plus Project Conditions. The proposed project would not, however, degrade the operations of any of the study intersections when compared to levels of service under Background Conditions. In fact, compared to Background Conditions, the worst increase in delay caused by the project (Intersection #6) is only 2.1 seconds. However, the project will contribute at least one trip to four intersections that currently operate at LOS F. Based on the Monterey County's standards of significance this increase would be considered significant. A brief description of the operations at each signalized intersection that would operate with deficiencies under Background Plus Project Conditions is provided below.

York Road and State Route 68, Intersection #2 (Signalized) would continue to operate at LOS F during the weekday A.M. and P.M. peak hours (average delay of 88.4 and 82.1 seconds, respectively). Since this intersection operates at LOS F during both weekday A.M. and P.M. peak hours, the addition of one trip to this signalized intersection during the weekday A.M. or P.M. peak hours would be considered a significant impact.

Pasadera Drive/Boots Road and State Route 68, Intersection #3 (Signalized) would continue to operate at LOS E during the weekday A.M. peak hour and LOS D during the P.M. peak hour (average delay of 74.8 and 44.9 seconds, respectively). The volume-to-capacity ratio of this signalized intersection would remain 1.10 during weekday A.M. peak hour and 1.00 during the weekday P.M. peak hour under both background and Background Plus Project Conditions. Since volume-to-capacity ratio would not increase by 0.01 or more, the addition of traffic to this intersection would be considered less than significant.

Laureles Grade and State Route 68, Intersection #4 (Signalized) would continue to operate at LOS E during the weekday A.M. peak hour and LOS F during the P.M. peak hour (average delay of 60.9 and 91.9 seconds, respectively). The volume-to-capacity ratio of this signalized intersection would remain 0.84 during the weekday A.M. peak hour under both background and Background Plus Project Conditions. Therefore, the addition of traffic to this intersection during the A.M. peak hour would be considered less than significant. However, the intersection operates at LOS F during the weekday P.M. peak hour. Therefore, the addition of one trip to this signalized intersection during the weekday P.M. peak hour would be considered a significant impact.

Corral de Tierra Road and State Route 68, Intersection #5 (Signalized) would continue to operate at LOS F during the weekday A.M. and P.M. peak hours (average delay of 128.5 and 145.2 seconds, respectively). Since this intersection operates at LOS F during both A.M. and P.M. peak hours, the addition of one trip to this signalized intersection during the weekday A.M. or P.M. peak hours would be considered a significant impact.

San Benancio Road and State Route 68, Intersection #6 (Signalized) would operate at LOS F during the weekday A.M. and P.M. peak hours (average delay of 84.6 and 137.1 seconds, respectively). Since this intersection operates at LOS F during both A.M. and P.M.

peak hours, the addition of one trip to this signalized intersection during the weekday A.M. or P.M. peak hours would be considered a significant impact.

As described in detail above, trips generated under Background Plus Project Conditions would exacerbate an unacceptable LOS F operating condition at the following four study intersections: York Road /State Route 68 Intersection; Laureles Grade/State Route 68 Intersection; Corral de Tierra Road and State Route 68 Intersection; and San Benancio Road and State Route 68 Intersection. This would be considered a **significant impact**, based on the "one trip" standard.

A series of intersection safety improvements along State Route 68 are included in the *Regional Transportation Plan* (TAMC 2005) including: adding a second State Route 68 westbound left-turn lane at the Laureles Grade Road/State Route 68 intersection; adding a fourth (north) Corral de Tierra Road leg and a second State Route 68 westbound left-turn lane at the Corral de Tierra Road/State Route 68 intersection; and adding a second State Route 68 westbound left-turn lane at the San Benancio Road/State Route 68 intersection. These improvements are assumed to be fully funded and in place under Background Conditions, and therefore are not identified as mitigation required by this project. These safety improvements will be beneficial to the State Route 68 corridor, but will not resolve existing intersection LOS deficiencies to which the project will contribute traffic.

The major improvements previously discussed under Existing and Background Conditions (4-laning the entire State Route 68 corridor) would improve the operations at the study intersections to acceptable levels of service under Background Plus Project Conditions. However, no funding is available for the implementation of the widening of State Route 68 to four lanes, or implementation of the South Fort Ord Bypass, nor have any of these improvements been included in the *Regional Transportation Plan*. Therefore, these improvements are not considered feasible mitigation under CEQA.

Implementation of mitigation measure **MM 3.10-1** as described below would require contribution towards the "State Route 68 Commuter Improvements," which would widen 2.3-miles of State Route 68 to four lanes from the existing 4-lane section (adjacent to Toro Park) to Corral de Tierra Road. Implementation of the "State Route 68 Commuter Improvements" would improve operation of two impacted intersections to acceptable levels of service. Upon implementation of the "State Route 68 Commuter Improvements," both the State Route 68/Corral de Tierra and the State Route 68/San Benancio Road intersections would operate at LOS C during both the A.M. and P.M. peak hours under Background Plus Project Conditions, as capacity would be increased at these locations. As an additional benefit, the "State Route 68 Commuter Improvements" project would reduce the length of the queue on westbound State Route 68 east of San Benancio Road during the weekday A.M. peak hour. Contribution towards these planned improvements through payment of the adopted TAMC fee would reduce direct, project-related impacts to the State Route 68/Corral de Tierra Intersection and State Route 68/San Benancio Road Intersection to a **less than significant** level. No further mitigation measures would be necessary at these two intersections.

However, with or without the implementation and/or contribution towards the "State Route 68 Commuter Improvements," two of the study intersections, the Laureles Grade/State Route 68 and York Road/State Route 68 intersections, would continue to operate at LOS F. Adding a second eastbound and/or westbound through lane(s) at either intersection is not feasible. Therefore, the project trips generated at the **Laureles Grade/State Route 68 Intersection** and **York Road/State Route 68 Intersection** would be considered a direct **significant and unavoidable impact**. No further mitigation measures are feasible.

Roadway Segments

Impact 3.10-1b Under Background Plus Project Conditions, all five of the study roadway segments along State Route 68 would continue to operate at unacceptable levels of service (LOS E or worse) in the A.M. and/or P.M. peak hour. Four of the five roadway segment would operate at LOS F in either the A.M. or P.M. peak hour. The proposed project would contribute of at least one traffic trip the four roadway segments operating at LOS F, which would directly affect the levels of service at all but one roadway segment. This would be considered a **significant impact.**

The road segment levels of service under Background Plus Project Conditions, as well as A.M. and P.M. peak hour volumes on the study road segments, are summarized in **Table 3.10-10, Roadway Segment Level of Service for Background Plus Project Conditions**.

TABLE 3.10-10
ROADWAY SEGMENT LEVEL OF SERVICE FOR BACKGROUND PLUS PROJECT CONDITIONS

Roadway Segment	Direction	LOS Standard	AM Peak Hour			PM Peak Hour		
			Volume (Veh/hr)	Average Speed[1] (mph)	LOS	Volume (Veh/hr)	Average Speed[1] (mph)	LOS
State Route 68 between:								
1. State Route 218 and	EB	C/D	1,613	36.6	E	1,228	38.8	E
York Road	WB	C/D	1,468	32.9	E	1,953	36.7	E
2. York Road and	EB	C/D	870	40.1	D	1,300	22.2	F
Pasadera Drive/Boots Road	WB	C/D	1,552	33.9	E	1,325	46.9	C
3. Pasadera Drive/Boots Road and	EB	C/D	859	41.7	D	1,245	10.8	F
Laureles Grade	WB	C/D	1,476	28.8	E	1,225	34.8	E
4. Laureles Grade and	EB	C/D	977	38.0	E	1,487	15.6	F
Corral de Tierra Road	WB	C/D	1,512	28.6	E	1,220	51.5	B
5. Corral de Tierra Road and	EB	C/D	1,126	35.5	E	1,540	19.9	F
San Benancio Road	WB	C/D	1,448	14.5	F	1,298	15.4	F

Notes: 1 Average travel speed calculated in Synchro software.

EB = Eastbound
WB = Westbound
Veh/hr = vehicles per hour
Mph miles per hour

Source: HatchMott MacDonald 2009

As shown in **Table 3.10-10, Roadway Segment Level of Service for Project Conditions** each study roadway segment on State Route 68, eastbound and westbound, would continue to operate below LOS C during both the A.M. or P.M. peak periods, as they would under existing and Background Conditions. A brief description of the operations along each roadway segment that would operate with deficiencies under Background Plus Project Conditions is provided below.

State Route 68 between State Route 218 and York Road (Roadway Segment #1) would continue to operate at LOS E in both the eastbound and westbound directions during the weekday A.M. peak hour (average speeds of 36.6 and 32.9 mph, respectively); and LOS E in both the eastbound and westbound directions during the weekday P.M. peak hour (average speeds of 38.8 and 36.7 mph, respectively). The level of service would not degrade when compared to Background Plus Project Conditions. Therefore, the addition of trips generated by the proposed project would be considered a less than significant impact.

State Route 68 between York Road and Pasadera Drive/Boots Road (Roadway Segment #2) would continue to operate at LOS D in the eastbound direction and LOS E in the westbound direction during the weekday A.M. peak hour (average speeds of 40.1 and 33.9 mph, respectively); and LOS F in the eastbound direction and LOS C in the westbound direction during the weekday P.M. peak hour (average speeds of 22.2 and 46.9 mph, respectively). Since this roadway segment operates at LOS F in the eastbound direction during the weekday P.M. peak hour, one additional trip to eastbound State Route 68 between York Road and Pasadera Drive/Boots Road during the weekday P.M. peak hour would be considered a significant impact.

State Route 68 between Pasadera Drive/Boots Road and Laureles Grade Road (Roadway Segment #3) would continue to operate at LOS D in the eastbound direction and LOS E in the westbound direction during the weekday A.M. peak hour (average speeds of 41.7 and 28.8 mph, respectively); and LOS F in the eastbound direction and LOS E in the westbound direction during the weekday P.M. peak hour (average speeds of 10.8 and 34.8 mph, respectively). Since this roadway segment operates at LOS F in the eastbound direction during the weekday P.M. peak hour, one additional trip to eastbound State Route 68 between Pasadera Drive/Boots Road and Laureles Grade Road during the weekday P.M. peak hour would be considered a significant impact.

State Route 68 between Laureles Grade Road and Corral de Tierra (Roadway Segment #4) would continue to operate at LOS E in the eastbound and westbound directions during the weekday A.M. peak hour (average speeds of 38.0 and 28.6 mph, respectively); and

LOS F in the eastbound direction and LOS B in the westbound direction during the weekday P.M. peak hour (average speeds of 15.6 and 51.5 mph, respectively). Since this roadway segment operates at LOS F in the eastbound direction during the weekday P.M. peak hour, one additional trip to eastbound State Route 68 between Laureles Grade Road and Corral de Tierra during the weekday P.M. peak hour would be considered a significant impact.

State Route 68 between Corral de Tierra and San Benancio Road (Roadway Segment #5) would continue to operate at LOS E in the eastbound direction and LOS F in the westbound during the weekday A.M. peak hour (average speeds of 35.5 and 14.5 mph, respectively); and LOS F in the eastbound and westbound directions during the weekday P.M. peak hour (average speeds of 19.9 and 15.4 mph, respectively). Since this roadway segment operates at LOS F in the westbound direction during the weekday A.M. peak hour and in the eastbound direction during the weekday A.M. and P.M. peak hours, one additional trip to eastbound State Route 68 between Corral de Tierra and San Benancio Road during the weekday A.M. or P.M. peak hour or westbound State Route 68 between Corral de Tierra and San Benancio Road during the weekday A.M. peak hour would be considered a significant impact.

As described in detail above, project trips generated under Background Plus Project Conditions would exacerbate an unacceptable LOS F operating condition at the following four roadway segments: State Route 68 between York Road and Pasadera Drive/Boots Road; State Route 68 between Pasadera Drive/Boots Road and Laureles Grade Road; State Route 68 between Laureles Grade Road and Corral de Tierra; and State Route 68 between Corral de Tierra and San Benancio Road. This would be considered a **significant impact**.

As identified previously, to operate at acceptable levels of service, State Route 68 would require widening to accommodate an additional eastbound and westbound lanes for the entire length evaluated. Alternatively, implementation of the South Fort Ord Bypass has been identified as an alternative to widening State Route 68 as part of the recommended Advisory Committee list of improvements. Either of these improvements would improve the operating conditions along the corridor to acceptable levels of service, but are not considered feasible mitigation at this time.

TAMC put into effect the Regional Development Impact Fee in August 2008. As discussed above, the *Regional Impact Fee Nexus Study Update* includes a project referred to as the "State Route 68 Commuter Improvements," which would widen 2.3-miles of State Route 68 to four lanes from the existing 4-lane section (adjacent to Toro Regional Park) to Corral de Tierra Road. The geometric design details of this improvement are not known at this time.

In consultation with Monterey County Public Works, Higgins Associates (now Hatch Mott MacDonald) evaluated a portion, or shorter version of, the "State Route 68 Commuter Improvements" project that would result in a reduction in travel time along the corridor. The project evaluated would construct a 1.1-mile extension of four lane freeway from

where the freeway currently ends to the west end of Toro Park Estates. This 1.1-mile freeway extension would provide several benefits to the State Route 68 corridor. One benefit would be a reduction in the travel time on State Route 68 in both directions. The freeway extension would reduce the combined eastbound and westbound travel time through the State Route 68 corridor by approximately 286 seconds (4.7 minutes) during the weekday A.M. and P.M. peak hours. The traffic generated by the proposed project would increase the combined eastbound and westbound travel time through the State Route 68 corridor by approximately 32 seconds. Therefore, implementation of the freeway extension would more than offset the increase in travel time caused by the proposed project. Furthermore, although a shorter version of the planned "State Route 68 Commuter Improvements" was evaluated, it is logical that improving a longer section of the roadway (2.3-miles instead of 1.1-miles) as a four lane freeway would reduce the travel time through the State Route 68 corridor by more than 286 seconds (4.7 minutes) during both the weekday A.M. and P.M. peak hours. The calculations, which used the Synchro arterial analysis reports, estimate the reduction in travel time with the freeway extension and are shown in Appendix O of the Traffic Impact Analysis included in **Appendix I** of the EIR. They are based on the average travel speeds through the State Route 68 corridor.

According to the *Regional Impact Fee Nexus Study Update*, even upon implementation of the "State Route 68 Commuter Improvements," the State Route 68 roadway segments between Laureles Grade Road and Corral De Tierra Road and between Corral de Tierra and Portola Drive would continue to operate at an unacceptable level of service of LOS F in Year 2030. These deficiencies were previously disclosed as part of the environmental review process for adoption of the fee program. However, the "State Route 68 Commuter Improvements" project as proposed would serve to improve operations by reducing the travel time along the corridor. Extending the freeway in this location would also reduce the length of the queue on westbound State Route 68 east of San Benancio Road during the weekday A.M. peak hour, which is currently up to 2.5 miles long. Safety would also be improved, as the state-wide accident rates on four lane freeways are about half of those on two lane highways.

At the local, neighborhood level, the "State Route 68 Commuter Improvements" project would have other immediate beneficial effects. The improvement project would eliminate the observed phenomenon of drivers exiting westbound State Route 68 at the Portola Drive interchange to cut through the neighborhoods in Toro Park Estates. Drivers do this to get ahead of traffic by re-entering the State Route 68 traffic stream at Torero Drive. This phenomenon, which occurs daily during the weekday A.M. peak hour, was evident in the data collection and was confirmed through discussions with Monterey County staff.

If this improvement was to be implemented, a design decision would have to be made regarding the existing intersection on State Route 68 at Torero Drive. There would be several options, including the closure of the intersection for use only as an emergency access (in which case existing traffic would be diverted to the Portola Drive interchange). Another option would be to convert the intersection to right-in, right-out access only, in which case the road segment would operate more as an expressway than a freeway. Other

options could also be explored, such as allowing eastbound State Route 68 left-turns onto Torero Drive, but prohibiting southbound Torero Drive left-turns onto State Route 68.

Reducing the travel time through the State Route 68 corridor and the length of the queue on westbound State Route 68 east of San Benancio Road would reduce the proposed project's impact on the corridor. Implementation of the following mitigation measure would ensure that the proposed project contributes their fair share towards the "State Route 68 Commuter Improvements" in order to improve operations on State Route 68 and reduce the proposed project's impact to the intersections and roadway segments within the corridor.

Mitigation Measure

MM 3.10-1 Prior to issuance of building permits, the project applicant shall comply with one of the following actions to improve operations at intersections and roadway segments along State Route 68:

a. Upon issuance of each building permit for proposed development on the project site, each applicant shall contribute their proportionate fair share, as calculated by the County, towards the "State Route 68 Commuter Improvements" through payment of the TAMC Regional Development Impact Fee (RDIF) in effect at that time, as required under mitigation measure **MM 3.10-6**. The TAMC RDIF payment will be earmarked for completion of the Caltrans Project Study Report (PSR) for the 2.3-mile "State Route 68 Commuter Improvements" project identified within the TAMC RDIF. or;

b. Prior to the issuance of the first building permit for proposed development on the project site, the applicant shall pay the entire fair share for all 17 single family residential units towards the "State Route 68 Commuter Improvements" through payment of the TAMC RDIF, as required under mitigation measure **MM 3.10-6**. or;

c. The project applicant shall fund, initiate and complete a Caltrans Project Study Report (PSR) process for the 2.3-mile "State Route 68 Commuter Improvements" project identified within the TAMC RDIF. The PSR process will identify the total roadway improvement costs, as well as each project applicant's proportionate fair share of those costs. If the cost of the PSR for the "State Route 68 Commuter Improvements" exceeds the project's proportionate fair share of the TAMC RDIF obligation, the applicant shall be reimbursed the amount in excess of their proportionate fair share. Monterey County will enter into a reimbursement agreement with the project applicant to refund the costs in excess of their proportionate fair share of the

TAMC RDIF as additional fees are collected from other applicants and sources.

Implementation of the above mitigation measure would ensure that the project applicant(s) contribute their fair share to the planned "State Route 68 Commuter Improvements." Once the "State Route 68 Commuter Improvements" are constructed, these improvements would shorten the travel time on State Route 68 in both directions; improve intersection operations at two locations from unacceptable to acceptable levels, reduce the length of the queue on westbound State Route 68 east of San Benancio Road during the weekday A.M. peak hour; improve safety along State Route 68; and eliminate the observed trend of drivers cutting through Toro Park Estates to re-enter State Route 68 at Torero Drive during the weekday A.M. peak hour.

Implementation of the "State Route 68 Commuter Improvements" project, a component of the TAMC RDIF, would effectively mitigate project impacts to the following intersections and roadway segments to a less than significant level:

- State Route 68/Corral de Tierra intersection
- State Route 68/San Benancio Road intersection
- State Route 68 segment between Corral de Tierra and San Benancio Road

Intersections and roadway segments impacted by the project that are not currently included in the RDIF would remain impacted. These facilities include:

- State Route 68/Laureles Grade intersection
- State Route 68/York Road intersection
- State Route 68 segment between York Road and Pasadera Drive
- State Route 68 segment between Pasadera Drive and Laureles Grade
- State Route 68 segment between Laureles Grade and Corral de Tierra

The facilities listed above that are not mitigated by the State Route 68 Commuter Improvements project will remain a **significant and unavoidable impact** of the project.

For purposes of CEQA and based on the significance thresholds used in this report, the project will have "unavoidable" effects as listed above. These conclusions are based upon a very conservative analysis and conservative (sensitive) significance threshold of "one traffic trip" entering an existing facility of LOS F. With 13 A.M. and 17 P.M. peak hour trips generated by the project, the actual driving delays experienced by motorists would be minimal. The worst increase delay (experienced at the State Route 68/San Benancio intersection) would be 2.1 seconds. Nonetheless, based on the standards used by Monterey County, the impact remains significant.

Increased Accident Potential Along San Benancio Road

Impact 3.10-2 The traffic generated by the proposed project may indirectly result in an increase in the accident potential along San Benancio Road. This would be considered a **less than significant impact**.

San Benancio Road between State Route 68 and Harper Canyon Road has a traffic volume of approximately 5,700 vehicles per day and currently operates at LOS B. According to Higgins Associates, the proposed project would add approximately 163 daily trips on San Benancio Road, which represents a three percent increase in traffic on this roadway. This would not affect the level of service along this roadway; however the increased traffic would create additional safety hazards along this local roadway as it would increase the potential for accidents.

Between January 2001 and March 2006 there were five collisions on San Benancio Road between State Route 68 and Harper Canyon Road. This represents an accident rate of 0.481 accidents per million vehicle miles, which is well below the state average accident rate of 1.24 accidents per million vehicle miles. All of the collisions involved property damage with no injuries or fatalities. Even with an elevated average speed of 46 miles per hour (mph) above the posted speed limit of 35 mph and increased traffic volumes over the years the accident rate has remained relatively low. Therefore, the increased traffic associated with the proposed project would have a **less than significant impact** to the accident rate along Benancio Road. No mitigation measures are necessary.

Increased Safety Hazards Along Meyer Road

Impact 3.10-3 Traffic generated by the proposed project would result in increased trips on Meyer Road, which currently does not meet the standards for a tertiary private road and therefore may result in direct safety hazards along this roadway. This would be considered a **potentially significant impact**.

Meyer Road is a two-lane privately maintained road owned by Harper Canyon Realty LLC. Meyer Road is classified as a tertiary road as it provides access to no more than 100 tributary dwelling units. The San Benancio Road / Meyer Road intersection is controlled by a stop sign on westbound Meyer Road. The level of service is anticipated to operate at acceptable levels due to the limited number of trips by the proposed project on this roadway. However, Meyer Road currently does not meet Monterey County's standard for tertiary private roads, which requires that the roadway be a minimum of 20 feet wide. This limits the ability for two cars to pass each other on Meyer Road. Meyer Road currently varies in width from 10 to 13 feet prior to turning into an unimproved road. Physical and topographic constraints limit Meyer Road from meeting Monterey County's standard for tertiary private roads. However, according to Higgins Associates, the roadway should at a minimum meet the standard for a cul-de-sac private road, which requires a minimum width of 18 feet. Increased traffic associated with the proposed project would further exacerbate the need for a wider roadway in order to ensure that the proposed project would not

increase safety hazards. Therefore, this would be considered a **potentially significant impact.**

Mitigation Measure

MM 3.10-3 Prior to approval of final improvement plans, the project applicant shall contract with a registered engineer to design roadway improvements to widen and resurface Meyer Road per the County of Monterey standards for a cul-de-sac private road (e.g. 18-foot wide roadbed). The roadway improvement plans shall be subject to review and approval by the County of Monterey and shall be constructed prior to occupancy of any of the residential units at the project site.

Implementation of the above mitigation measure will require that the project applicant widen and resurface Meyer Road to improve operations. Widening the road will require improvement and construction activity on one or both sides of the existing roadway, typically involving grading, surfacing and some vegetation removal. As this improvement is directly related to implementation of the project, other measures contained within this EIR that mitigate construction impacts (grading, noise, vegetation, drainage) are also applicable to this aspect of the project. Therefore, the impact to operations (and construction activities) on Meyer Road would be reduced to a **less than significant** level.

Project Access and Sight Distance at the Meyer Road/San Benancio Road Intersection

Impact 3.10-4 Implementation of the proposed project would result in an increase in vehicle access at the Meyer Road/San Benancio Road intersection, which currently does not meet the American Association of State Highway and Transportation Officials (AASHTO) sight distance standards. This would be considered a **potentially significant impact**.

Localized access to the project site would be provided by Meyer Road via San Benancio Road, which would increase the traffic volumes at the Meyer Road/San Benancio Road intersection. There are several contributing factors that limit sight distance at the Meyer Road/San Benancio Road intersection including but not limited to the following: the intersection is not stop or signal controlled; the average travel speed is 45 to 46 mph on San Benancio Road which is significantly over the posted speed limit over 35 mph; and the vertical curvature of San Benancio Road. Currently, the sight distance at this intersection is approximately 240 feet north of the Meyer Road and about 250 feet south of Meyer Road, which is considered substandard sight distances per AASHTO standards. According to Higgins Associates, the minimum sight distance should be 423 feet to the south of Meyer Road and 436 feet to the north of Meyer Road to provide safe operation conditions at this intersection. The proposed project would add approximately 163 daily trips on San Benancio Road. This increase in traffic associated with the proposed project will further exacerbate the need for sight distance improvements at the Meyer Road/San Benancio

Road intersection, which would be considered a **potentially significant impact**. The following mitigation measures would reduce this impact.

Mitigation Measures

MM 3.10-4a Prior to approval of final improvement plans, the Monterey County Public Works Department shall require that the project applicant contract with a registered engineer to prepare a sight distance improvement plan at the Meyer Road/San Benancio Road intersection. The improvement plan shall include but not be limited to the following: trimming the vegetation and grading the embankment in the vicinity of the intersection and installing right turn tapers into and out of Meyer Road. The design of all intersection improvements shall be subject to review and approval by the County of Monterey Public Works Department. All improvements shall be completed prior to occupancy of any residential units.

MM 3.10-4b Prior to approval of final improvement plans, the Monterey County Public Works Department shall require that the project applicant shall design and construct a southbound San Benancio Road left-turn lane at the Meyer Road/San Benancio Road intersection in accordance with the Monterey County Public Works Department standards and guidelines.

Implementation of the above mitigation measure **MM 3.10-5a** and **MM 3.10-5b** would remove impediments to sight distance and provide better right-turn and left-turn movement at the Meyer Road/San Benancio Road intersection, which would improve sight distance at the Meyer Road/San Benancio Road intersection. In addition, implementation of mitigation measure **MM 3.10-4**, which requires that Meyer Road be resurfaced to raise the elevation, which would also improve sight distance. As these improvements are directly related to project implementation and will involve construction (based on ultimate design), all other measures related to construction impacts within this EIR also apply (grading, vegetation, noise, drainage). With implementation of the measures identified, this impact would be reduced to a **less than significant** level.

Inadequate Emergency Access

Impact 3.10-5 Implementation of the proposed project would result in residential development requiring emergency vehicle access. This would be considered a **less than significant impact**.

Implementation of the proposed project will include construction of 17 residential units that may require emergency vehicles to access the project site. The proposed project will be constructed according to the Monterey County Public Works Department roadway standards and shall be subject to Salinas Rural Fire Protection District's approval. There are a few unimproved roads located on the project site that would remain as access roads for utility service to the project site. These roadways may also be used as additional access

points for emergency vehicles in time of need. In addition, during the review of the final roadway plans, Salinas Rural Fire Protection District will ensure that roadways are designed to accommodate their vehicles and that fire lanes are designated. Therefore, the impact to emergency access is considered **less than significant**. No mitigation measures are necessary.

Parking Capacity

Monterey County Zoning Ordinance 21.58 requires that the proposed project provide two parking spaces per single-family residential unit. The proposed project would be required to design each residential lot in accordance with Monterey County Zoning Ordinance 21.58. Therefore, adequate parking would be provided and there would be **no impact** associated with inadequate parking capacity.

Conflict with adopted policies, plan or programs supporting alternative transportation

There is not a significant amount of foot-traffic in the vicinity of the proposed project and therefore sidewalks are not provided along State Route 68, Meyer Road, or San Benancio Road. However, crosswalks and pedestrian signal phasing are provided at the signalized study intersections. No bicycle facilities are located in the vicinity of the proposed project. Although, the proposed project would result in a slight increase in population, the proposed project would not conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks).

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Adverse Impact on Level of Service

Impact 3.10-6 Implementation of the proposed project would contribute to a cumulative increase in traffic volumes that would indirectly result in or exacerbate unacceptable levels of service on the regional roadway network. This would be considered a **significant cumulative impact**.

A number of other projects have been proposed within the geographical study area that have not yet been approved or even formally submitted for evaluation. The extensive list of cumulative projects relevant to this traffic study was developed in consultation with the County of Monterey Planning and Public Works staff and is included in Appendix G of the Traffic Impact Analysis in **Appendix I** of this EIR. The geographic reach of the projects considered within the cumulative analysis encompasses a regional large area, including all Monterey Peninsula cities and large areas of unincorporated Monterey County territory.

The proposed project, combined with the approved and cumulative relevant projects, would generate an estimated 358,002 daily trips within this regional planning area, with 22,952 trips (12,812 in, 10,140 out) during the A.M. peak hour and 34,258 trips (16,362 in, 17,896 out) during the P.M. peak hour. The Harper Canyon subdivision would contribute approximately 0.045 percent of total volume towards the cumulative daily trips,

as measured regionally. Approximately five percent of the total cumulative trips generated during the A.M. peak hour and approximately four percent of the total cumulative trips generated during the P.M. peak hour find their way onto State Route 68.

Intersections

Intersection levels of service for Cumulative Conditions are summarized in **Table 3.10-11, Intersection Level of Service for Cumulative Project Conditions**.

TABLE 3.10-11
INTERSECTION LEVEL OF SERVICE FOR CUMULATIVE PROJECT CONDITIONS

Intersection	LOS Standard	AM Peak Hour		PM Peak Hour	
		Delay (Seconds)	LOS	Delay (Seconds)	LOS
1. State Route 218 at State Route 68	C/D	63.9	E	111.4	F
2. York Road at State Route 68	C/D	178.5	F	180.5	F
3. Pasadera Drive-Boots Road at State Route 68	C/D	189.9	F	184.6	F
4. Laureles Grade at State Route 68	C/D	173.0	F	226.5	F
5. Corral de Tierra Road at State Route 68	C/D	>300	F	>300	F
6. San Benancio Road at State Route 68	C/D	264.1	F	>300	F

Source: HatchMott MacDonald 2009

All six study intersections would operate at unacceptable levels of service under Cumulative Conditions. Similar to Background Plus Project Conditions, all six study intersections would be impacted by the project because of LOS F operating conditions. Each signalized intersection operating deficiently under Cumulative Conditions is described below.

State Route 218/State Route 68, Intersection #1 (Signalized) would operate at LOS E during the weekday A.M. peak hour and LOS F during the weekday P.M. peak hour (average delay of 63.9 and 111.4 seconds, respectively). This would be considered a significant impact. Widening and re-striping the northbound approach to include one left-turn lane, one through lane, and one right-turn lane; widening and re-striping the eastbound approach to include two left-turn lanes, one through lane and one shared through/right-turn lane; and installing southbound right-turn overlap phasing at this intersection would improve operations to acceptable LOS C during the A.M. and P.M. peak hours.

York Drive/State Route 68, Intersection #2 (Signalized) would operate at LOS F during the weekday A.M. and P.M. peak hours (average delay of 178.5 and 180.5 seconds, respectively). Since this signalized intersection operates at LOS F, the addition of one trip to this intersection during the A.M. or P.M. peak hours would be considered a significant

impact. The addition of a second eastbound through lane in conjunction with the addition of a second westbound through lane as recommended under Existing Conditions would improve operations at this intersection to an acceptable LOS C during the A.M. and P.M. peak hours.

Pasadera Drive-Boots Road/State Route 68, Intersection #3 (Signalized) would operate at LOS F during the both the weekday A.M. and P.M. peak hours (average delay of 189.9 and 184.6 seconds, respectively). During the A.M. peak hour, this signalized intersection would degrade from LOS E with a volume-to-capacity ratio of 1.10 under Background Plus Project Conditions to LOS F with a volume-to-capacity ratio of 1.52 under Cumulative Conditions. During the P.M. peak hour, this intersection would degrade from LOS D with a volume-to-capacity ratio of 1.00 under Background Plus Project Conditions to LOS F with a volume-to-capacity ratio of 1.35 under Cumulative Conditions. Since the level of service would degrade from LOS E to LOS F and the volume-to-capacity ratio would increase by 0.42 during the A.M. peak hour, and the level of service would degrade from LOS D to LOS F and the volume-to-capacity ratio would increase by 0.35 during the P.M. peak hour this would be considered a significant cumulative impact. The addition of a second eastbound through lane in addition to the addition of a second westbound through lane recommended under Existing Conditions, would improve operations at this intersection to an acceptable LOS B during the A.M. and P.M. peak hours.

Laureles Grade/State Route 68, Intersection #4 (Signalized) would operate at LOS F during the weekday A.M. and P.M. peak hours (average delay of 173.0 and 226.5 seconds, respectively). During the A.M. peak hour, this signalized intersection would degrade from LOS E with a volume-to-capacity ratio of 1.11 under Background Plus Project Conditions to LOS F with a volume-to-capacity ratio of 1.49 under Cumulative Conditions. Since the level of service would degrade from LOS E to LOS F and the volume-to-capacity ratio would increase by 0.38 during the A.M. peak hour and the level of service is LOS F during the P.M. peak hour, the addition of one trip to this intersection during either the A.M. or P.M. peak hour would be considered a significant impact. Converting the northbound right-turn to right-turn overlap phasing in conjunction with the addition of a second eastbound through lane and a second westbound through lane as recommended under Existing Conditions, would improve operations at this intersection to an acceptable LOS B during the A.M. peak hour and LOS C during the P.M. peak hour.

Corral de Tierra Road / State Route 68 (Intersection #5) would operate at LOS F during the weekday A.M. and P.M. peak hours (average delay greater than 300 seconds, respectively). Since this signalized intersection operates at LOS F during both the A.M. and P.M. peak hours, the addition of one trip would be considered a significant impact. Converting the northbound right turn to right-turn overlap phasing in conjunction with the addition of a second eastbound through lane and a second westbound through lane as recommended under Existing Conditions, would improve operations at this intersection to an acceptable LOS C during the A.M. and P.M. peak hours.

San Benancio Road / State Route 68 (Intersection #6) would operate at LOS F during the weekday A.M. and P.M. peak hours (average delay of 264.1 and greater than 300 seconds, respectively). Since this signalized intersection operates at LOS F during both the A.M. and P.M. peak hours, the addition of one trip would be considered a significant impact. The addition of a second eastbound through lane and a second westbound through lane as recommended under Existing Conditions, would improve operations at this intersection to an acceptable LOS C during the A.M. and P.M. peak hours.

Roadway Segments

Cumulative traffic conditions for road segment levels of service, as well as A.M. and P.M. peak hour volumes on the study road segments, are summarized in **Table 3.10-12, Roadway Segment Level of Service for Cumulative Project Conditions.**

TABLE 3.10-12
ROADWAY SEGMENT LEVEL OF SERVICE FOR CUMULATIVE PROJECT CONDITIONS

Roadway Segment	Direction	LOS Standard	AM Peak Hour			PM Peak Hour		
			Volume (Veh/hr)	Average Speed[1] (mph)	LOS	Volume (Veh/hr)	Average Speed[1] (mph)	LOS
State Route 68 between:								
1. State Route 218 and York Road	EB	C/D	2,010	39.0	E	1,594	38.5	E
	WB	C/D	1,862	14.9	F	2,353	15.6	F
2. York Road and Pasadera Drive/Boots Road	EB	C/D	1,261	33.5	E	1,757	14.2	F
	WB	C/D	2,069	20.6	F	1,779	36.2	E
3. Pasadera Drive/Boots Road and Laureles Grade	EB	C/D	1,236	25.8	E	1,694	7.6	F
	WB	C/D	2,003	13.7	F	1,673	15.9	F
4. Laureles Grade and Corral de Tierra Road	EB	C/D	1,366	19.3	F	1,976	10.8	F
	WB	C/D	2,034	15.6	F	1,640	33.8	E
5. Corral de Tierra Road and an Benancio Road	EB	C/D	1,556	13.2	F	2,065	12.0	F
	WB	C/D	1,985	7.8	F	1,791	5.0	F

Notes: 1 Average travel speed calculated in Synchro software.
EB = Eastbound
WB = Westbound
Veh/hr = vehicles per hour
Mph = miles per hour

Source: HatchMott MacDonald 2009

As shown in **Table 3.10-11, Roadway Segment Level of Service for Cumulative Project Conditions** each study roadway segment, eastbound and westbound on State Route 68, would continue to operate below LOS D during both the A.M. or P.M. peak hours as they would under existing, background, and Background Plus Project Conditions. Similar to

Background Plus Project Conditions, the addition of one vehicle to the LOS F conditions along four of the study segments and the degradation of the level of service on westbound State Route 68 between State Route 218 and York Road would result in the project having a significant cumulative impact. A brief description of the operations along each roadway segment that would operate with deficiencies under Background Plus Project Conditions is provided below.

State Route 68 between State Route 218 and York Road (Roadway Segment #1) would operate at LOS E in the eastbound direction and LOS F in the westbound directions during the weekday A.M. peak hour (average speeds of 39.0 and 14.9 mph, respectively); and would operate at LOS E in the eastbound direction and LOS F in the westbound direction during the weekday P.M. peak hour (average speeds of 38.5 and 15.6 mph, respectively). The level of service on westbound State Route 68 would degrade from LOS E under Background Plus Project Conditions to LOS F under Cumulative Conditions during the P.M. peak hour. Therefore, the project trips combined with cumulative traffic volumes generated during either the A.M. or P.M. peak hours on westbound State Route 68 between State Route 218 and York Road would be considered a significant cumulative impact.

State Route 68 between York Road and Pasadera Drive/Boots Road (Roadway Segment #2) would operate at LOS E in the eastbound direction and LOS F in the westbound direction during the weekday A.M. peak hour (average speeds of 33.5 and 20.6 mph, respectively); and LOS F in the eastbound direction and LOS E in the westbound direction during the weekday P.M. peak hour (average speeds of 14.2 and 36.2 mph, respectively). During the weekday A.M. peak hour, eastbound State Route 68 between York Road and Pasadera Drive/Boots Road would degrade from LOS D under Background Plus Project Conditions to LOS E under Cumulative Conditions and eastbound State Route 68 between York Road and Pasadera Drive/Boots Road would degrade from LOS E under Background Plus Project Conditions to LOS F under Cumulative Conditions. During the P.M. peak hour, eastbound State Route 68 between York Road and Pasadera Drive/Boots Road would continue to operation at LOS F and the westbound direction would degrade from LOS C under Background Plus Project Conditions to LOS E under Cumulative Conditions. Therefore, the project trips combined with cumulative traffic volumes generated during during either the A.M. or P.M. peak hours on State Route 68 between York Road and Pasadera Drive/Boots Road would be considered a significant cumulative impact.

State Route 68 between Pasadera Drive/Boots Road and Laureles Grade Road (Roadway Segment #3) would operate at LOS E in the eastbound direction and LOS F in the westbound direction during the weekday A.M. peak hour (average speeds of 25.8 and 13.7 mph, respectively); and LOS F in both the eastbound and westbound directions during the weekday P.M. peak hour (average speeds of 7.6 and 15.9 mph, respectively). During the weekday A.M. peak hour, State Route 68 between York Road and Pasadera Drive/Boots Road would degrade from LOS D under Background Plus Project Conditions to LOS E under Cumulative Conditions in the eastbound direction and would degrade from LOS E under Background Plus Project Conditions to LOS F under Cumulative Conditions in the

westbound direction. During the weekday P.M. peak hour, State Route 68 between York Road and Pasadera Drive/Boots Road would continue to operate at LOS F in the eastbound direction and would degrade from LOS E under Background Plus Project Conditions to LOS E under Cumulative Conditions in the westbound direction. Therefore, the project trips combined with cumulative traffic volumes generated during either the A.M. or P.M. peak hours on westbound State Route 68 between York Road and Pasadera Drive/Boots Road would be considered a significant cumulative impact.

State Route 68 between Laureles Grade Road and Corral de Tierra (Roadway Segment #4) would operate at LOS F in both the eastbound and westbound directions during the weekday A.M. peak hour (average speeds of 19.3 and 15.6 mph, respectively); and LOS F in the eastbound direction and LOS E in the westbound direction during the weekday P.M. peak hour (average speeds of 10.8 and 33.8 mph, respectively). During the weekday A.M. peak hour, State Route 68 between Laureles Grade Road and Corral de Tierra would degrade from LOS E under Background Plus Project Conditions to LOS F under Cumulative Conditions in both the eastbound and westbound directions. During the weekday P.M. peak hour, State Route 68 between Laureles Grade Road and Corral de Tierra would continue to operate at LOS F under Cumulative Conditions in the eastbound direction and would degrade from LOS B under Background Plus Project Conditions to LOS E under Cumulative Condition in the westbound direction. Therefore, the project trips combined with cumulative traffic volumes generated during either the A.M. or P.M. peak hours on State Route 68 between Laureles Grade Road and Corral de Tierra during would be considered a significant cumulative impact.

State Route 68 between Corral de Tierra and San Benancio Road (Roadway Segment #5) would operate at LOS F in the eastbound and westbound directions during the weekday A.M. peak hour (average speeds of 13.2 and 7.8 mph, respectively); and LOS F in the eastbound and westbound directions during the weekday P.M. peak hour (average speeds of 12.0 and 5.0 mph, respectively). During A.M. peak hour operations, State Route 68 between Corral de Tierra and San Benancio Road would degrade from LOS E under Background Plus Project Conditions to LOS F under Cumulative Conditions in the eastbound direction and would continue to operate at LOS F in the westbound direction. During the weekday P.M. peak hour, eastbound and westbound State Route 68 between Corral de Tierra and San Benancio Road would continue to operate at LOS F under Cumulative Conditions. Therefore, the project trips combined with cumulative traffic volumes generated during either the A.M. or P.M. peak hours on State Route 68 between Corral de Tierra and San Benancio Road would be considered a significant cumulative impact.

Cumulative Impact Summary

The cumulative trips associated with the proposed project and other development would degrade the levels of service or would exacerbate existing unacceptable levels of service at all six study intersections and all five study roadway segments. This would be considered a **significant cumulative impact**. Implementation of mitigation measure **MM 3.10-1** requires

the applicant to contribute specifically toward implementation of the "State Route 68 Commuter Improvements," a programmed project within the TAMC RDIF program. Implementation of this improvement would improve intersection and roadway segment operations under Cumulative Conditions**.** As under Background Plus Project Conditions, implementation of the "State Route 68 Commuter Improvements" would also improve operations at two study intersections under Cumulative Conditions (i.e., Corral de Tierra/SR 68 and San Benancio/SR 68). In order to improve operations at the Corral de Tierra Road/State Route 68 intersection to acceptable levels of service under Cumulative Conditions, the traffic analysis for the proposed project also identified the need for the following improvement:

- At the Corral de Tierra Road/State Route 68 intersection, convert the northbound right-turn to right-turn overlap phasing. Implementation of this improvement would improve operations at this intersection to LOS C during both the A.M. and P.M. peak hours under Cumulative Conditions. Implementation of mitigation measure **MM 3.10-1** would result in the widening of State Route 68 to four lanes at this intersection, which would necessitate traffic signal modifications. The northbound right-turn phasing at this intersection could be converted to right-turn overlap phasing as part of the signal modifications. This improvement is recommended to be included in the "State Route 68 Commuter Improvements," which is included in the TAMC Regional Development Impact Fee program. Although this improvement is only triggered under Cumulative Conditions, this minor signal phasing modification is assumed to be implemented with mitigation measure **MM 3.10-1**.

In addition to implementation of intersection improvements associated with the widening of State Route 68, as recommended under Existing Conditions, other regional improvements would be required under Cumulative Conditions. The traffic analysis for the proposed project identified the need for additional intersection improvements along the State Route 68 corridor under the Cumulative Conditions. These recommended improvements include:

- Widen and restripe the northbound approach of the State Route 218/State Route 68 intersection to include one left-turn lane, one through lane, and one right-turn lane. Widen and restripe the eastbound approach to include two left-turn lanes, one through lane, and one shared through/right-turn lane. Install southbound right turn overlap phasing at this location. Implementation of this improvement would improve operations at this intersection to LOS C during both the A.M. and P.M. peak hours under Cumulative Conditions. However, these improvements are not currently included in any Capital Improvement Program (CIP).

- At the Laureles Grade/State Route 68 intersection, convert the northbound right-turn to right-turn overlap phasing. Implementation of this improvement, in addition to adding second eastbound and westbound through lanes

(recommended under Existing Conditions), would improve operations at this intersection to LOS B during the A.M. peak hour and LOS C during the P.M. peak hour under Cumulative Conditions. However, these improvements are not currently included in any CIP.

- At the York Road/State Route 68 intersection, add a second eastbound through lane and a second eastbound left-turn lane. Implementation of this improvement, in addition to adding a second westbound through lane (recommended under Existing Conditions), would improve operations at this intersection to LOS C during both the A.M. and P.M. peak hours under Cumulative Conditions. However, these improvements are not currently included in any CIP.

- At the Pasadera Drive/State Route 68 intersection, add a second eastbound through lane. Implementation of this improvement, in addition to adding a second westbound through lane (recommended under Existing Conditions), would improve operations at this intersection to LOS B during both the A.M. and P.M. peak hours under Cumulative Conditions. However, this improvement is not currently included in any CIP.

Although the above improvements are recommended in the traffic analysis and would improve operations, these improvements are not included in any CIP; therefore, are not considered feasible.

The proposed project would address cumulative traffic impacts through contribution towards other previously identified regional improvements, which is consistent with the County and TAMC's methodology. The following mitigation measure would require that the project applicant contribute their fair share towards all traffic impact fees, including the TAMC Regional Development Impact Fee (also referred to as the TAMC RDIF), to help fund all regional improvements in the County and reduce the proposed project's cumulative impact to affected intersections and roadway segments.

Mitigation Measure

MM 3.10-6 The Monterey County Resource Management Agency shall require the project applicant to pay any traffic impact fees in effect at the time of building permit applications for future development on the project site. Such fees include, but are not limited to, the TAMC Regional Development Impact Fee (RDIF). Payment of the TAMC RDIF may be done so under the options listed in mitigation measure **MM 3.10-1**. The funds contributed toward the "State Route 68 Commuter Improvements" project as required under mitigation measure **MM 3.10-1** shall be credited towards their total proportionate fair share of the TAMC RDIF, as they will be contributing their fair share towards regional improvements identified within the TAMC *Regional Improvement Nexus Study Update*.

> If implementation of mitigation measure **MM 3.10-1** requires the project applicant(s) to contribute towards the "State Route 68 Commuter Improvements" in an amount greater than their fair share identified in the PSR and/or their total fair share of the TAMC RDIF, the project applicant shall be reimbursed as additional funds are collected by other applicants or sources. Payment of the RDIF is considered appropriate and sufficient mitigation for cumulative traffic impacts.

Implementation of the above mitigation measure would require the proposed project to contribute their fair share towards all regional traffic impact fees in effect at the time of issuance of building permit (or sooner if mitigation measure **MM 3.10-1b** is selected by the project applicant), including but not limited to the TAMC RDIF. Through the payment of the regional traffic impact fees, the proposed project would directly contribute to future improvements, which would help off-set any cumulative traffic impacts on regional roadways caused by increased trip volume associated with the proposed project. Payment of all regional impact fees will mitigate the proposed project's cumulative traffic impacts to the regional roadway network. Therefore, the proposed project's cumulative impact on traffic operations under Cumulative Conditions would be reduced to a **less than significant** level.

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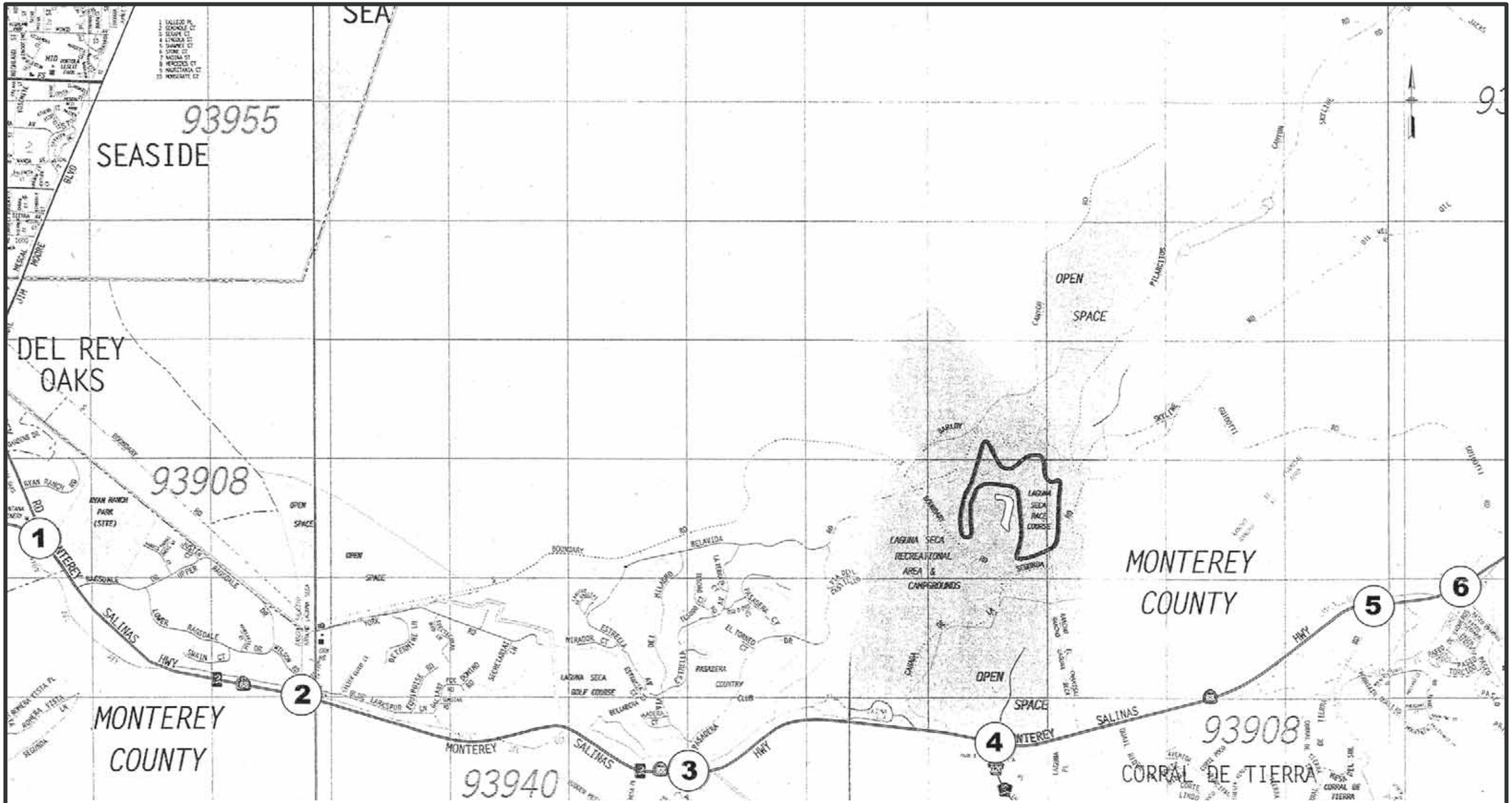

Source: Higgins Associates 2005

G:\ftp\Monterey County Harper Canyon\figures

FIGURE 3.10 -1
INTERSECTIONS

PMC

RECIRCULATED DRAFT
ENVIRONMENTAL IMPACT REPORT

FOR THE

HARPER CANYON (ENCINA HILLS) SUBDIVISION

SCH# 2003071157
PLN 000696

VOLUME II OF II
(CD ONLY)

PREPARED FOR:

COUNTY OF MONTEREY RESOURCE MANAGEMENT AGENCY
PLANNING DEPARTMENT
168 W. Alisal Street, 2nd Floor
Salinas, CA 93901

PREPARED BY:

PMC®

DECEMBER 2009

Hatch Mott MacDonald

HARPER CANYON / ENCINA HILLS SUBDIVISION

TORO PLANNING AREA
MONTEREY COUNTY, CALIFORNIA

TRAFFIC IMPACT ANALYSIS

Administrative Draft Report

Prepared For

Pacific Municipal Consultants
585 Cannery Row, Ste. 304
Monterey, CA 93940

December 15, 2009

1300-B First Street ▪ Gilroy, California 95020-4738 ▪ VOICE/ 408 848-3122 ▪ FAX/ 408 848-2202 ▪ www.hatchmott.com

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1 INTRODUCTION

This Traffic Impact Analysis (TIA) was commissioned to evaluate the potential traffic impacts associated with the implementation of the proposed Harper Canyon / Encina Hills Subdivision residential development along the State Route 68 corridor in Monterey County. This TIA serves as an update to the initial traffic impact analysis that was prepared by Higgins Associates, a division of Hatch Mott MacDonald, for the proposed project during 2001. The time that lapsed between the preparation of the 2001 TIA and the public approval process for the project was considered too long; it was determined that the traffic conditions along the SR 68 corridor have changed and that the improvements identified and recommended to mitigate project impacts as part of the 2001 TIA might need to be revised. Furthermore, the County of Monterey decided that a full Environmental Impact Report (EIR) would be required for this proposed project.

1.1 Project Description

The proposed project site is located in Monterey County, approximately twelve miles east of the City of Monterey, ten miles west of Salinas and south of State Route 68. The project site of approximately 164 acres would be developed as 17 market-rate single family homes and one remainder parcel, approximately 180 acres in size that will be open space. State Route 68 would provide regional access to the project site. More specifically, the project site for the proposed Harper Canyon / Encina Hills Subdivision is located off San Benancio Road to the south of State Route 68 via Meyer Road. The location of the proposed project is shown in Exhibit 1A. The project site plan is shown in Exhibit 1B.

1.2 Scope of Work

The study area and specific scope of work was evaluated by the County of Monterey staff and deemed adequate. This traffic study analyzed the anticipated project traffic impacts on the local roadways and intersections. Study intersections were analyzed for the weekday morning (i.e., 7:00 to 9:00 a.m.) and evening (i.e., 4:00 to 6:00 p.m.) peak periods. Recommendations for mitigation measures to offset the traffic impacts from the proposed project are also provided. Exhibit 2 shows the extent of the study area. The following intersections and road segments were included in the analyses:

Intersections:

1. SR 218 / SR 68
2. York Road / SR 68
3. Pasadera Drive-Boots Road / SR 68
4. Laureles Grade / SR 68
5. Corral de Tierra Road / SR 68
6. San Benancio Road / SR 68

Road Segments:

1. SR 68 between SR 218 and York Road
2. SR 68 between York Road and Pasadera Drive-Boots Road
3. SR 68 between Pasadera Drive-Boots Road and Laureles Grade
4. SR 68 between Laureles Grade and Corral de Tierra Road
5. SR 68 between Corral de Tierra Road and San Benancio Road

The study analyzed traffic conditions under the following development scenarios:

- Existing Conditions
- Background Conditions
- Background + Project Conditions
- Cumulative Conditions

1.3 Intersection Traffic Operation Evaluation Methodologies

Intersection traffic operations were evaluated based on the Level of Service (LOS) concept. Quantitative Level of Service (LOS) analyses were performed for the study intersections based on the *2000 Highway Capacity Manual* methodologies using the Synchro analysis software. LOS is a quantitative description of an intersection's operation, ranging from LOS A to LOS F. Level of service A represents free flow un-congested traffic conditions. Level of service F represents highly congested traffic conditions with unacceptable delay to vehicles at intersections. The intermediate levels of service represent incremental levels of congestion and delay between these two extremes. *Appendix A* provides the LOS descriptions for signalized intersections.

A saturation flow rate of 1600 vehicles per lane per hour was used for the eastbound through and westbound through movements along SR 68 at the request of Caltrans District 5 staff.

1.4 Road Segment Traffic Operation Evaluation Methodologies

Road segment traffic operations along the SR 68 corridor have been a topic of discussion for a very long time. Two commonly accepted methods used to evaluate the operations of road segments include the Highway Capacity Manual's Arterial and Two-Lane Highway methodologies.

SR 68 can be considered a Class I two-lane rural highway, but there are also a number of signalized intersections located along the study route. Although all methodologies previously used to evaluate road segments were based on the Level of Service (LOS) concept, different methodologies provided different results.

For example, the Synchro software allows the analysis of arterials based on the Highway Capacity Manual's (HCM) arterial analysis methodology. The results of the HCM's arterial analysis are strongly influenced by the operations of the signalized intersections

along the corridor, and in this case yielded results that were significantly better than what is actually perceived in the field.

The HCS software allows the analysis of two-lane rural highways based on methodologies also included in the Highway Capacity Manual. This analysis is based on traffic volumes, road capacity, and the percent-time-spent-following for a two-lane rural highway. For this study, it was also found that the use of this software did not accurately reflect the actual conditions in the field.

It could be argued that SR 68 is a hybrid between a two-lane rural highway and a signalized arterial. Due to the unique characteristics of SR 68, and based on discussions with Monterey County staff, it was decided that an alternative method for analyzing the road segment operations would be appropriate.

GPS (Geographical Positioning System) and GIS (Geographical Information System)-based technology provides a way to evaluate road segments and corridors based on actual conditions that are experienced in the field. The method involves the use of a test vehicle equipped with a global positioning device. As the test vehicle travels along the study corridor, the GPS device records the position of the test vehicle in one-second intervals. The collected data can then be used to determine the travel speed, travel time, and delays along the corridor.

In this traffic study, road segment Levels of Service (LOS) were determined using GPS and GIS-based technology. The GPS approach to determine travel speed, travel time, and delay along SR 68 provided a more accurate sense of the existing traffic operations along SR 68 than the other methodologies previously mentioned.

The data obtained from the GPS-equipped test vehicle under existing traffic conditions was used to calibrate the Synchro traffic analysis software in order to assess the road segment operations under the projected traffic conditions (background, background plus project and cumulative).

1.5 Level of Service Standards

All of the study intersections and road segments are located along State Route 68. State Route 68 falls under the jurisdiction of Caltrans, therefore the Caltrans level of service standard of the transition between LOS C and LOS D was applied to the study intersections and road segments.

1.6 Modeling of Right-Turns-on-Red (RTOR)

All of the signalized study intersections allow right turns on red (RTOR), and these right turns can have an effect on the intersection LOS calculations. There are several options to model right turns on red with different traffic analysis software packages, but the only method prescribed by the HCM for modeling RTOR is to reduce the input volumes to account for vehicles turning right on red. Where an exclusive right turn lane movement runs concurrent with a protected left turn phase from the cross street, the HCM allows for

the right turn volume to be reduced by the number of shadowed left turners. However, the length of the right turn lane affects the number vehicles that are able to turn right on red. This is because a short right turn lane can result in right turning vehicles being trapped in the queue with vehicles in the through lane. In order to represent the worst case scenario, it was assumed that no vehicles would be able to turn right on red.

1.7 Criteria for Significant Project Impact

In accordance with the California Environmental Quality Act (CEQA) and agency and professional standards, specific impact criteria have been applied to the study intersections and road segments to determine if a significant impact would occur due to the implementation of the proposed project.

Based on Monterey County Public Works Policy and professional standards, generally a significant impact at a **signalized study intersection** is defined to occur under the following scenarios:

- The addition of project traffic causes operations to deteriorate from an acceptable level of service (LOS A, B or C) to an unacceptable level of service (LOS D, E or F).
- For intersections already operating at LOS D or E, a significant impact would occur if a project adds 0.01 or more to the critical movement's volume-to-capacity ratio.
- For intersections already operating at LOS F, any increase (one vehicle) to the intersection's critical movement is considered significant.

A significant impact at an **unsignalized study intersection** is defined to occur under the following scenarios:

- The addition of project traffic causes any traffic movement to operate at LOS F, or any traffic signal warrant to be met.

A significant impact on a **study roadway segment** is defined to occur under the following scenarios:

- The addition of project traffic causes a roadway segment operating at LOS A through LOS E to degrade to a lower level of service D, E or F, or
- The addition of one project trip is added to a segment already operating at LOS F.

1.8 Previously Recommended Improvements along SR 68 Corridor

Certain segments along the SR 68 corridor currently operate below the LOS C/D standard established by Caltrans. Specific recommended improvements would enhance the level of operation at the study intersections to an acceptable level of service. Although the implementation of improvements at the intersections would not necessarily have an effect on the levels of service of the SR 68 road segments, it would facilitate a slight reduction of the travel time along the corridor.

In order to achieve acceptable levels of service for the SR 68 study road segments, the roadway would require widening to four lanes between Toro Park and SR 1.

Alternatively, a four-lane freeway parallel to the SR 68 corridor was considered, as part of the Fort Ord Reuse Plan. The County of Monterey and Caltrans are in consideration of the South Fort Ord Bypass along an alignment approximately one-half mile north of the existing SR 68 roadway. However, there are no short or long-term funding sources available for either one of these alternatives.

Furthermore, there are no feasible interim improvements that could be implemented along the corridor that would achieve and maintain the acceptable level of service standards (i.e., widening the entire corridor to a four-lane facility is not feasible at this time).

In 2001, the State Route 68 Improvement Advisory Committee (sponsored by the County of Monterey) identified and prioritized a list of improvements for existing and future traffic conditions that would facilitate a slight reduction in the travel time along the corridor. The recommended SR 68 improvements are summarized in Table 1.

Subsequent to the 2001 SR 68 Improvement Advisory Committee recommendations, the Transportation Agency for Monterey County (TAMC) prepared the *Nexus Study for a Regional Development Impact Fee* dated May 14, 2004. Items 2, 4a, 6, and 8 in Table 1 were included in the TAMC regional impact fee in 2004.

Apart from the improvements listed in Table 1, a number of other minor improvements were also recommended in several other study reports for proposed developments along the SR 68 corridor. The following additional mitigation measures for the SR 68 corridor were also previously recommended:

1. Re-striping of the San Benancio Road northbound and southbound approaches at the SR 68 / San Benancio Road intersection to provide a left-turn/through lane and a right-turn lane on both approaches.
2. Install a right-turn overlap phase at the traffic signal on the northbound approach of the SR 68 / San Benancio Road intersection.
3. Install a right-turn overlap phase at the traffic signal on the northbound approach of the SR 68/ Corral de Tierra Road intersection.
4. Install a right-turn overlap phase on the traffic signal on the southbound approach of the SR 68/SR 218 intersection.

Table 1. SR 68 Traffic Improvements Identified by the Advisory Committee

Priority	Project	Estimated Cost (2001 Dollars)	Status
1	Install Opticom emergency vehicle preemption at the signal controlled intersections	$110,000	Completed
2	Dual left-turn lanes on westbound SR 68 at the Laureles Grade Road intersection	$1,360,000	Completed
3	Provide improved access onto SR 68 from Torero Drive	Caltrans budget item	Completed
4a (tie)	Dual left-turn lanes on westbound SR 68 at the intersection of Corral de Tierra Road	$755,000	In environmental review and design phase.
4b (tie)	Continuously maintain the existing shoulder along SR 68 for safety reasons	Caltrans budget item	Ongoing
6	Extend the eastbound right turn lane at Laureles Grade Road	$500,000	Completed
7	Widen SR 68 to four lanes from State Route 218 to Ragsdale Drive	$1,626,351	Completed
8	Dual left-turn lanes on westbound SR 68 at the intersection with San Benancio Road	$2,852,000	EIR completed. In final design phase. Scheduled for construction in 2010.
9	South Fort Ord Bypass (Torero Drive to State Route 218)	$179,000,000	This project is included in the regional transportation plan as an unconstrained project. No funding has been identified for this improvement in the foreseeable future (20 years).

Source: County of Monterey Public Works Department, 2009.

Note: Items 2, 4a, 6 and 8 were included in the 2004 TAMC fee program.

1.9 Regional Impact Fee Nexus Study Update

In March, 2008, TAMC updated the *Nexus Study for a Regional Development Impact Fee*. As of this writing, the project list in the *Regional Impact Fee Nexus Study Update* includes a project referred to as "SR 68 Commuter Improvements", which would widen SR 68 to four lanes from the existing 4-lane section adjacent to Toro Park to Corral de Tierra Road. The operational benefits associated with this improvement are discussed in Section 7.3 of this report.

1.10 Assumed Roadway Improvements

Discussions with County of Monterey and Caltrans District 5 staff have indicated that the following intersection improvements will be implemented within 1 to 5 years. Therefore, these improvements were assumed to be completed under the Background Traffic Conditions scenario.

1. York Road / SR 68 Intersection
    a. The addition of a fourth (south) York Road leg (to be implemented by the Monterra Ranch development).
    b. A second York Road southbound left-turn lane and eastbound acceleration lane (to be implemented by the Laguna Villas Condominium development).

2. Laureles Grade Road / SR 68 Intersection
    a. A second SR 68 westbound left-turn lane (SR 68 Advisory Committee Priority 2).
    b. Extension of the eastbound right-turn lane (SR 68 Advisory Committee Priority 6).

3. Corral de Tierra Road / SR 68 Intersection
    a. The addition of a fourth (north) Corral de Tierra Road leg (to be implemented by the Cypress Church access modification).
    b. A second SR 68 westbound left-turn lane (SR 68 Advisory Committee Priority 4a).

4. San Benancio Road / SR 68 Intersection
    a. A second SR 68 westbound left-turn lane (SR 68 Advisory Committee Priority 8).

2 EXISTING TRAFFIC CONDITIONS

This chapter provides a description of existing traffic conditions in terms of roadway facilities, bicycle and pedestrian facilities, transit service, traffic volumes, and intersection and roadway operations.

2.1 Existing Traffic Network

The study area, shown in Exhibit 2, stretches from the SR 68 / SR 218 intersection in the west to the SR 68 / San Benancio Road intersection in the east. A brief description of each of the roads in the study area follows:

State Route 68 (Monterey-Salinas Highway) is a two-lane rural highway connecting State Route 1 in Monterey and SR 101 in Salinas. The speed limit on SR 68 along the study area is 55 miles per hour. It serves as a commute route between Salinas and the Monterey Peninsula, provides access to the low-density developments along it, and functions as a scenic tourist route to the Monterey Peninsula.

State Route 218 (Canyon Del Rey Road) is a two-lane highway that connects State Route 68 and State Route 1. It provides access to Del Rey Oaks, Sand City and Seaside. The SR 218 / SR 68 intersection is signal controlled.

York Road provides access to some single unit housing developments as well as the Laguna Seca and Ryan Ranch Business Parks located to the north of SR 68. The speed limit on York Road is 25 miles per hour. The SR 68 / York Road intersection is signal controlled.

Pasadera Drive is a private road to the north off SR 68 and provides access to the Pasadera Country Club and its associated single unit housing development. The speed limit on Pasadera Drive is 25 miles per hour. The SR 68 / Pasadera Drive intersection is signal controlled.

Boots Road provides access to a small quantity of residential developments to the south of SR 68 and the speed limit on Boots Road is 25 miles per hour. The SR 68 / Boots Road intersection is signal controlled.

Laureles Grade Road is a two-lane north/south county road that connects SR 68 with Carmel Valley. The speed limit on Laureles Grade Road is 45 miles per hour and it also provides access to several residential developments. The SR 68 / Laureles Grade Road intersection is signal controlled.

Corral de Tierra Road is located to the west of San Benancio Road. It is a two-lane collector street with a speed limit of 35 miles per hour. The SR 68 / Corral Del Tierra Road intersection is signal controlled.

San Benancio Road is a two-lane collector street with a speed limit of 35 miles per hour and it provides access to several residential developments. The SR 68 / San Benancio Road intersection is signal controlled.

Meyer Road is a two-lane privately maintained road owned by Harper Canyon Realty LLC. The San Benancio Road / Meyer Road intersection is controlled by a stop sign on westbound Meyer Road.

2.2 Existing Transit Services

Monterey-Salinas Transit (MST) provides fixed-route bus service in Monterey County and Peninsula cities. Line 21 provides service between Monterey and Salinas via SR 68 with stops at various locations along SR 68. MST has reduced Line 21 service in recent years due to a lack of ridership on the route. In August 2003 weekday mid-day service was eliminated, and on July 30, 2005 service was further reduced to the current schedule which includes only one weekday morning round trip and a single westbound one-way trip on weekday afternoons. According to MST, most passengers traveling between Monterey and Salinas use MST's Line 20, which travels through Marina, due to the poor on-time performance of Line 21.

2.3 Existing Pedestrian and Bicycle Facilities

Pedestrian facilities include sidewalks, crosswalks and pedestrian signals. There is not a significant amount of foot-traffic in the vicinity of the proposed project and therefore sidewalks are not provided along SR 68, San Benancio Road and Meyer Road. Crosswalks and pedestrian signal phasing are provided at the signalized study intersections.

There are three basic types of bicycle facilities recognized in the County of Monterey. Each type is described below:

Bike path (Class I) - A completely separate right-of-way designed for the exclusive use of cyclists and pedestrians, with minimal crossings for motorists.

Bike lane (Class II) - A lane on a regular roadway, separated from the motorized vehicle right-of-way by paint striping, designated for the exclusive or semi-exclusive use of bicycles. Bike lanes allow one-way bike travel. Through travel by motor vehicles or pedestrians is prohibited, but crossing by pedestrians and motorists is permitted.

Bike route (Class III) - Provides shared use of the roadway, designated by signs or permanent markings and shared with motorists.

However, there are no bicycle facilities provided in the project vicinity.

2.4 Existing Traffic Data

The following sections present a description of the existing traffic network, existing traffic volumes, intersection levels of service, and an overview of traffic flow conditions within the study area under existing traffic conditions.

To establish existing traffic flow conditions, intersection traffic counts were collected during the weekday AM (i.e. 7:00 – 9:00 a.m.) and PM (i.e. 4:00 – 6:00 p.m.) peak hours at the 6 study intersections. The traffic counts were conducted between February 9th and August 29th, 2006. The traffic count dates are shown in Table 2. From the peak period traffic counts, the AM and PM peak hour turning movement volumes were identified. The existing AM and PM peak hour traffic volumes are presented on Exhibit 3.

Table 2
Dates of Manual Traffic Counts at Study Intersections

	INTERSECTION	COUNT DATE
1	SR 218 / SR 68	August 15, 2006
2	York Road / SR 68	August 16, 2006
3	Boots Road-Pasadera Drive / SR 68	August 16, 2006
4	Laureles Grade / SR 68	August 16 & August 29, 2006
5	Corral de Tierra Road / SR 68	August 22, 2006
6	San Benancio Road / SR 68	August 16, 2006

2.5 Existing Traffic Conditions – Intersection Operations

Intersection levels of service for existing traffic conditions are summarized on Exhibit 4. Level of service calculation worksheets for existing traffic conditions are included in *Appendix B.*

Five of the six study intersections operate below the level of service standard under existing traffic conditions. The following is a description of the operations of each intersection currently operating at deficient levels. Recommended mitigation measures are discussed in italics below the description of each intersection's operations.

York Road / SR 68 – Intersection # 2 (signalized) currently operates at LOS E during both the weekday AM and PM peak hours.

The addition of a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

Pasadera Drive-Boots Road / SR 68 – Intersection # 3 (signalized) currently operates at LOS D during the weekday AM peak hour and LOS C during the weekday PM peak hour.

The addition of a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

Laureles Grade Road / SR 68 – Intersection # 4 (signalized) currently operates at LOS D during the weekday AM peak hour and LOS F during the weekday PM peak hour.

The addition of a second eastbound through lane and a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

Corral de Tierra Road / SR 68 – Intersection # 5 (signalized) currently operates at LOS D during the weekday AM peak hour and LOS E during the weekday PM peak hour.

The addition of a second eastbound through lane and a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

San Benancio Road / SR 68 – Intersection # 6 (signalized) currently operates at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour.

The addition of a second eastbound through lane and a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

2.6 Existing Traffic Conditions – Road Segment Operations

To determine the existing conditions road segment operating conditions along the SR 68 corridor, the GPS and GIS-based technologies referenced in section 1.4 were used. The average travel speed was determined along an approximate 6.5 mile section of the SR 68 corridor starting at a point just west of the SR 68 / SR 218 intersection and ending at a point just east of the SR 68 / San Benancio Road intersection. Four one-way travel runs were performed during the weekday AM and PM peak hours as well as during the off-peak period. The off-peak runs were performed to provide a comparison between the peak hours and a relatively un-congested time period. It should be noted that there was a wide range in the speeds recorded; speeds in excess of 55 mph were recorded on sections of the corridor during both the peak periods as well as during the off-peak periods. However, for the purposes of this traffic analysis, the focus will be placed on the average travel speed and on areas of heavy congestion.
The results of the GPS travel runs can be seen graphically in Exhibits 5A through 5C and the results are briefly discussed below:

Eastbound AM Peak Period: When considering the two AM peak period GPS runs in the eastbound direction, the longest travel time along the 6.5 mile study corridor was 9.6 minutes. The average travel speeds on the segments ranged between 26 and 44 mph and the levels of service ranged from LOS D to LOS E. The most congested sections of the

corridor were between York Road and San Benancio Road. Refer to Exhibit 5A for details.

Westbound AM Peak Period: When considering the two AM peak period GPS runs in the westbound direction, the longest travel time along the 6.5 mile study corridor was 10.0 minutes. The average travel speeds on the segments ranged between 31 and 40 mph and the level of service was LOS E on all the study segments. The most congested sections of the corridor were east of Corral de Tierra Road and east of Laureles Grade Road. Refer to Exhibit 5A for details.

Eastbound PM Peak Period: When considering two PM peak period GPS runs in the eastbound direction, the longest travel time along the 6.5 mile study corridor was 19.0 minutes. The average travel speeds on the segments ranged between 11 and 39 mph and the levels of service ranged from LOS E to LOS F. The most congested sections of the corridor were between San Benancio Road and Pasadera Drive. Refer to Exhibit 5B for details.

Westbound PM Peak Period: When considering the two PM peak period GPS runs in the westbound direction, the longest travel time along the 6.5 mile study corridor was 9.5 minutes. The average travel speeds on the segments ranged between 28 and 52 mph and the levels of service ranged from LOS B to LOS E. The most congested sections of the corridor were east of Corral de Tierra Road. Refer to Exhibit 5B for details.

Eastbound Off-Peak Period: When considering the two off-peak period GPS runs in the eastbound direction, the longest travel time along the 6.5 mile study corridor was 8.6 minutes. The average travel speeds on the segments ranged between 26 and 55 mph and the levels of service ranged from LOS E to LOS A. The most congested sections of the corridor were between Pasadera Drive and Laureles Grade Road and between Corral de Tierra Road and San Benancio Road. Refer to Exhibit 5C for details.

Westbound Off-Peak Period: When considering the two off-peak period GPS runs in the westbound direction, the longest travel time along the 6.5 mile study corridor was 9.0 minutes. The average travel speeds on the segments ranged between 20 and 53 mph and the levels of service ranged from LOS A to LOS F. The most congested sections of the corridor were east of SR 218 and west of San Benancio Road. Refer to Exhibit 5C for details.

Conclusion: It should be noted that the results discussed in the preceding paragraphs were based on the average travel speed for each segment along the 6.5 mile stretch of the corridor which included the stopped times at the signalized intersections. Portions of the individual segments operated at levels of service better or worse than the average, ranging from LOS A to LOS F. For details of each segment's level of service, refer to Exhibit 6.

The results show that, within the study corridor, congestion is experienced on SR 68 during both and AM and PM peak hours, with the most critical congestion occurring in the eastbound direction during the PM peak hour. It is anticipated that the widening of SR

68 to a 4-lane facility would improve the operating conditions along the corridor to acceptable levels of service.

Existing traffic conditions road segment levels of service, as well as AM and PM peak hour traffic volumes on the study road segments, are tabulated in Exhibit 6. These are based upon the turning volumes illustrated on Exhibit 3. Recommended mitigation measures for existing traffic conditions are shown in Exhibit 7.

3 BACKGROUND TRAFFIC CONDITIONS

This chapter presents a description of the traffic network, traffic volumes, and intersection levels of service within the study area under background (existing plus approved projects) traffic conditions.

3.1 Approved Projects

A number of other projects have been approved within the study area that have not yet been constructed. The list of approved projects relevant to this traffic study was developed in consultation with the County of Monterey Planning and Public Works staff. *Appendix C* includes a trip generation table of the approved projects that will most likely be implemented within the next 5 years. It is anticipated that the trips generated by the approved projects will impact the study street network prior to impacts being experienced by the proposed project.

3.2 Background Traffic Conditions - Intersection Operations

The traffic that would be generated by the approved projects was combined with the existing traffic volumes to obtain volumes for background traffic conditions. Background AM and PM peak hour turning volumes are illustrated on Exhibit 8. Intersection levels of service for background traffic conditions are summarized on Exhibit 4. The levels of service shown in Exhibit 4 reflect the improvements discussed in section 1.9 starting under background traffic conditions. Intersection level of service calculation worksheets for background traffic conditions is included in *Appendix D*.

Five of the six study intersections would operate below the level of service standard under background traffic conditions. The following is a description of the operations of each intersection that would operate at deficient levels of service. Recommended mitigation measures are discussed in italics below the description of each intersection's operations.

York Road / SR 68 – Intersection # 2 (signalized) would operate at LOS F during both the weekday AM and PM peak hours.

The addition of a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

Pasadera Drive-Boots Road / SR 68 – Intersection # 3 (signalized) would operate at LOS E during the weekday AM peak hour and LOS D during the weekday PM peak hour.

The addition of a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

Laureles Grade Road / SR 68 – Intersection # 4 (signalized) would operate at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour.

The addition of a second eastbound through lane and a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

Corral de Tierra Road / SR 68 – Intersection # 5 (signalized) would operate at LOS F during the weekday AM and PM peak hours.

The addition of a second eastbound through lane and a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

San Benancio Road / SR 68 – Intersection # 6 (signalized) would operate at LOS F during the weekday AM and PM peak hours.

The addition of a second eastbound through lane and a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

3.3 Background Traffic Conditions – Road Segment Operations

With the use of the GPS and GIS-based technology, it was possible to accurately determine the operating conditions along the SR 68 corridor under existing traffic conditions. However, finding the correct methodology to determine the road segment levels of service for future conditions is more of a challenge. SR 68 is classified as a Class 1, 2-lane rural highway. The methodologies described in the Highway Capacity Manual to evaluate the operating conditions include two variables; travel speed and percent time spent following another vehicle. In an attempt to match the existing conditions travel speeds with results using other methodologies, it was found that the Highway Capacity Software (HCS) showed reasonably similar results. In an attempt to match the HCS results with the actual travel speed measured with the GPS methodology, it was found that in the case of SR 68, the percent time spent following does not really play a significant role in determining the average travel speed and corresponding LOS for the road segment.

The data obtained from the GPS-equipped test vehicle under existing traffic conditions was used to calibrate the Synchro traffic analysis software in order to assess the road segment operations under the projected traffic conditions (background, background plus project and cumulative). Exhibit 6 shows the actual speed on each study segment as recorded from the GPS device compared to the speed that was calibrated in Synchro under existing traffic conditions. Once the Synchro analysis software was calibrated for existing conditions, it was then used to estimate the projected average travel speeds for the future scenarios. The Synchro "Arterial Level of Service" reports are included in *Appendix E*. It should be noted that these reports were used to estimate the speeds on the study segments, which were then used to determine the levels of service based on the speeds in Table 3 (which can be found on Exhibit 6). Therefore, the only values utilized from the Synchro "Arterial Level of Service" reports were the arterial speeds.

Background traffic conditions road segment levels of service, as well as AM and PM peak hour traffic volumes on the study road segments, are tabulated in Exhibit 6. These are based upon the turning volumes illustrated in Exhibit 8. The Synchro arterial level of service reports used to estimate the projected travel speeds under background traffic conditions are included in *Appendix E*. As can be seen from Exhibit 6, the study road segments would continue to operate at unacceptable levels of service under background traffic conditions.

As identified under existing traffic conditions, congestion would continue to be experienced on SR 68 during both and the AM and PM peak hours, with the most critical congestion occurring in the eastbound direction during the PM peak hour. It is anticipated that the widening of SR 68 to a 4-lane facility would improve the operating conditions along the corridor to acceptable levels of service.

4 BACKGROUND PLUS PROJECT TRAFFIC CONDITIONS

This chapter presents a description of the traffic network, traffic volumes, and intersection levels of service within the study area under Background Plus Project Traffic Conditions. It also includes an evaluation of the sight distance at the project access intersection, as well as discussions on traffic operations and accident history on the local road network in the vicinity of the project site.

4.1 Project Description and Trip Generation

The proposed project site is located in Monterey County, approximately twelve miles east of the City of Monterey, ten miles west of Salinas and south of State Route 68. The project site of approximately 164 acres would be developed as 17 market-rate single family homes and one remainder parcel, approximately 180 acres in size that will be open space. State Route 68 would provide regional access to the project site; local access to the Harper Canyon / Encina Hills Subdivision will be provided by improving an existing dirt road (Meyer Road / Alta Lane) located off of San Benancio Road between State Route 68 and Harper Canyon Road.

The proposed project would generate an estimated 163 daily trips, with 13 trips generated during the AM peak hour (3 in, 10 out) and 17 trips generated during the PM peak hour (11 in, 6 out). The project trip generation table is shown in Exhibit 9.

4.2 Background Plus Project Traffic Conditions - Intersection Operations

The traffic that would be generated by the Harper Canyon / Encina Hills Subdivision was combined with the background traffic volumes to obtain background plus project traffic conditions. The AM and PM peak hour project trip assignment is illustrated on Exhibit 10. Background plus project AM and PM peak hour turning volumes are illustrated on Exhibit 11. Intersection levels of service for background plus project traffic conditions are summarized on Exhibit 4.

Intersection level of service calculation worksheets for background plus project traffic conditions are included in *Appendix F*.

Five of the six study intersections would continue to operate below the level of service standard under background plus project traffic conditions. The following is a description of the operations of each intersection that would operate at deficient levels of service. Recommended mitigation measures are discussed in italics below the description of each intersection's operations.

York Road / SR 68 – Intersection # 2 (signalized) would continue to operate at LOS F during both the weekday AM and PM peak hours.

The addition of a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

Pasadera Drive-Boots Road / SR 68 – Intersection # 3 (signalized) would continue to operate at LOS E during the weekday AM peak hour and LOS D during the weekday PM peak hour.

The addition of a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

Laureles Grade Road / SR 68 – Intersection # 4 (signalized) would continue to operate at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour.

The addition of a second eastbound through lane and a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

Corral de Tierra Road / SR 68 – Intersection # 5 (signalized) would continue to operate at LOS F during the weekday AM and PM peak hours.

The addition of a second eastbound through lane and a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

San Benancio Road / SR 68 – Intersection # 6 (signalized) would continue to operate at LOS F during the weekday AM and PM peak hours.

The addition of a second eastbound through lane and a second westbound through lane would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

4.3 Background Plus Project Traffic Conditions – Road Segment Operations

Background plus project traffic conditions road segment levels of service, as well as AM and PM peak hour traffic volumes on the study road segments, are tabulated in Exhibit 6. These are based on the turning volumes illustrated in Exhibit 11. Exhibit 7 tabulates mitigation measures for background plus project traffic conditions. The Synchro arterial level of service reports used to estimate the projected travel speeds under background plus project traffic conditions are included in *Appendix E*.

As identified under existing traffic conditions, congestion would continue to be experienced on SR 68 during both and the AM and PM peak hours, with the most critical congestion occurring in the eastbound direction during the PM peak hour. It is anticipated that the widening of SR 68 to a 4-lane facility would improve the operating conditions along the corridor to acceptable levels of service.

Based on the criteria for significant project impacts discussed in Section 1.7 of this report, the addition of any project trips to road segments already operating at LOS F should be considered significant.

5 CUMULATIVE TRAFFIC CONDITIONS

This chapter presents a description of the traffic network, traffic volumes, and intersection levels of service within the study area under Cumulative Traffic Conditions. Various approved and proposed projects throughout the Cities of Marina, Seaside, Sand City, Monterey, Del Rey Oaks, Salinas, and Monterey County are anticipated to be developed, or at least partially developed, within approximately the next twenty-five years. The Cumulative Traffic Conditions scenario includes the existing traffic volumes plus the estimated traffic that would be generated by all approved and cumulative projects in the vicinity of the study area, as well as the proposed project. The horizon year for the Cumulative Traffic Conditions scenario is the year 2030. The AMBAG Regional Travel Model was used to estimate the Cumulative 2030 traffic volumes on the study road network.

5.1 Cumulative Projects

A number of projects have been proposed within the study area that have not yet been approved or even formally submitted for evaluation. The list of cumulative projects relevant to this traffic study was developed in consultation with the County of Monterey Planning and Public Works staff. *Appendix G* includes a trip generation table of the cumulative projects.

5.2 Cumulative Traffic Conditions - Intersection Operations

Cumulative traffic conditions AM and PM peak hour turning volumes are illustrated on Exhibit 12. Intersection levels of service for cumulative traffic conditions are summarized on Exhibit 4. Intersection levels of service calculation worksheets for cumulative traffic conditions are included in *Appendix H*.

All six of the study intersections would operate below the level of service standard under cumulative traffic conditions. The following is a description of the operations of each intersection that would operate at deficient levels of service. Recommended mitigation measures are discussed in italics below the description of each intersection's operations.

SR 218 / SR 68 Intersection #1 (signalized) would operate at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour.

Widening and restriping the northbound approach to include one left-turn lane, one through lane, and one right-turn lane, widening the eastbound approach to include two left-turn lanes, one through lane, and one shared through/right-turn lane, and the addition of southbound right-turn overlap phasing would improve operations at this intersection to acceptable levels of service during the AM and PM peak hours.

York Drive / SR 68 Intersection #2 (signalized) would operate at LOS F during the weekday AM and PM peak hours.

The addition of a second eastbound through lane, a second eastbound left-turn lane, and a second westbound through lane at this intersection would improve operations to an acceptable level of service during the AM and PM peak hours.

Pasadera Drive-Boots Road / SR 68 Intersection #3 (signalized) would operate at LOS F during the weekday AM and PM peak hours.

The addition of a second eastbound through lane and a second westbound through lane at this intersection would improve operations to an acceptable level of service during the AM and PM peak hours.

Laureles Grade / SR 68 Intersection #4 (signalized) would operate at LOS F during the weekday AM and PM peak hours.

The addition of a second eastbound through lane, a second westbound through lane, and the addition of northbound right-turn overlap phasing at this intersection would improve operations to an acceptable level of service during the AM and PM peak hours.

Corral de Tierra Road / SR 68 Intersection #5 (signalized) would operate at LOS F during the weekday AM and PM peak hours.

The addition of a second eastbound through lane, a second westbound through lane, and the addition of northbound right-turn overlap phasing at this intersection would improve operations to an acceptable level of service during the AM and PM peak hours.

San Benancio Road / SR 68 Intersection #6 (signalized) would operate at LOS F during the weekday AM and PM peak hours.

The addition of a second eastbound through lane and a second westbound through lane at this intersection would improve operations to an acceptable level of service during the AM and PM peak hours.

5.3 Cumulative Traffic Conditions – Road Segment Operations

Cumulative traffic conditions road segment levels of service, as well as AM and PM peak hour volumes on the study road segments, are tabulated in Exhibit 6. These are based on the turning volumes illustrated on Exhibit 12. Exhibit 7 tabulates the recommended mitigation measures for cumulative traffic conditions. The Synchro arterial level of service reports used to estimate the projected travel speeds under cumulative traffic conditions are included in *Appendix E*.

As identified under existing traffic conditions, congestion would continue to be experienced on SR 68 during both and the AM and PM peak hours, with the most critical congestion occurring in the eastbound direction during the PM peak hour. It is anticipated that the widening of SR 68 to a 4-lane facility would improve the operating conditions along the corridor to acceptable levels of service.

Based on the criteria for significant project impacts discussed in Section 1.7 of this report, the addition of any cumulative trips to road segments already operating at LOS F should be considered significant.

6 PROJECT ACCESS AND SIGHT DISTANCE

6.1 Project Access

Access to the project site for the proposed Harper Canyon / Encina Hills Subdivision is located off San Benancio Road to the south of State Route 68; the location of the proposed project is shown in Exhibit 1A. San Benancio Road is a collector road providing access to several residential developments and the posted speed limit is 35 mph. Localized main access to the proposed project will be via Meyer Road. The proposed project would create 17 single-family residential parcels that range from 5.13 acres to 23.42 acres, associated roadway improvements and one remainder parcel of approximately 180 acres that would remain as open space.

State Route 68 provides regional access to the project site. Meyer Road would provide access to lots 15 through 17. Lots 1 through 7 and 11 through 14 would be accessed via Alta Lane and lots 8 through 10 would be accessed via Sierra Lane. Lot 7 would have an extended 12 foot wide driveway from Alta Lane extending behind lot 6.

6.2 Sight Distance Analysis

6.2.1 Speed Survey on San Benancio Road

A speed survey was conducted on San Benancio Road in the vicinity of the San Benancio Road / Meyer Road intersection. The speed survey was conducted in accordance with the requirements of the latest California Vehicle Code and the Caltrans Traffic Manual.

During the speed survey, Higgins Associates collected 106 readings (53 readings in the northbound travel direction and 53 readings in the southbound travel direction) using manual radar speed survey equipment. The survey radar device was calibrated and the speed surveys were conducted in good weather and under normal traffic conditions on May 5, 2006.

The speed survey data was analyzed and the results indicate that, in the northbound direction, the average travel speed on San Benancio Road in the vicinity of Meyer Road is 45 miles per hour, and the 85th percentile speed is 51 mph. In the southbound direction, the average speed is 46 mph, and the 85th percentile speed is 52 mph. The results of the speed survey are summarized on Exhibits 13 and 14.

6.2.2 Actual Sight Distance Currently Provided at the San Benancio Road / Meyer Road Intersection

Currently, a sight distance of about 240 feet is provided to the north of the intersection and about 250 feet of sight distance is provided to the south. This is based on a 13 foot setback from the edge of travel way. Corner sight distance is measured from a point 3.5 feet above the ground at the location of the driver on the minor street

to a 4.25 feet object height in the center of the approaching lane of the major road. Photographs of the San Benancio Road / Meyer Road intersection, which were taken on May 9, 2006, are included in *Appendix I*.

6.2.3 Required Sight Distance at the San Benancio Road / Meyer Road Intersection to Accommodate Prevailing Traffic Speeds

Based on the prevailing traffic speeds on San Benancio Road and the standards set forth in *A Policy on Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials (AASHTO), 2001, the minimum sight distance that should be provided to allow for safe operating conditions at the San Benancio Road / Meyer Road intersection is 436 feet looking north from Meyer Road, and 423 feet looking south from Meyer Road. The sight distance calculations are included in Exhibit 15.

Based upon the available sight distances, neither direction meets AASHTO standards for sight distance. Therefore, existing conditions constitute substandard sight distances per AASHTO standards.

6.2.4 Remedial Measures

The lack of acceptable sight distance at this intersection could be improved by trimming vegetation and cutting back the embankment. However, the vertical curvature also contributes to the lack of acceptable sight distance at this location. Overlaying Meyer Road to raise the elevation of the vantage point of the driver on Meyer Road will also improve sight distance. The existing 240 and 250 foot sight distances at the San Benancio Road / Meyer Road intersection accommodate a speed of 35 mph, as shown in Exhibit 15. However, based on the speed survey, a speed limit of 35 mph on San Benancio Road in the vicinity of Meyer Road would not be enforceable.

6.3 General Recommendations Regarding the San Benancio Road / Meyer Road Intersection

The San Benancio Road / Meyer Road intersection should be upgraded to meet Monterey County standards for a private road / county road intersection. In addition, based on the Monterey County Left-Turn Policy, adopted on February 26, 1980, a southbound left-turn lane will be warranted under background plus project traffic conditions at the San Benancio / Meyer Road intersection. The left-turn channelization warrant is included as *Appendix J.*

In addition, the Meyer Road approach currently does not include standard tapers to accommodate right turns into and out of Meyer Road. The San Benancio Road / Meyer Road intersection should be upgraded per County of Monterey standards for a private road / county road intersection. This will also assist in improving sight distance at the intersection.

6.4 San Benancio Road Traffic Operations Analysis

6.4.1. Traffic Volumes and Level of Service

Based on the 2005 Annual Average Daily Traffic booklet, published by the Monterey County Department of Public Works, the 2005 Annual Average Daily Traffic (AADT) on San Benancio Road between SR 68 and Harper Canyon Road was 5,700 vehicles per day. San Benancio Road, a two-lane rural road, currently operates at LOS B, based on the Level of Service Threshold Volumes for Various Roadway Types, which are included in *Appendix K*.

The project will add approximately 170 daily trips on San Benancio Road, which is about a 3% increase in traffic. With the addition of project traffic, San Benancio Road will still operate at LOS B.

6.4.2 Accident Analysis

Accident history data on San Benancio Road was obtained from County of Monterey staff. The accident data indicate that during a five-year period (from January, 2001 until March, 2006) there were five collisions on San Benancio Road between SR 68 and Harper Canyon Road. Of the five reported collisions on San Benancio Road, three involved one vehicle that ran off the road and hit an object. The other two collisions involved two vehicles with one vehicle being broadsided by the other. Of the five reported collisions on San Benancio Road between SR 68 and Harper Canyon Road, all of them involved property damage with no injuries and no fatalities. A collision diagram summarizing the accident history on San Benancio Road (between SR 68 and Harper Canyon Road) within the last five years is shown on Exhibit 16. Table 4 compares the accident rate on San Benancio Road between SR 68 and Harper Canyon Road with the statewide average accident rate for 2-lane rural roads[1]. From Table 4 it can be seen that the accident rate on San Benancio Road, between SR 68 and Harper Canyon Road, is well below the statewide average for similar types of roads.

[1] *2003 Collision Data on California State Highways*, published by Caltrans.

Table 4. Accident Rates on San Benancio Road Compared with Statewide Average Accident Rates on 2-Lane Rural Roads

	San Benancio Road Accident Rate	Statewide Average Accident Rate
Total Accidents	0.481 Acc / MVM*	1.24 Acc / MVM*
Fatality + Injury	0.00 Fatal + Injury / MVM*	0.57 Fatal + Injury /MVM*
Fatality	0.00 Fatal / 100 MVM*	3.84 Fatal / 100 MVM*

*Acc/MVM = accidents per million vehicle miles.

6.4.3 General Recommendations Regarding San Benancio Road

Field observations and comments from residents on San Benancio Road indicate that many of the private driveways along San Benancio Road experience limited sight distance conditions. Vegetation should be minimized where it interferes with sight distance. This is the responsibility of the County of Monterey within the public right of way and the individual property owner if a sight distance constraint is created by landscaping, fences or other physical features within the property owner's land. Enforcement is also recommended. However, it must be remembered that that there is a history of very few accidents on San Benancio Road. Relatively high speeds and increasing traffic volumes have apparently not resulted in a safety problem.

6.5 Meyer Road Traffic Operations Evaluation

Meyer Road is a privately maintained road owned by Harper Canyon Realty LLC, subject to easements in favor of other residences along the road. Meyer Road would be classified as a tertiary road based on Monterey County street classifications, as it would provide access to no more than 100 tributary dwelling units. The width of Meyer Road currently varies between approximately 10 to 13 feet. It is recommended that Meyer Road be upgraded per County of Monterey standards (for a tertiary private rural road) to a minimum surfaced roadbed width of 20 feet. Physical and topographic constraints may limit the ability to meet tertiary standards. At a minimum, a County of Monterey standard cul-de-sac street with 18 feet of paved width should be provided. Typical cross sections for these types of roads are included in *Appendix L*.

6.6 Project-Specific Recommendations

The following are project-specific recommendations based on the preceding analysis.

1. To the extent practical, trim or cut back the vegetation and embankment in the vicinity of the San Benancio Road / Meyer Road intersection to improve sight distance at the intersection. The precise extent of vegetation removal, embankment re-grading and resurfacing will require the review and approval by the Monterey County Public Works Department at the time of obtaining an Encroachment Permit.

2. To the extent practical, widen and resurface Meyer Road per County of Monterey standards for a cul-de-sac private road (i.e., to a minimum surfaced roadbed width of 18 feet) per Monterey County Public Works Standard Detail Plate No. 5, included herein as *Appendix L*.

3. To the extent practical, provide right turn tapers at the San Benancio Road / Meyer Road intersection per County of Monterey standards for a private road / county road intersection as described in the Monterey County Roadway Design Standards, page 18, item P (included as *Appendix M*) or similar to the standard Caltrans Access Openings on Expressways, Figure 205.1 (included as *Appendix N*).

4. Construct a southbound San Benancio Road left-turn lane per Monterey County standards at the San Benancio Road / Meyer Road intersection.

7 CONCLUDING COMMENTS AND RECOMMENDATIONS

7.1 Concluding Comments

This traffic impact analysis evaluated the anticipated impacts from the increase in traffic that would be generated by the proposed Harper Canyon / Encina Hills Subdivision on the surrounding road network. Four traffic scenarios were assessed in the traffic analysis, namely, existing traffic conditions, background (existing plus approved projects) traffic conditions, background plus project traffic conditions, and cumulative traffic conditions.

The results have been thoroughly discussed in the preceding chapters of this report and the conclusion is that a number of mitigating improvements along the SR 68 corridor would be required, beginning under existing traffic conditions, to achieve and maintain acceptable levels of service on the study road network. These improvements, which for the most part are based on existing deficiencies in the road network, would not be triggered by the proposed project. In addition, funding for the implementation of these improvements along the entire SR 68 corridor is not available.

Although the proposed project would not cause any of the study intersections or road segments to degrade to a lower level of service, the project would generate traffic that would be added to the road network, which is already operating at deficient levels.

It is therefore recommended that the proposed Harper Canyon / Encina Hills Subdivision project contribute funds to improve the operating conditions on the SR 68 corridor. A series of intersection improvements were identified by the Highway 68 Advisory Committee. These have been assumed in this report to be fully funded and in place under Background traffic conditions and therefore are not identified as mitigation required by this project.

7.2 Widening SR 68 to Four Lanes from Toro Park to West End of Toro Park Estates

In November 2006, Higgins Associates (now Hatch Mott MacDonald) explored the possibility of adding a 1.1 mile extension of the 4-lane freeway portion of SR 68, from where the freeway currently ends to the west end of Toro Park Estates in order to provide a net reduction in travel time along the SR 68 corridor. The freeway extension would provide several benefits to the SR 68 corridor. One benefit would be a reduction in the travel time on SR 68 in both directions. The freeway extension would reduce the *combined* eastbound and westbound travel time through the SR 68 corridor by approximately 286 seconds (4.7 minutes) during the weekday AM and PM peak hours. The traffic generated by the Harper Canyon / Encina Hills Subdivision project would increase the *combined* eastbound and westbound travel time through the SR 68 corridor by approximately 32 seconds. Therefore the implementation of the freeway extension would more than offset the increase in travel time caused by the proposed project. The calculations used to estimate the reduction in travel time with the freeway extension are shown in *Appendix O* and are based on the average travel speeds through the SR 68

corridor in Exhibits 5A and 5B. The increase in travel time caused by the project was estimated using the Synchro arterial analysis reports which are included in *Appendix P*.

Another benefit of extending the freeway would be a reduction in the length of the queue on westbound SR 68 east of San Benancio Road during the weekday AM peak hour, which is currently up to 2.5 miles long. It is also reasonable to assume that it would improve safety on SR 68, as the state-wide accident rates on 4-lane freeways are about half of those on 2-lane highways. In addition, it would eliminate the observed phenomenon of drivers exiting westbound SR 68 at the Portola Drive interchange to cut through the neighborhoods in Toro Park Estates. Drivers do this to get ahead of traffic by re-entering the SR 68 traffic stream at Torero Drive. This phenomenon, which occurs daily during the weekday AM peak hour, was evident in the data collection and was confirmed through discussions with Monterey County staff.

If this improvement was to be implemented, a decision would have to be made regarding the existing intersection on SR 68 at Torero Drive. There would be several options; the intersection could be closed off and only used as an emergency access. In this case, existing traffic would be diverted to the Portola Drive interchange. Another option would be to convert the intersection to right-in, right-out access only, in which case the road segment would operate more as an expressway than a freeway. Other options could also be explored, such as allowing eastbound SR 68 left-turns onto Torero Drive, but prohibiting southbound Torero Drive left-turns onto SR 68.

7.3 Widening SR 68 to Four Lanes from Toro Park to Corral de Tierra Road

As was mentioned in Section 1.9 of this report, the Transportation Agency for Monterey County (TAMC) updated the 2004 *Nexus Study for a Regional Development Impact Fee* in March, 2008. The project list in the 2008 *Regional Impact Fee Nexus Study Update* includes a project referred to as "SR 68 Commuter Improvements", which would widen SR 68 to four lanes from the existing 4-lane section (adjacent to Toro Park) to Corral de Tierra Road.

This improvement includes the improvement discussed in Section 7.2 (4-laning a 1.1 mile portion of SR 68) in addition to 4-laning another 1.2 miles of SR 68, for a total extension of 2.3 miles. Although reductions in travel time were not evaluated for this improvement, it is logical to presume that extending the existing 4-lane section of SR 68 by 2.3 miles would reduce the travel time through the SR 68 corridor by more than the 286 seconds (4.7 minutes) evaluated for the 1.1 mile extension. It would also provide additional benefits, as were discussed with the 1.1 mile extension (reduction in westbound queue during the AM peak hour, improved safety, etc.).

7.4 Significant Impacts on Intersections and Road Segments

Based on the significant impact criteria listed in section 1.7 of this report, the implementation of the proposed project will have a significant impact on four of the six study intersections (i.e., for intersections already operating at LOS F, any increase, even one vehicle, to the intersection's critical movement is considered significant) and four of

the five study road segments (i.e., the addition of one project trip added to a segment already operating at LOS F is considered significant).

7.5 Recommended Improvements and Mitigation Measures on Study Road Network

The recommended improvements and mitigation measures for each traffic scenario are listed below. To minimize confusion, recommended improvements and mitigation measures will not be repeated under subsequent traffic scenarios if they were already identified under a preceding scenario.

- **Recommended Improvements for Existing Traffic Conditions**

Recommended Improvement #1 – A second westbound through lane should be added at the York Road / SR 68 intersection. This improvement would facilitate the widening of SR 68 to four lanes, which is not considered feasible at this time.

Recommended Improvement #2 – A second westbound through lane should be added at the Pasadera Drive / SR 68 intersection. This improvement would facilitate the widening of SR 68 to four lanes, which is not considered feasible at this time.

Recommended Improvement #3 – A second eastbound through lane and a second westbound through lane should be added at the Laureles Grade Road / SR 68 intersection. This improvement would facilitate the widening of SR 68 to four lanes, which is not considered feasible at this time.

Recommended Improvement #4 – A second eastbound through lane and a second westbound through lane should be added at the Corral de Tierra Road / SR 68 intersection. This improvement is included in the TAMC Regional Development Impact Fee program.

Recommended Improvement #5 – A second eastbound through lane and a second westbound through lane should be added at the San Benancio Road / SR 68 intersection. This improvement is included in the TAMC Regional Development Impact Fee program.

The SR 68 corridor should be widened to a 4-lane facility to ensure acceptable operating conditions.

- **Recommended Improvements for Background Traffic Conditions**

No new improvements are recommended under background traffic conditions.

The same improvements recommended under existing traffic conditions are also recommended under background traffic conditions.

- **Mitigation Measures for Background Plus Project Traffic Conditions**

The same improvements recommended under existing and background traffic conditions are also recommended under background plus project traffic conditions. In addition:

Mitigation Measure #1 – Payment of the TAMC fee would mitigate direct, project-related impacts to the SR 68 / Corral de Tierra Road and SR 68 / San Benancio Road intersections and the segment of SR 68 between Corral de Tierra Road and San Benancio Road by contributing funds to the "SR 68 Commuter Improvements" project on the TAMC project list. The "SR 68 Commuter Improvements" project would add a second eastbound and a second westbound through lane at these intersections and is equivalent to Recommended Improvements #4 and #5 identified under existing traffic conditions.

Mitigation Measure #2 – To the extent practical, trim or cut back the vegetation and embankment in the vicinity of the San Benancio Road / Meyer Road intersection to improve sight distance at the intersection. The precise extent of vegetation removal, embankment re-grading and resurfacing will require the review and approval by the Monterey County Public Works Department at the time of obtaining an Encroachment Permit.

Mitigation Measure #3 – To the extent practical, widen and resurface Meyer Road per County of Monterey standards for a cul-de-sac private road (i.e., to a minimum surfaced roadbed width of 18 feet) per Monterey County Public Works Standard Detail Plate No. 5, included herein as *Appendix L*.

Mitigation Measure #4 – To the extent practical, provide right turn tapers at the San Benancio Road / Meyer Road intersection per County of Monterey standards for a private road / county road intersection as described in the Monterey County Roadway Design Standards, page 18, item P (included as *Appendix M*) or similar to the standard Caltrans Access Openings on Expressways, Figure 205.1 (included as *Appendix N*).

Mitigation Measure #5 – Construct a southbound San Benancio Road left-turn lane per Monterey County standards at the San Benancio Road / Meyer Road intersection.

- **Recommended Improvements for Cumulative Traffic Conditions**

Mitigation Measure #6 – The study project should pay the TAMC Regional Traffic Impact Fee to mitigate cumulative project impacts along SR 68. Through the payment of the TAMC Regional Traffic Impact Fee, the proposed project would thus directly contribute to improvements along the SR 68 corridor.

Recommended Improvement #6 – Widen and restripe the northbound approach to include one left-turn lane, one through lane, and one right-turn lane, widen and restripe the eastbound approach to include two left-turn lanes, one through lane and one shared through/right-turn lane, and install right-turn over lap phasing at the SR 218 / SR 68 intersection. These improvements are not currently included in any Capital Improvement Program (CIP).

Recommended Improvement #7 – A second eastbound through lane and a second eastbound left-turn lane should be added at the York Road / SR 68 intersection. These improvements are not currently included in any Capital Improvement Program (CIP).

Recommended Improvement #8 – A second eastbound through lane should be added at the Pasadera Drive / SR 68 intersection. This improvement is not currently included in any Capital Improvement Program (CIP).

Recommended Improvement #9 – Convert the northbound right-turn to right-turn overlap phasing at the Laureles Grade Road / SR 68 intersection. This improvement is not currently included in any Capital Improvement Program (CIP).

Recommended Improvement #10 – Convert the northbound right-turn to right-turn overlap phasing at the Corral de Tierra Road / SR 68 intersection. It is recommended that this improvement be included in the "SR 68 Commuter Improvements" project in the TAMC Regional Development Impact Fee program.

APPENDIX A

LEVEL OF SERVICE (LOS) DESCRIPTION
SIGNALIZED INTERSECTIONS

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

The methodology for signalized intersection is designed to consider individual intersection approaches and individual lane groups within approaches. A lane group consists of one or more lanes on an intersection approach. The outputs from application of the method described in the HCM 2000 are reported on the basis of each lane. For a given lane group at a signalized intersection, three indications are displayed: green, yellow and red. The red indication may include a short period during which all indications are red, referred to as an all-red interval and the yellow indication forms the change and clearance interval between two green phases.

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

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

LEVEL OF SERVICE (LOS) CRITERIA FOR SIGNALIZED INTERSECTIONS
(Reference Highway Capacity Manual 2000)

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

Appendix B

Intersection Level of Service Calculation Worksheets

Existing Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	962	8	12	947	386	5	3	9	461	19	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1752	3200		1444	3200	1568	1770	1449		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1752	3200		1444	3200	1568	1770	1449		3433	1863	1583
Peak-hour factor, PHF	0.82	0.82	0.82	0.94	0.94	0.94	0.85	0.85	0.85	0.79	0.79	0.79
Adj. Flow (vph)	152	1173	10	13	1007	411	6	4	11	584	24	228
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	152	1183	0	13	1007	411	6	15	0	584	24	228
Heavy Vehicles (%)	3%	2%	13%	25%	4%	3%	2%	2%	22%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.8	36.5		0.5	28.2	45.0	1.4	1.4		16.8	16.8	16.8
Effective Green, g (s)	9.0	38.5		0.7	30.2	47.6	1.6	1.6		18.1	18.1	18.1
Actuated g/C Ratio	0.12	0.51		0.01	0.40	0.64	0.02	0.02		0.24	0.24	0.24
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	211	1645		13	1290	996	38	31		830	450	383
v/s Ratio Prot	c0.09	0.37		0.01	c0.31	0.10	0.00	c0.01		c0.17	0.01	
v/s Ratio Perm						0.16						0.14
v/c Ratio	0.72	0.72		1.00	0.78	0.41	0.16	0.48		0.70	0.05	0.60
Uniform Delay, d1	31.7	14.0		37.1	19.5	6.7	36.0	36.2		25.9	21.8	25.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.8	1.4		249.6	3.0	0.2	0.7	4.3		2.5	0.0	2.1
Delay (s)	42.5	15.5		286.7	22.5	6.9	36.7	40.5		28.5	21.9	27.2
Level of Service	D	B		F	C	A	D	D		C	C	C
Approach Delay (s)		18.5			20.4			39.4			27.9	
Approach LOS		B			C			D			C	

Intersection Summary

HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	220	702	1092	323	86	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1600	1600	1583	1770	1568
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1600	1600	1583	1770	1568
Peak-hour factor, PHF	0.92	0.92	0.93	0.93	0.55	0.55
Adj. Flow (vph)	239	763	1174	347	156	202
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	239	763	1174	347	156	202
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	16.8	110.8	89.8	89.8	19.0	19.0
Effective Green, g (s)	17.0	112.8	91.8	91.8	19.2	19.2
Actuated g/C Ratio	0.12	0.81	0.66	0.66	0.14	0.14
Clearance Time (s)	4.2	6.0	6.0	6.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	4.5	3.5	3.5
Lane Grp Cap (vph)	215	1289	1049	1038	243	215
v/s Ratio Prot	c0.14	0.48	c0.73		0.09	
v/s Ratio Perm				0.22		c0.13
v/c Ratio	1.11	0.59	1.12	0.33	0.64	0.94
Uniform Delay, d1	61.5	5.1	24.1	10.6	57.1	59.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	94.5	1.0	66.6	0.3	5.9	44.5
Delay (s)	156.0	6.0	90.7	11.0	63.1	104.3
Level of Service	F	A	F	B	E	F
Approach Delay (s)		41.8	72.5		86.4	
Approach LOS		D	E		F	

Intersection Summary

HCM Average Control Delay	63.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	715	46	21	1301	29	51	2	28	19	1	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1545	1770	1566			1773	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00			0.73	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1545	1384	1566			1356	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.95	0.95	0.95	0.88	0.88	0.88	0.90	0.90	0.90
Adj. Flow (vph)	31	822	53	22	1369	31	58	2	32	21	1	70
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	31	822	53	22	1369	31	58	34	0	0	22	70
Confl. Peds. (#/hr)				1		1			1	1		
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	3.1	109.2	109.2	3.7	109.8	109.8	9.8	9.8			9.8	9.8
Effective Green, g (s)	2.8	111.2	111.2	3.4	111.8	111.8	9.9	9.9			9.9	9.9
Actuated g/C Ratio	0.02	0.81	0.81	0.02	0.82	0.82	0.07	0.07			0.07	0.07
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	36	1303	1290	44	1310	1265	100	114			98	115
v/s Ratio Prot	c0.02	0.51		0.01	c0.86			0.02				
v/s Ratio Perm			0.03			0.02	0.04				0.02	c0.04
v/c Ratio	0.86	0.63	0.04	0.50	1.05	0.02	0.58	0.30			0.22	0.61
Uniform Delay, d1	66.7	4.8	2.4	65.7	12.4	2.3	61.3	60.0			59.7	61.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	95.3	1.1	0.0	8.7	37.5	0.0	7.9	1.5			1.2	8.8
Delay (s)	161.9	6.0	2.4	74.4	49.8	2.3	69.2	61.5			60.8	70.2
Level of Service	F	A	A	E	D	A	E	E			E	E
Approach Delay (s)		11.1			49.2			66.4			68.0	
Approach LOS		B			D			E			E	

Intersection Summary

HCM Average Control Delay	36.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	136.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	636	136	228	1145	206	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	1770	1600	1770	1547
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	1770	1600	1770	1547
Peak-hour factor, PHF	0.96	0.96	0.98	0.98	0.87	0.87
Adj. Flow (vph)	662	142	233	1168	237	268
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	662	142	233	1168	237	268
Confl. Peds. (#/hr)			1		1	1
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	52.3	52.3	16.0	72.0	18.3	18.3
Effective Green, g (s)	54.3	54.3	15.7	74.0	18.0	18.0
Actuated g/C Ratio	0.54	0.54	0.16	0.74	0.18	0.18
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	869	860	278	1184	319	278
v/s Ratio Prot	0.41		0.13	c0.73	0.13	
v/s Ratio Perm		0.09				c0.17
v/c Ratio	0.76	0.17	0.84	0.99	0.74	0.96
Uniform Delay, d1	17.8	11.5	40.9	12.5	38.8	40.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	0.1	19.0	22.7	9.0	43.8
Delay (s)	21.6	11.5	59.9	35.2	47.8	84.5
Level of Service	C	B	E	D	D	F
Approach Delay (s)	19.8			39.3	67.3	
Approach LOS	B			D	E	

Intersection Summary

HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	824	52	86	1219	154	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	1752	1600	1752	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	1752	1600	1752	1583
Peak-hour factor, PHF	0.85	0.85	0.98	0.98	0.90	0.90
Adj. Flow (vph)	969	61	88	1244	171	218
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	969	61	88	1244	171	218
Heavy Vehicles (%)	2%	2%	3%	2%	3%	2%
Turn Type		pm+ov	Prot			Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	87.1	107.2	9.4	100.2	20.1	20.1
Effective Green, g (s)	89.1	106.6	9.1	102.2	19.8	19.8
Actuated g/C Ratio	0.69	0.82	0.07	0.79	0.15	0.15
Clearance Time (s)	6.0	3.7	3.7	6.0	3.7	3.7
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5
Lane Grp Cap (vph)	1097	1298	123	1258	267	241
v/s Ratio Prot	0.61	0.01	0.05	c0.78	0.10	
v/s Ratio Perm		0.03				c0.14
v/c Ratio	0.88	0.05	0.72	0.99	0.64	0.90
Uniform Delay, d1	16.3	2.2	59.2	13.4	51.8	54.2
Progression Factor	1.00	1.00	0.98	1.49	1.00	1.00
Incremental Delay, d2	10.4	0.0	4.6	10.4	4.6	33.4
Delay (s)	26.7	2.2	62.8	30.3	56.3	87.6
Level of Service	C	A	E	C	E	F
Approach Delay (s)	25.2			32.4	73.9	
Approach LOS	C			C	E	

Intersection Summary

HCM Average Control Delay	35.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	964	34	60	1199	1	105	0	127	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0			4.0
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	0.97			1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00			1.00
Frt		1.00	0.85	1.00	1.00			1.00	0.85			0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)		1600	1583	1687	1600			1770	1542			1583
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (perm)		1600	1583	1687	1600			1770	1542			1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.96	0.96	0.96	0.77	0.77	0.77	0.25	0.25	0.25
Adj. Flow (vph)	0	1161	41	62	1249	1	136	0	165	0	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1161	41	62	1250	0	0	136	165	0	0	4
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)		83.5	83.5	12.6	99.8			11.3	11.3			5.5
Effective Green, g (s)		85.5	85.5	12.3	101.8			11.0	11.0			5.2
Actuated g/C Ratio		0.66	0.66	0.09	0.78			0.08	0.08			0.04
Clearance Time (s)		6.0	6.0	3.7	6.0			3.7	3.7			3.7
Vehicle Extension (s)		3.0	3.0	2.5	3.0			2.5	2.5			2.5
Lane Grp Cap (vph)		1052	1041	160	1253			150	130			63
v/s Ratio Prot		c0.73		0.04	c0.78			0.08				
v/s Ratio Perm			0.03						c0.11			c0.00
v/c Ratio		1.10	0.04	0.39	1.00			0.91	1.27			0.06
Uniform Delay, d1		22.2	7.8	55.3	14.0			59.0	59.5			60.1
Progression Factor		1.33	1.27	1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2		54.0	0.0	1.1	24.9			46.5	168.2			0.3
Delay (s)		83.5	10.0	56.4	38.8			105.5	227.7			60.4
Level of Service		F	B	E	D			F	F			E
Approach Delay (s)		81.0			39.7			172.5			60.4	
Approach LOS		F			D			F			E	

Intersection Summary

HCM Average Control Delay	71.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	774	2	10	1140	576	11	21	31	262	8	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3200		1769	3200	1559	1656	1603		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3200		1769	3200	1559	1656	1603		3433	1863	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.66	0.66	0.66	0.83	0.83	0.83
Adj. Flow (vph)	186	823	2	11	1239	626	17	32	47	316	10	163
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	186	825	0	11	1239	626	17	79	0	316	10	163
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	50%	2%	2%	2%	9%	14%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	9.3	44.5		0.6	35.8	49.0	4.8	4.8		13.2	13.2	13.2
Effective Green, g (s)	9.5	46.5		0.8	37.8	51.6	5.0	5.0		14.5	14.5	14.5
Actuated g/C Ratio	0.11	0.56		0.01	0.46	0.62	0.06	0.06		0.18	0.18	0.18
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	203	1797		17	1461	972	100	97		601	326	277
v/s Ratio Prot	c0.11	0.26		0.01	c0.39	c0.11	0.01	c0.05		0.09	0.01	
v/s Ratio Perm						0.29						0.10
v/c Ratio	0.92	0.46		0.65	0.85	0.64	0.17	0.81		0.53	0.03	0.59
Uniform Delay, d1	36.3	10.7		40.9	20.0	9.8	36.9	38.4		31.0	28.3	31.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	40.2	0.1		62.0	4.7	1.3	0.3	37.1		0.6	0.0	2.6
Delay (s)	76.4	10.9		102.9	24.7	11.1	37.2	75.5		31.7	28.3	34.0
Level of Service	E	B		F	C	B	D	E		C	C	C
Approach Delay (s)		22.9			20.6			68.8			32.4	
Approach LOS		C			C			E			C	

Intersection Summary

HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	82.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	79	840	1122	83	293	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1600	1600	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1600	1600	1583	1770	1583
Peak-hour factor, PHF	0.88	0.88	0.86	0.86	0.90	0.90
Adj. Flow (vph)	90	955	1305	97	326	166
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	90	955	1305	97	326	166
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	5.8	98.0	88.0	88.0	21.8	21.8
Effective Green, g (s)	6.0	100.0	90.0	90.0	22.0	22.0
Actuated g/C Ratio	0.05	0.77	0.69	0.69	0.17	0.17
Clearance Time (s)	4.2	6.0	6.0	6.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	4.5	3.5	3.5
Lane Grp Cap (vph)	82	1231	1108	1096	300	268
v/s Ratio Prot	c0.05	0.60	c0.82		c0.18	
v/s Ratio Perm				0.06		0.10
v/c Ratio	1.10	0.78	1.18	0.09	1.09	0.62
Uniform Delay, d1	62.0	8.6	20.0	6.6	54.0	50.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	128.4	3.5	89.6	0.1	77.1	4.4
Delay (s)	190.4	12.1	109.6	6.6	131.1	54.5
Level of Service	F	B	F	A	F	D
Approach Delay (s)		27.4	102.5		105.3	
Approach LOS		C	F		F	

Intersection Summary

HCM Average Control Delay	76.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	1026	64	13	1071	18	70	5	30	34	4	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1625			1783	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00			0.72	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1280	1625			1334	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.75	0.75	0.75	0.61	0.61	0.61
Adj. Flow (vph)	46	1103	69	14	1177	20	93	7	40	56	7	105
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	46	1103	69	14	1177	20	93	47	0	0	63	105
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	5.0	112.1	112.1	1.5	108.6	108.6	15.3	15.3			15.3	15.3
Effective Green, g (s)	4.7	114.1	114.1	1.2	110.6	110.6	15.4	15.4			15.4	15.4
Actuated g/C Ratio	0.03	0.80	0.80	0.01	0.78	0.78	0.11	0.11			0.11	0.11
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	58	1279	1266	15	1240	1227	138	175			144	171
v/s Ratio Prot	c0.03	c0.69		0.01	c0.74			0.03				
v/s Ratio Perm			0.04			0.01	c0.07				0.05	0.07
v/c Ratio	0.79	0.86	0.05	0.93	0.95	0.02	0.67	0.27			0.44	0.61
Uniform Delay, d1	68.5	9.2	3.0	70.7	13.7	3.7	61.2	58.5			59.6	60.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	51.1	6.4	0.0	197.1	15.0	0.0	12.2	0.8			2.1	6.4
Delay (s)	119.7	15.7	3.0	267.8	28.7	3.7	73.5	59.3			61.7	67.2
Level of Service	F	B	A	F	C	A	E	E			E	E
Approach Delay (s)		18.9			31.0			68.7			65.1	
Approach LOS		B			C			E			E	

Intersection Summary

HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	142.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	950	140	189	885	217	359
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	1770	1600	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	1770	1600	1770	1583
Peak-hour factor, PHF	0.97	0.97	0.89	0.89	0.74	0.74
Adj. Flow (vph)	979	144	212	994	293	485
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	979	144	212	994	293	485
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	73.0	73.0	15.3	92.0	38.3	38.3
Effective Green, g (s)	75.0	75.0	15.0	94.0	38.0	38.0
Actuated g/C Ratio	0.54	0.54	0.11	0.67	0.27	0.27
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	857	848	190	1074	480	430
v/s Ratio Prot	c0.61		c0.12	0.62	0.17	
v/s Ratio Perm		0.09				c0.31
v/c Ratio	1.14	0.17	1.12	0.93	0.61	1.13
Uniform Delay, d1	32.5	16.6	62.5	20.0	44.5	51.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	77.9	0.1	99.8	13.1	2.3	83.1
Delay (s)	110.4	16.7	162.3	33.0	46.8	134.1
Level of Service	F	B	F	C	D	F
Approach Delay (s)	98.4			55.7	101.2	
Approach LOS	F			E	F	

Intersection Summary

HCM Average Control Delay	82.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1193	116	153	996	78	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	1770	1600	1770	1568
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	1770	1600	1770	1568
Peak-hour factor, PHF	0.94	0.94	0.88	0.88	0.79	0.79
Adj. Flow (vph)	1269	123	174	1132	99	200
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1269	123	174	1132	99	200
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%
Turn Type		pm+ov	Prot			Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	84.3	103.6	13.0	101.0	19.3	19.3
Effective Green, g (s)	86.3	103.0	12.7	103.0	19.0	19.0
Actuated g/C Ratio	0.66	0.79	0.10	0.79	0.15	0.15
Clearance Time (s)	6.0	3.7	3.7	6.0	3.7	3.7
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5
Lane Grp Cap (vph)	1062	1254	173	1268	259	229
v/s Ratio Prot	c0.79	0.01	c0.10	0.71	0.06	
v/s Ratio Perm		0.06				c0.13
v/c Ratio	1.19	0.10	1.01	0.89	0.38	0.87
Uniform Delay, d1	21.8	3.0	58.6	9.6	50.2	54.3
Progression Factor	1.00	1.00	1.07	0.58	1.00	1.00
Incremental Delay, d2	97.1	0.0	47.9	4.9	0.7	28.4
Delay (s)	118.9	3.1	110.9	10.5	50.9	82.7
Level of Service	F	A	F	B	D	F
Approach Delay (s)	108.7			23.9	72.2	
Approach LOS	F			C	E	

Intersection Summary

HCM Average Control Delay	68.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	1257	106	124	1079	1	68	2	88	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00			1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85			0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)	1770	1600	1583	1736	1600			1777	1583			1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (perm)	1770	1600	1583	1736	1600			1777	1583			1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.76	0.76	0.76	0.50	0.50	0.50
Adj. Flow (vph)	2	1381	116	133	1160	1	89	3	116	0	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1381	116	133	1161	0	0	92	116	0	0	4
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.3	79.5	79.5	20.6	98.8			7.3	7.3			5.5
Effective Green, g (s)	1.0	81.5	81.5	20.3	100.8			7.0	7.0			5.2
Actuated g/C Ratio	0.01	0.63	0.63	0.16	0.78			0.05	0.05			0.04
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7			3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5			2.5
Lane Grp Cap (vph)	14	1003	992	271	1241			96	85			63
v/s Ratio Prot	0.00	c0.86		c0.08	c0.73			0.05				
v/s Ratio Perm			0.07						c0.07			c0.00
v/c Ratio	0.14	1.38	0.12	0.49	0.94			0.96	1.36			0.06
Uniform Delay, d1	64.1	24.2	9.8	50.1	11.9			61.4	61.5			60.1
Progression Factor	1.22	0.64	0.47	1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.4	170.2	0.0	1.0	14.1			77.4	222.6			0.3
Delay (s)	78.8	185.6	4.6	51.1	26.1			138.7	284.1			60.4
Level of Service	E	F	A	D	C			F	F			E
Approach Delay (s)		171.5			28.7			219.8			60.4	
Approach LOS		F			C			F			E	

Intersection Summary

HCM Average Control Delay	113.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	220	702	1092	323	86	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1600	3200	1583	1770	1568
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1600	3200	1583	1770	1568
Peak-hour factor, PHF	0.92	0.92	0.93	0.93	0.55	0.55
Adj. Flow (vph)	239	763	1174	347	156	202
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	239	763	1174	347	156	202
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	16.9	61.7	40.6	40.6	18.3	18.3
Effective Green, g (s)	17.1	63.7	42.6	42.6	18.5	18.5
Actuated g/C Ratio	0.19	0.71	0.47	0.47	0.21	0.21
Clearance Time (s)	4.2	6.0	6.0	6.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	4.5	3.5	3.5
Lane Grp Cap (vph)	336	1130	1511	748	363	322
v/s Ratio Prot	0.14	c0.48	c0.37		0.09	
v/s Ratio Perm				0.22		c0.13
v/c Ratio	0.71	0.68	0.78	0.46	0.43	0.63
Uniform Delay, d1	34.2	7.4	19.8	16.1	31.3	32.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.9	1.9	2.9	0.8	1.0	4.0
Delay (s)	42.1	9.4	22.7	16.9	32.2	36.7
Level of Service	D	A	C	B	C	D
Approach Delay (s)		17.2	21.4		34.7	
Approach LOS		B	C		C	

Intersection Summary

HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	715	46	21	1301	29	51	2	28	19	1	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1548	1770	1580			1777	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00			0.74	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1548	1384	1580			1371	1583
Peak-hour factor, PHF	0.87	0.87	0.87	0.95	0.95	0.95	0.88	0.88	0.88	0.90	0.90	0.90
Adj. Flow (vph)	31	822	53	22	1369	31	58	2	32	21	1	70
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	31	822	53	22	1369	31	58	34	0	0	22	70
Confl. Peds. (#/hr)				1		1			1	1		
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	2.0	47.6	47.6	1.8	47.4	47.4	7.7	7.7			7.7	7.7
Effective Green, g (s)	1.7	49.6	49.6	1.5	49.4	49.4	7.8	7.8			7.8	7.8
Actuated g/C Ratio	0.02	0.70	0.70	0.02	0.70	0.70	0.11	0.11			0.11	0.11
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	42	1119	1107	37	2230	1079	152	174			151	174
v/s Ratio Prot	c0.02	c0.51		0.01	0.43			0.02				
v/s Ratio Perm			0.03			0.02	0.04				0.02	c0.04
v/c Ratio	0.74	0.73	0.05	0.59	0.61	0.03	0.38	0.20			0.15	0.40
Uniform Delay, d1	34.4	6.6	3.3	34.4	5.7	3.3	29.3	28.7			28.5	29.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	49.5	2.7	0.0	23.1	0.6	0.0	1.6	0.6			0.4	1.5
Delay (s)	83.9	9.3	3.3	57.5	6.3	3.3	30.9	29.2			29.0	30.9
Level of Service	F	A	A	E	A	A	C	C			C	C
Approach Delay (s)		11.5			7.0			30.3			30.4	
Approach LOS		B			A			C			C	

Intersection Summary

HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	70.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	636	136	228	1145	206	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	1770	3200	1770	1563
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	1770	3200	1770	1563
Peak-hour factor, PHF	0.96	0.96	0.98	0.98	0.87	0.87
Adj. Flow (vph)	662	142	233	1168	237	268
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	662	142	233	1168	237	268
Confl. Peds. (#/hr)			1		1	1
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	18.2	18.2	13.4	35.3	17.7	17.7
Effective Green, g (s)	20.2	20.2	13.1	37.3	17.4	17.4
Actuated g/C Ratio	0.32	0.32	0.21	0.59	0.28	0.28
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1031	510	370	1904	491	434
v/s Ratio Prot	0.21		0.13	c0.37	0.13	
v/s Ratio Perm		0.09				c0.17
v/c Ratio	0.64	0.28	0.63	0.61	0.48	0.62
Uniform Delay, d1	18.2	15.8	22.6	8.1	18.9	19.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.2	2.9	0.5	0.8	2.6
Delay (s)	19.4	16.0	25.5	8.6	19.6	22.4
Level of Service	B	B	C	A	B	C
Approach Delay (s)	18.8			11.4	21.1	
Approach LOS	B			B	C	

Intersection Summary

HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	62.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	824	52	86	1219	154	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	1752	3200	1752	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	1752	3200	1752	1583
Peak-hour factor, PHF	0.85	0.85	0.98	0.98	0.90	0.90
Adj. Flow (vph)	969	61	88	1244	171	218
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	969	61	88	1244	171	218
Heavy Vehicles (%)	2%	2%	3%	2%	3%	2%
Turn Type		pm+ov	Prot			Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	87.1	107.2	9.4	100.2	20.1	20.1
Effective Green, g (s)	89.1	106.6	9.1	102.2	19.8	19.8
Actuated g/C Ratio	0.69	0.82	0.07	0.79	0.15	0.15
Clearance Time (s)	6.0	3.7	3.7	6.0	3.7	3.7
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5
Lane Grp Cap (vph)	2193	1298	123	2516	267	241
v/s Ratio Prot	0.30	0.01	c0.05	c0.39	0.10	
v/s Ratio Perm		0.03				c0.14
v/c Ratio	0.44	0.05	0.72	0.49	0.64	0.90
Uniform Delay, d1	9.2	2.2	59.2	4.9	51.8	54.2
Progression Factor	1.00	1.00	0.90	1.18	1.00	1.00
Incremental Delay, d2	0.6	0.0	14.7	0.6	4.6	33.4
Delay (s)	9.9	2.2	67.9	6.3	56.3	87.6
Level of Service	A	A	E	A	E	F
Approach Delay (s)	9.4			10.4	73.9	
Approach LOS	A			B	E	

Intersection Summary

HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	964	34	60	1199	1	105	0	127	0	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0			4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	0.98			1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00			1.00
Frt		1.00	0.85	1.00	1.00			1.00	0.85			0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)		3200	1583	1687	3200			1770	1546			1583
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (perm)		3200	1583	1687	3200			1770	1546			1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.96	0.96	0.96	0.77	0.77	0.77	0.25	0.25	0.25
Adj. Flow (vph)	0	1161	41	62	1249	1	136	0	165	0	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1161	41	62	1250	0	0	136	165	0	0	4
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)		80.8	80.8	8.5	93.0			18.1	18.1			5.5
Effective Green, g (s)		82.8	82.8	8.2	95.0			17.8	17.8			5.2
Actuated g/C Ratio		0.64	0.64	0.06	0.73			0.14	0.14			0.04
Clearance Time (s)		6.0	6.0	3.7	6.0			3.7	3.7			3.7
Vehicle Extension (s)		3.0	3.0	2.5	3.0			2.5	2.5			2.5
Lane Grp Cap (vph)		2038	1008	106	2338			242	212			63
v/s Ratio Prot		c0.36		0.04	c0.39			0.08				
v/s Ratio Perm			0.03						c0.11			c0.00
v/c Ratio		0.57	0.04	0.58	0.53			0.56	0.78			0.06
Uniform Delay, d1		13.4	8.8	59.2	7.7			52.5	54.2			60.1
Progression Factor		1.69	1.61	1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2		1.0	0.1	6.7	0.9			2.4	15.8			0.3
Delay (s)		23.7	14.2	65.9	8.6			54.9	69.9			60.4
Level of Service		C	B	E	A			D	E			E
Approach Delay (s)		23.4			11.3			63.1			60.4	
Approach LOS		C			B			E			E	

Intersection Summary

HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	79	840	1122	83	293	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1600	3200	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1600	3200	1583	1770	1583
Peak-hour factor, PHF	0.88	0.88	0.86	0.86	0.90	0.90
Adj. Flow (vph)	90	955	1305	97	326	166
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	90	955	1305	97	326	166
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	6.0	63.2	53.0	53.0	22.6	22.6
Effective Green, g (s)	6.2	65.2	55.0	55.0	22.8	22.8
Actuated g/C Ratio	0.06	0.68	0.57	0.57	0.24	0.24
Clearance Time (s)	4.2	6.0	6.0	6.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	4.5	3.5	3.5
Lane Grp Cap (vph)	114	1087	1833	907	420	376
v/s Ratio Prot	0.05	c0.60	0.41		c0.18	
v/s Ratio Perm				0.06		0.10
v/c Ratio	0.79	0.88	0.71	0.11	0.78	0.44
Uniform Delay, d1	44.3	12.3	14.8	9.3	34.2	31.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.3	8.7	1.5	0.1	9.0	1.0
Delay (s)	76.6	21.0	16.3	9.4	43.2	32.2
Level of Service	E	C	B	A	D	C
Approach Delay (s)		25.8	15.8		39.5	
Approach LOS		C	B		D	

Intersection Summary

HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	96.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	1026	64	13	1071	18	70	5	30	34	4	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1583	1770	1625			1783	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00			0.72	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1583	1334	1625			1345	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.75	0.75	0.75	0.61	0.61	0.61
Adj. Flow (vph)	46	1103	69	14	1177	20	93	7	40	56	7	105
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	46	1103	69	14	1177	20	93	47	0	0	63	105
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	5.4	84.5	84.5	1.2	80.3	80.3	14.8	14.8			14.8	14.8
Effective Green, g (s)	5.1	86.5	86.5	0.9	82.3	82.3	14.9	14.9			14.9	14.9
Actuated g/C Ratio	0.04	0.76	0.76	0.01	0.72	0.72	0.13	0.13			0.13	0.13
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	79	1211	1198	14	2304	1140	174	212			175	206
v/s Ratio Prot	c0.03	c0.69		0.01	0.37			0.03				
v/s Ratio Perm			0.04			0.01	c0.07				0.05	0.07
v/c Ratio	0.58	0.91	0.06	1.00	0.51	0.02	0.53	0.22			0.36	0.51
Uniform Delay, d1	53.6	10.9	3.5	56.7	7.1	4.5	46.5	44.5			45.3	46.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	10.5	10.5	0.0	240.5	0.3	0.0	3.1	0.5			1.3	2.0
Delay (s)	64.0	21.4	3.6	297.2	7.3	4.5	49.6	45.0			46.6	48.3
Level of Service	E	C	A	F	A	A	D	D			D	D
Approach Delay (s)		22.0			10.6			48.1			47.7	
Approach LOS		C			B			D			D	

Intersection Summary

HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	114.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	950	140	189	885	217	359
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	1770	3200	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	1770	3200	1770	1583
Peak-hour factor, PHF	0.97	0.97	0.89	0.89	0.74	0.74
Adj. Flow (vph)	979	144	212	994	293	485
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	979	144	212	994	293	485
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	37.5	37.5	15.4	56.6	38.5	38.5
Effective Green, g (s)	39.5	39.5	15.1	58.6	38.2	38.2
Actuated g/C Ratio	0.38	0.38	0.14	0.56	0.36	0.36
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1206	597	255	1789	645	577
v/s Ratio Prot	c0.31		c0.12	0.31	0.17	
v/s Ratio Perm		0.09				c0.31
v/c Ratio	0.81	0.24	0.83	0.56	0.45	0.84
Uniform Delay, d1	29.3	22.4	43.6	14.8	25.4	30.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	0.2	19.7	0.3	0.5	10.7
Delay (s)	33.5	22.5	63.3	15.1	25.9	41.2
Level of Service	C	C	E	B	C	D
Approach Delay (s)	32.1			23.6	35.4	
Approach LOS	C			C	D	

Intersection Summary

HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	104.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1193	116	153	996	78	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	1770	3200	1770	1568
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	1770	3200	1770	1568
Peak-hour factor, PHF	0.94	0.94	0.88	0.88	0.79	0.79
Adj. Flow (vph)	1269	123	174	1132	99	200
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1269	123	174	1132	99	200
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%
Turn Type		pm+ov	Prot			Perm
Protected Phases	2	3	1	6	3	
Permitted Phases		2				3
Actuated Green, G (s)	84.3	103.6	13.0	101.0	19.3	19.3
Effective Green, g (s)	86.3	103.0	12.7	103.0	19.0	19.0
Actuated g/C Ratio	0.66	0.79	0.10	0.79	0.15	0.15
Clearance Time (s)	6.0	3.7	3.7	6.0	3.7	3.7
Vehicle Extension (s)	3.0	2.5	2.5	3.0	2.5	2.5
Lane Grp Cap (vph)	2124	1254	173	2535	259	229
v/s Ratio Prot	c0.40	0.01	c0.10	0.35	0.06	
v/s Ratio Perm		0.06				c0.13
v/c Ratio	0.60	0.10	1.01	0.45	0.38	0.87
Uniform Delay, d1	12.2	3.0	58.6	4.3	50.2	54.3
Progression Factor	1.00	1.00	1.23	0.54	1.00	1.00
Incremental Delay, d2	1.2	0.0	66.5	0.5	0.7	28.4
Delay (s)	13.4	3.1	138.7	2.8	50.9	82.7
Level of Service	B	A	F	A	D	F
Approach Delay (s)	12.5			20.9	72.2	
Approach LOS	B			C	E	

Intersection Summary

HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	1257	106	124	1079	1	68	2	88	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0			4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00			1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85			0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)	1770	3200	1583	1736	3200			1777	1583			1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00			1.00
Satd. Flow (perm)	1770	3200	1583	1736	3200			1777	1583			1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.76	0.76	0.76	0.50	0.50	0.50
Adj. Flow (vph)	2	1381	116	133	1160	1	89	3	116	0	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1381	116	133	1161	0	0	92	116	0	0	4
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.3	79.6	79.6	15.0	93.3			12.8	12.8			5.5
Effective Green, g (s)	1.0	81.6	81.6	14.7	95.3			12.5	12.5			5.2
Actuated g/C Ratio	0.01	0.63	0.63	0.11	0.73			0.10	0.10			0.04
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7			3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5			2.5
Lane Grp Cap (vph)	14	2009	994	196	2346			171	152			63
v/s Ratio Prot	0.00	c0.43		c0.08	0.36			0.05				
v/s Ratio Perm			0.07						c0.07			c0.00
v/c Ratio	0.14	0.69	0.12	0.68	0.49			0.54	0.76			0.06
Uniform Delay, d1	64.1	15.8	9.7	55.4	7.3			56.0	57.3			60.1
Progression Factor	1.25	0.79	0.60	1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	3.7	1.5	0.2	8.2	0.7			2.5	19.3			0.3
Delay (s)	84.1	14.1	6.0	63.6	8.0			58.5	76.6			60.4
Level of Service	F	B	A	E	A			E	E			E
Approach Delay (s)		13.5			13.7			68.6			60.4	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

TRIP GENERATION FOR APPROVED PROJECTS

PROJECT	SIZE	DAILY TRIP RATE	DAILY TRIPS	AM PEAK HOUR PEAK HOUR VOL.	AM PEAK HOUR (% OF DAILY)	AM PEAK HOUR IN	AM PEAK HOUR OUT	PM PEAK HOUR PEAK HOUR VOL.	PM PEAK HOUR (% OF DAILY)	PM PEAK HOUR IN	PM PEAK HOUR OUT
City of Marina:											
1. Marina Heights Subdivision[2]											
Townhomes	102 Units	5.86	598	45	(8%)	8	37	55	(9%)	37	18
Single-Family Detached Housing	948 Units	9.57	9,072	711	(8%)	177	534	958	(11%)	613	345
2. CSUMB North Campus Housing[3]	492 Units	-	2,627	204	(8%)	46	158	261	(10%)	169	92
3. CSUMB Students (2010) [3]	1,939 Students	-	2,103	186	(9%)	149	37	186	(9%)	56	130
4. Reservation Road Condominiums	14 Units	5.86	82	6	(7%)	1	5	7	(9%)	5	2
5. Paddon Place Subdivision	15 Units	9.57	144	11	(8%)	3	8	15	(10%)	10	5
6. 249 Carmel	10 Units	9.57	96	8	(8%)	2	6	10	(10%)	7	3
7. Crescent/Carmel Subdivision	14 Units	9.57	134	11	(8%)	3	8	14	(10%)	9	5
8. Hotel - 323 Reservation Road [4]	39 Rooms	8.92	348	26	(7%)	15	11	27	(8%)	13	14
9. Dunes at Monterey Bay (University Villages)[5]											
Phase 1	- -	-	48,241	1,958	(4%)	1,056	902	4,282	(9%)	2,195	2,087
10. Marina Landing Redevelopment[6]	300,000 S.F.	-	11,886	357	(3%)	218	139	1,044	(9%)	530	514
11. 3200 Seaside											
Single-Family Detached Housing	17 Units	9.57	163	13	(8%)	3	10	17	(10%)	11	6
Carriage Units	12 Units	6.72	81	6	(7%)	1	5	7	(9%)	5	2
12. 3110 Seacrest	7 Units	9.57	67	5	(7%)	1	4	7	(10%)	5	2
13. MPC Satellite Campus	700 Students	1.20	840	84	(10%)	69	15	84	(10%)	54	30
14. FORA Business Park [7]	43,381 S.F.	-	326	46	(14%)	40	6	45	(14%)	7	38
15. MST Transit Station[8]	- -	-	2,793	56	(2%)	13	43	104	(4%)	59	45
16. Cypress Knolls[9]	- -	-	5,088	299	(6%)	128	171	396	(8%)	207	189
17. Marina Station[10]	- -	-	25,837	2,276	(9%)	1,201	1,075	2,605	(10%)	1,179	1,426
City of Seaside:											
18. Seaside Resort [11]	- -	-	5,672	267	(5%)	145	122	362	(6%)	180	182
19. City Center (Fremont/Broadway)											
Sit-Down Restaurants	24,674 S.F.	108.55	2,678	25	(1%)	13	12	227	(8%)	145	82
Bank	4,000 S.F.	246.49	986	49	(5%)	27	22	183	(19%)	92	91
Commercial/Retail Space[12]	15,326 S.F.	44.32	679	20	(3%)	12	8	42	(6%)	18	24
20. MPC Satellite Campus	400 Students	1.20	480	48	(10%)	39	9	48	(10%)	31	17
21. The Pointe											
Condominiums	6 Units	5.86	35	3	(9%)	1	2	3	(9%)	2	1
Commercial/Retail[12]	3,000 S.F.	44.32	133	4	(3%)	2	2	8	(6%)	4	4
22. Lexus Service Center[13]	5,123 S.F.	20.00	102	15	(15%)	10	5	17	(17%)	9	8
23. Georis Building (commercial)[12]	3,978 S.F.	44.32	176	5	(3%)	3	2	11	(6%)	5	6
24. Dentistry for Children	4,835 S.F.	36.13	175	12	(7%)	9	3	18	(10%)	5	13
25. First National Bank	4,939 S.F.	156.48	773	20	(3%)	10	10	164	(21%)	82	82
26. Ord Military Housing											
RCI Development Area	- -	-	7,200	536	(7%)	172	364	691	(10%)	408	283
City of Sand City:											
27. Costco Expansion	16,795 S.F.	56.02	941	14	(1%)	10	4	85	(9%)	43	42
28. Design Center[14]											
Apartments	30 Units	6.72	202	15	(7%)	3	12	19	(9%)	12	7
Commercial/Retail[12]	20,000 S.F.	44.32	886	27	(3%)	16	11	54	(6%)	24	30
Office	20,000 S.F.	11.01	220	31	(14%)	27	4	30	(14%)	5	25
City of Monterey:											
29. Ryan Ranch Business Park (Buildout)											
CHOMP Medical Offices (remainder)	138,380 S.F.	-	5,443	343	(6%)	271	72	426	(8%)	115	311
6 & 8 Lower Ragsdale Dr. (Office)	63,985 S.F.	11.01	704	99	(14%)	87	12	95	(13%)	16	79
30. Del Monte Beach Tract 2 Resubdivision	17 Homes	9.57	163	13	(8%)	3	10	17	(10%)	11	6
31. St. John the Baptist Greek Orth. Church	8,300 S.F.	9.11	76	6	(8%)	3	3	5	(7%)	3	2
32. Calvary Chappel Expansion	25,932 S.F.	9.11	236	19	(8%)	10	9	17	(7%)	9	8
City of Del Rey Oaks:											
33. Safeway Supermarket (former Ralph's)	54,000 S.F.	102.24	5,521	176	(3%)	107	69	564	(10%)	288	276
City of Salinas:											
34. Tynan Village Mixed Use Development[15]	- -	-	2,758	173	(6%)	60	113	233	(8%)	132	101
35. Hartnell College Expansion[16]	3,000 Students	1.54	4,620	420	(9%)	380	40	510	(11%)	345	165
36. Monte Bella Subdivision	550 Units	9.57	5,264	413	(8%)	103	310	556	(11%)	373	183
Unincorporated Monterey County:											
37. CSUMB East Campus Housing [17]	125 Homes	9.57	1,196	94	(8%)	24	70	126	(11%)	81	45
38. East Garrison [18]	- -	-	12,391	975	(8%)	247	728	1,315	(11%)	793	522
39. Monterra Ranch	151 Homes	9.57	1,445	113	(8%)	28	85	153	(11%)	103	50
40. Pasadera	43 Homes	9.57	412	32	(8%)	8	24	43	(10%)	29	14
41. Harper 14 Lots of Record	14 Homes	9.57	134	11	(8%)	3	8	14	(10%)	9	5
42. Oaks Subdivision	11 Homes	9.57	105	8	(8%)	2	6	11	(10%)	7	4
43. Laguna Seca Business Park											
York Road Office Building [19]	20,000 S.F.	11.01	220	31	(14%)	27	4	30	(14%)	5	25
Jessen Office Building [20]	16,388 S.F.	-	345	31	(9%)	26	5	39	(11%)	10	29
44. Tanimura Family Residential	73 Lots	9.57	699	55	(8%)	14	41	74	(11%)	48	26
TOTAL APPROVED PROJECTS			173,596	10,411	(6%)	5,036	5,375	16,314	(9%)	8,612	7,702

Notes:

1. Traffic volumes are based on trip generation rates quoted by the Institute of Transportation Engineers, *Trip Generation* , 6th Edition, 1997, and 7th Edition, 2003, unless otherwise noted.
2. Trip generation from *Marina Heights Environmental Impact Report Traffic Study* , Higgins Associates, April 2003.
3. Trip generation from *California State University at Monterey Bay (CSUMB) 2004 Master Plan Update Traffic Impact Study Report* , Higgins Associates, July 26, 2004.
4. Trip generation for hotel land use assumes 100% occpuancy.
5. Trip generation from *Marina University Villages Mixed Use Development Traffic Impact Study Report* , Higgins Associates, December 17, 2004.
6. Daily and PM peak hour trip generation from *Environmental Impact Report For The Proposed Marina Landing Shopping Center Project* , Earth Metrics Inc., February 1998. AM peak hour trip generation derived based upon same derivation assumptions as utilized in said report.
7. Trip generation takes into account office tennants that would relocate to this new office space from existing office space off of Second Avenue north of Imjin Parkway that would be removed as part of the second phase of the Marina University Villages development.
8. Trip generation for Marina Transit Center from Letter to E. Spencer, "Marina Transit Station Traffic Study, Marina, California – Revised Project Definition," Higgins Associates, September 14, 2006. Project includes upgraded transit facility, commercial space, and apartments.
9. Trip generation from *Cypress Knolls Traffic Impact Analysis* , Higgins Associates, November 2006.
10. Trip generation for Marina Station from *Marina Station Traffic Impact Analysis* , Higgins Associates, December 6, 2006. Project includes residential, commercial, office, and industrial uses.
11. Trip generation from *Transportation Impact Analysis for Seaside Resort* , Fehr & Peers, May 2004.
12. ITE does not provide AM peak hour trip rates for the "specialty retail" land use. Rates used here are published by San Diego Association of Governments, *Brief Guilde of Vehicular Traffic Generation Rates for the San Diego Region* , July 1998.
13. ITE doesn not provide weekday daily trip rates for the "automobile care center" land use. Rates used here are published by San Diego Association of Governments, *Brief Guilde of Vehicular Traffic Generation Rates for the San Diego Region* , July 1998.
14. City of Sand City describes project as 80,000 square feet over 4 floors, with commercial/retail and office space on first two floors. Assumed each floor equal in size.
15. Trip generation from *Tynan Village Mixed Use Development Traffic Impact Study Report* , Higgins Associates, November 2004.
16. Trip generation from *Hartnell College Master Plan TIA* , Fehr & Peers, September 2005.
17. Trip generation from *CSUMB East Campus Housing Traffic Study* , Wilbur Smith Associates, January 2004.
18. Full buildout of East Garrison development will not occur until 2030. Fifty percent of the development is assumed to be constructed by the year 2015. Trip generation represents trips external to the development itself.
19. Size of building unknown -- square footage used to derive trip generation is assumed, based upon other buildings within business park.
20. Trip generation from Letter to J. Jessen, "Trip Generation Study for Jessen Office Building Project, Laguna Seca Office Park Lot #13," Higgins Associates, June 6, 2006. Project includes both standard and medical office space.

Appendix D

Intersection Level of Service Calculation Worksheets

Background Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	1093	11	17	1016	431	14	11	25	494	21	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3200		1770	3200	1568	1770	1669		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3200		1770	3200	1568	1770	1669		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	1188	12	18	1104	468	15	12	27	537	23	213
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	160	1200	0	18	1104	468	15	39	0	537	23	213
Heavy Vehicles (%)	2%	2%	2%	2%	4%	3%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.2	37.5		0.7	30.0	46.2	2.2	2.2		16.2	16.2	16.2
Effective Green, g (s)	8.4	39.5		0.9	32.0	48.8	2.4	2.4		17.5	17.5	17.5
Actuated g/C Ratio	0.11	0.52		0.01	0.42	0.64	0.03	0.03		0.23	0.23	0.23
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	195	1657		21	1342	1003	56	52		787	427	363
v/s Ratio Prot	c0.09	0.38		0.01	c0.35	0.11	0.01	c0.02		c0.16	0.01	
v/s Ratio Perm						0.19						0.13
v/c Ratio	0.82	0.72		0.86	0.82	0.47	0.27	0.75		0.68	0.05	0.59
Uniform Delay, d1	33.2	14.2		37.6	19.6	7.1	36.1	36.7		26.9	22.9	26.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	22.9	1.5		129.6	4.1	0.3	0.9	41.1		2.2	0.0	2.0
Delay (s)	56.1	15.7		167.2	23.8	7.3	37.0	77.7		29.1	23.0	28.2
Level of Service	E	B		F	C	A	D	E		C	C	C
Approach Delay (s)		20.4			20.5			66.4			28.7	
Approach LOS		C			C			E			C	

Intersection Summary

HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	76.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	751	3	2	1152	394	9	2	5	113	1	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1663		3433	1863	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1770	1663		3433	1863	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	275	816	3	2	1252	428	10	2	5	123	1	151
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	275	816	3	2	1252	428	10	7	0	123	1	151
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	17.8	111.3	111.3	0.8	94.1	94.1	1.5	3.1		16.7	17.9	17.9
Effective Green, g (s)	18.0	113.3	113.3	0.8	96.1	96.1	1.7	3.1		16.7	18.1	18.1
Actuated g/C Ratio	0.12	0.76	0.76	0.01	0.64	0.64	0.01	0.02		0.11	0.12	0.12
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	213	1209	1196	9	1026	1015	20	34		382	225	189
v/s Ratio Prot	c0.16	0.51		0.00	c0.78		0.01	0.00		c0.04	0.00	
v/s Ratio Perm			0.00			0.27						c0.10
v/c Ratio	1.29	0.67	0.00	0.22	1.22	0.42	0.50	0.21		0.32	0.00	0.80
Uniform Delay, d1	66.0	9.1	4.5	74.2	26.9	13.2	73.7	72.2		61.4	58.0	64.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	161.4	1.8	0.0	12.1	108.0	0.5	30.2	3.0		0.5	0.0	21.1
Delay (s)	227.4	10.9	4.5	86.4	134.9	13.7	103.8	75.2		61.9	58.0	85.2
Level of Service	F	B	A	F	F	B	F	E		E	E	F
Approach Delay (s)		65.3			104.0			92.0			74.7	
Approach LOS		E			F			F			E	

Intersection Summary

HCM Average Control Delay	87.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	149.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	791	46	21	1419	32	51	2	28	29	1	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1545	1770	1567			1772	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00			0.73	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1545	1370	1567			1348	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	860	50	23	1542	35	55	2	30	32	1	84
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	35	860	50	23	1542	35	55	32	0	0	33	84
Confl. Peds. (#/hr)				1		1			1	1		
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	3.1	107.5	107.5	3.8	108.2	108.2	12.5	12.5			12.5	12.5
Effective Green, g (s)	2.8	109.5	109.5	3.5	110.2	110.2	12.6	12.6			12.6	12.6
Actuated g/C Ratio	0.02	0.80	0.80	0.03	0.80	0.80	0.09	0.09			0.09	0.09
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	36	1273	1260	45	1281	1237	125	143			123	145
v/s Ratio Prot	c0.02	0.54		0.01	c0.96			0.02				
v/s Ratio Perm			0.03			0.02	0.04				0.02	c0.05
v/c Ratio	0.97	0.68	0.04	0.51	1.20	0.03	0.44	0.22			0.27	0.58
Uniform Delay, d1	67.4	6.2	3.0	66.2	13.7	2.8	59.2	58.0			58.2	60.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	138.2	1.6	0.0	9.5	99.3	0.0	2.5	0.8			1.2	5.5
Delay (s)	205.6	7.8	3.0	75.7	113.0	2.8	61.6	58.8			59.4	65.5
Level of Service	F	A	A	E	F	A	E	E			E	E
Approach Delay (s)		14.8			110.1			60.6			63.8	
Approach LOS		B			F			E			E	

Intersection Summary

HCM Average Control Delay	73.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	137.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	722	136	237	1266	206	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	3433	1600	1770	1546
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	3433	1600	1770	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	785	148	258	1376	224	266
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	785	148	258	1376	224	266
Confl. Peds. (#/hr)			1		1	1
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	75.5	75.5	11.8	91.0	19.3	19.3
Effective Green, g (s)	77.5	77.5	11.5	93.0	19.0	19.0
Actuated g/C Ratio	0.65	0.65	0.10	0.78	0.16	0.16
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1033	1022	329	1240	280	245
v/s Ratio Prot	0.49		0.08	c0.86	0.13	
v/s Ratio Perm		0.09				c0.17
v/c Ratio	0.76	0.14	0.78	1.11	0.80	1.09
Uniform Delay, d1	14.8	8.3	53.0	13.5	48.7	50.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.0	11.2	61.2	15.0	82.2
Delay (s)	17.9	8.4	64.2	74.7	63.7	132.7
Level of Service	B	A	E	E	E	F
Approach Delay (s)	16.4			73.0	101.2	
Approach LOS	B			E	F	

Intersection Summary

HCM Average Control Delay	60.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	918	56	88	1343	13	160	1	199	8	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1600	1583	3400	1600			1757	1583		1783	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1600	1583	3400	1600			1757	1583		1783	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	998	61	96	1460	14	174	1	216	9	1	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	998	61	96	1474	0	0	175	216	0	10	5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	3%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	1.0	92.1	92.1	7.4	98.2			29.8	29.8		3.0	3.0
Effective Green, g (s)	1.0	94.1	94.1	7.1	100.2			29.8	29.8		3.0	3.0
Actuated g/C Ratio	0.01	0.63	0.63	0.05	0.67			0.20	0.20		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	12	1004	993	161	1069			349	314		36	32
v/s Ratio Prot	0.00	0.62		c0.03	c0.92			0.10			c0.01	
v/s Ratio Perm			0.04						c0.14			0.00
v/c Ratio	0.17	0.99	0.06	0.60	1.38			0.50	0.69		0.28	0.16
Uniform Delay, d1	74.1	27.7	10.8	70.0	24.9			53.5	55.8		72.4	72.3
Progression Factor	1.00	1.00	1.00	0.98	1.34			1.00	1.00		1.00	1.00
Incremental Delay, d2	6.5	27.0	0.1	0.5	171.0			1.1	6.1		4.2	2.3
Delay (s)	80.6	54.7	11.0	69.3	204.4			54.6	61.9		76.6	74.5
Level of Service	F	D	B	E	F			D	E		E	E
Approach Delay (s)		52.2			196.2			58.7			75.9	
Approach LOS		D			F			E			E	

Intersection Summary

HCM Average Control Delay	127.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1059	36	70	1320	1	111	1	143	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.97		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	1600	1583	3273	1600			1775	1542		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	1600	1583	3273	1600			1775	1542		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1151	39	76	1435	1	121	1	155	1	1	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1151	39	76	1436	0	0	122	155	0	2	1
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.2	105.1	105.1	10.2	114.1			12.3	12.3		5.3	5.3
Effective Green, g (s)	0.9	107.1	107.1	9.9	116.1			12.0	12.0		5.0	5.0
Actuated g/C Ratio	0.01	0.71	0.71	0.07	0.77			0.08	0.08		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	11	1142	1130	216	1238			142	123		61	53
v/s Ratio Prot	0.00	0.72		c0.02	c0.90			0.07			c0.00	
v/s Ratio Perm			0.02						c0.10			0.00
v/c Ratio	0.09	1.01	0.03	0.35	1.16			0.86	1.26		0.03	0.02
Uniform Delay, d1	74.1	21.5	6.3	67.0	17.0			68.2	69.0		70.2	70.1
Progression Factor	0.85	1.15	1.35	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4	18.6	0.0	0.7	81.3			36.7	166.8		0.2	0.1
Delay (s)	64.1	43.3	8.5	67.7	98.3			104.9	235.8		70.3	70.2
Level of Service	E	D	A	E	F			F	F		E	E
Approach Delay (s)		42.2			96.7			178.2			70.3	
Approach LOS		D			F			F			E	

Intersection Summary

HCM Average Control Delay	82.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	860	13	29	1292	630	17	25	40	324	17	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3200		1770	3200	1559	1656	1673		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3200		1770	3200	1559	1656	1673		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	935	14	32	1404	685	18	27	43	352	18	182
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	223	949	0	32	1404	685	18	70	0	352	18	182
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.8	42.9		2.2	36.3	50.6	4.0	4.0		14.3	14.3	14.3
Effective Green, g (s)	9.0	44.9		2.4	38.3	53.2	4.2	4.2		15.6	15.6	15.6
Actuated g/C Ratio	0.11	0.54		0.03	0.46	0.64	0.05	0.05		0.19	0.19	0.19
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	192	1729		51	1475	998	84	85		644	350	297
v/s Ratio Prot	c0.13	0.30		0.02	c0.44	c0.13	0.01	c0.04		0.10	0.01	
v/s Ratio Perm						0.31						0.11
v/c Ratio	1.16	0.55		0.63	0.95	0.69	0.21	0.82		0.55	0.05	0.61
Uniform Delay, d1	37.0	12.5		39.9	21.5	9.6	37.9	39.1		30.5	27.7	31.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	115.2	0.3		21.7	13.6	1.8	0.5	43.2		0.8	0.0	3.2
Delay (s)	152.2	12.8		61.6	35.1	11.4	38.3	82.3		31.3	27.7	34.2
Level of Service	F	B		E	D	B	D	F		C	C	C
Approach Delay (s)		39.3			27.9			73.3			32.1	
Approach LOS		D			C			E			C	

Intersection Summary

HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	83.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	921	10	7	1198	118	5	1	3	372	3	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1653		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1770	1653		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1001	11	8	1302	128	5	1	3	404	3	204
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	118	1001	11	8	1302	128	5	4	0	404	3	204
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	7.8	105.7	105.7	0.8	98.5	98.5	0.8	3.3		20.0	22.1	22.1
Effective Green, g (s)	8.0	107.7	107.7	0.8	100.5	100.5	1.0	3.3		20.0	22.3	22.3
Actuated g/C Ratio	0.05	0.73	0.73	0.01	0.68	0.68	0.01	0.02		0.14	0.15	0.15
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	96	1166	1154	10	1088	1076	12	37		465	281	239
v/s Ratio Prot	c0.07	0.63		0.00	c0.81		0.00	0.00		c0.12	0.00	
v/s Ratio Perm			0.01			0.08						c0.13
v/c Ratio	1.23	0.86	0.01	0.80	1.20	0.12	0.42	0.11		0.87	0.01	0.85
Uniform Delay, d1	69.9	14.5	5.5	73.4	23.7	8.2	73.1	70.8		62.6	53.4	61.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	165.7	6.9	0.0	169.7	97.6	0.1	35.8	1.3		15.7	0.0	24.9
Delay (s)	235.6	21.5	5.5	243.1	121.3	8.3	108.9	72.1		78.3	53.4	86.0
Level of Service	F	C	A	F	F	A	F	E		E	D	F
Approach Delay (s)		43.7			111.9			92.6			80.8	
Approach LOS		D			F			F			F	

Intersection Summary

HCM Average Control Delay	81.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	147.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	1172	64	13	1180	30	70	5	30	40	4	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1620			1781	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00			0.72	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1353	1620			1335	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	1274	70	14	1283	33	76	5	33	43	4	78
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	1274	70	14	1283	33	76	38	0	0	47	78
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	5.3	112.0	112.0	1.6	108.3	108.3	13.1	13.1			13.1	13.1
Effective Green, g (s)	5.0	114.0	114.0	1.3	110.3	110.3	13.2	13.2			13.2	13.2
Actuated g/C Ratio	0.04	0.81	0.81	0.01	0.79	0.79	0.09	0.09			0.09	0.09
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	63	1298	1284	16	1256	1243	127	152			125	149
v/s Ratio Prot	c0.04	c0.80		0.01	c0.80			0.02				
v/s Ratio Perm			0.04			0.02	c0.06				0.04	0.05
v/c Ratio	1.03	0.98	0.05	0.88	1.02	0.03	0.60	0.25			0.38	0.52
Uniform Delay, d1	67.8	12.3	2.6	69.5	15.1	3.3	61.1	59.1			59.8	60.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	122.5	20.6	0.0	161.3	31.0	0.0	7.4	0.9			1.9	3.3
Delay (s)	190.3	32.9	2.6	230.8	46.1	3.3	68.5	59.9			61.7	63.9
Level of Service	F	C	A	F	D	A	E	E			E	E
Approach Delay (s)		38.6			46.9			65.6			63.1	
Approach LOS		D			D			E			E	

Intersection Summary

HCM Average Control Delay	44.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	140.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1101	140	208	1006	217	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	3433	1600	1770	1546
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	3433	1600	1770	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1197	152	226	1093	236	414
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1197	152	226	1093	236	414
Confl. Peds. (#/hr)			1		1	1
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	86.0	86.0	8.3	98.0	32.3	32.3
Effective Green, g (s)	88.0	88.0	8.0	100.0	32.0	32.0
Actuated g/C Ratio	0.63	0.63	0.06	0.71	0.23	0.23
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1006	995	196	1143	405	353
v/s Ratio Prot	c0.75		c0.07	0.68	0.13	
v/s Ratio Perm		0.10				c0.27
v/c Ratio	1.19	0.15	1.15	0.96	0.58	1.17
Uniform Delay, d1	26.0	10.7	66.0	18.0	48.1	54.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	95.5	0.1	111.6	17.0	2.1	103.7
Delay (s)	121.5	10.7	177.6	35.0	50.2	157.7
Level of Service	F	B	F	D	D	F
Approach Delay (s)	109.0			59.5	118.7	
Approach LOS	F			E	F	

Intersection Summary

HCM Average Control Delay	91.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1361	121	157	1132	7	82	1	161	4	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1600	1583	3433	1600			1775	1568		1791	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1600	1583	3433	1600			1775	1568		1791	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1479	132	171	1230	8	89	1	175	4	1	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1479	132	171	1238	0	0	90	175	0	5	4
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	0.8	92.5	92.5	11.7	103.1			25.4	25.4		2.7	2.7
Effective Green, g (s)	0.8	94.5	94.5	11.4	105.1			25.4	25.4		2.7	2.7
Actuated g/C Ratio	0.01	0.63	0.63	0.08	0.70			0.17	0.17		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	9	1008	997	261	1121			301	266		32	28
v/s Ratio Prot	0.00	c0.92		c0.05	c0.77			0.05			c0.00	
v/s Ratio Perm			0.08						c0.11			0.00
v/c Ratio	0.11	1.47	0.13	0.66	1.10			0.30	0.66		0.16	0.14
Uniform Delay, d1	74.2	27.8	11.2	67.4	22.4			54.5	58.2		72.5	72.5
Progression Factor	1.00	1.00	1.00	1.04	0.72			1.00	1.00		1.00	1.00
Incremental Delay, d2	5.4	215.7	0.3	1.3	50.7			0.6	5.8		2.3	2.3
Delay (s)	79.7	243.5	11.5	71.3	66.9			55.1	64.0		74.8	74.9
Level of Service	E	F	B	E	E			E	E		E	E
Approach Delay (s)		224.4			67.4			61.0			74.8	
Approach LOS		F			E			E			E	

Intersection Summary

HCM Average Control Delay	143.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	1422	112	149	1215	1	72	2	110	1	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.97		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	1600	1583	3273	1600			1776	1539		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	1600	1583	3273	1600			1776	1539		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1546	122	162	1321	1	78	2	120	1	1	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1546	122	162	1322	0	0	80	120	0	2	2
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.3	101.3	101.3	17.0	117.0			9.3	9.3		5.3	5.3
Effective Green, g (s)	1.0	103.3	103.3	16.7	119.0			9.0	9.0		5.0	5.0
Actuated g/C Ratio	0.01	0.69	0.69	0.11	0.79			0.06	0.06		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	12	1102	1090	364	1269			107	92		61	53
v/s Ratio Prot	0.00	c0.97		c0.05	c0.83			0.05			0.00	
v/s Ratio Perm			0.08						c0.08			c0.00
v/c Ratio	0.17	1.40	0.11	0.45	1.04			0.75	1.30		0.03	0.04
Uniform Delay, d1	74.1	23.4	7.9	62.3	15.5			69.4	70.5		70.2	70.2
Progression Factor	1.13	1.46	0.95	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	181.8	0.0	0.6	36.8			23.3	195.7		0.2	0.2
Delay (s)	84.3	215.9	7.5	63.0	52.3			92.7	266.2		70.3	70.4
Level of Service	F	F	A	E	D			F	F		E	E
Approach Delay (s)		200.6			53.5			196.8			70.4	
Approach LOS		F			D			F			E	

Intersection Summary

HCM Average Control Delay	135.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	751	3	2	1152	394	9	2	5	113	1	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1583	1770	1663		3433	1863	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1583	1770	1663		3433	1863	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	275	816	3	2	1252	428	10	2	5	123	1	151
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	275	816	3	2	1252	428	10	7	0	123	1	151
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	25.0	81.5	81.5	0.6	56.9	56.9	1.2	2.6		16.7	17.7	17.7
Effective Green, g (s)	25.2	83.5	83.5	0.6	58.9	58.9	1.4	2.6		16.7	17.9	17.9
Actuated g/C Ratio	0.21	0.70	0.70	0.01	0.49	0.49	0.01	0.02		0.14	0.15	0.15
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	374	1119	1107	9	1579	781	21	36		480	279	235
v/s Ratio Prot	0.16	c0.51		0.00	c0.39		0.01	0.00		c0.04	0.00	
v/s Ratio Perm			0.00			0.27						c0.10
v/c Ratio	0.74	0.73	0.00	0.22	0.79	0.55	0.48	0.19		0.26	0.00	0.64
Uniform Delay, d1	44.0	11.0	5.4	59.2	25.2	21.0	58.6	57.4		45.8	43.2	47.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.3	2.7	0.0	12.1	3.1	1.2	26.6	2.6		0.3	0.0	6.2
Delay (s)	52.3	13.8	5.4	71.3	28.3	22.2	85.2	60.0		46.1	43.2	53.9
Level of Service	D	B	A	E	C	C	F	E		D	D	D
Approach Delay (s)		23.4			26.8			74.9			50.4	
Approach LOS		C			C			E			D	

Intersection Summary

HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	791	46	21	1419	32	51	2	28	29	1	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1548	1770	1581			1775	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00			0.72	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1548	1370	1581			1343	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	860	50	23	1542	35	55	2	30	32	1	84
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	35	860	50	23	1542	35	55	32	0	0	33	84
Confl. Peds. (#/hr)				1		1			1	1		
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	3.8	56.3	56.3	1.9	54.4	54.4	8.8	8.8			8.8	8.8
Effective Green, g (s)	3.5	58.3	58.3	1.6	56.4	56.4	8.9	8.9			8.9	8.9
Actuated g/C Ratio	0.04	0.72	0.72	0.02	0.70	0.70	0.11	0.11			0.11	0.11
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	77	1154	1142	35	2234	1081	151	174			148	174
v/s Ratio Prot	c0.02	c0.54		0.01	0.48			0.02				
v/s Ratio Perm			0.03			0.02	0.04				0.02	c0.05
v/c Ratio	0.45	0.75	0.04	0.66	0.69	0.03	0.36	0.18			0.22	0.48
Uniform Delay, d1	37.7	6.8	3.2	39.3	7.1	3.8	33.3	32.7			32.8	33.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	4.2	2.8	0.0	36.6	1.0	0.0	1.5	0.5			0.8	2.1
Delay (s)	41.9	9.6	3.3	76.0	8.1	3.8	34.8	33.2			33.6	35.9
Level of Service	D	A	A	E	A	A	C	C			C	D
Approach Delay (s)		10.5			9.0			34.2			35.2	
Approach LOS		B			A			C			D	

Intersection Summary

HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	722	136	237	1266	206	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	3433	3200	1770	1563
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	3433	3200	1770	1563
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	785	148	258	1376	224	266
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	785	148	258	1376	224	266
Confl. Peds. (#/hr)			1		1	1
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	22.8	22.8	10.8	37.3	17.9	17.9
Effective Green, g (s)	24.8	24.8	10.5	39.3	17.6	17.6
Actuated g/C Ratio	0.38	0.38	0.16	0.61	0.27	0.27
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1223	605	555	1938	480	424
v/s Ratio Prot	0.25		0.08	c0.43	0.13	
v/s Ratio Perm		0.09				c0.17
v/c Ratio	0.64	0.24	0.46	0.71	0.47	0.63
Uniform Delay, d1	16.4	13.7	24.7	8.9	19.7	20.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.2	0.4	1.2	0.7	2.9
Delay (s)	17.4	13.8	25.1	10.0	20.5	23.7
Level of Service	B	B	C	B	C	C
Approach Delay (s)	16.9			12.4	22.2	
Approach LOS	B			B	C	

Intersection Summary

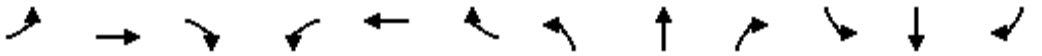
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	64.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	918	56	88	1343	13	160	1	199	8	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	3200	1583	3400	3200			1757	1583		1783	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	3200	1583	3400	3200			1757	1583		1783	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	998	61	96	1460	14	174	1	216	9	1	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	998	61	96	1474	0	0	175	216	0	10	5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	3%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	1.3	94.6	94.6	9.1	102.1			25.6	25.6		3.0	3.0
Effective Green, g (s)	1.3	96.6	96.6	8.8	104.1			25.6	25.6		3.0	3.0
Actuated g/C Ratio	0.01	0.64	0.64	0.06	0.69			0.17	0.17		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	15	2061	1019	199	2221			300	270		36	32
v/s Ratio Prot	0.00	0.31		c0.03	c0.46			0.10			c0.01	
v/s Ratio Perm			0.04						c0.14			0.00
v/c Ratio	0.13	0.48	0.06	0.48	0.66			0.58	0.80		0.28	0.16
Uniform Delay, d1	73.8	13.8	9.9	68.4	13.0			57.3	59.7		72.4	72.3
Progression Factor	1.00	1.00	1.00	0.87	1.74			1.00	1.00		1.00	1.00
Incremental Delay, d2	4.0	0.8	0.1	1.1	1.3			2.9	15.5		4.2	2.3
Delay (s)	77.8	14.6	10.0	60.5	23.9			60.2	75.2		76.6	74.5
Level of Service	E	B	A	E	C			E	E		E	E
Approach Delay (s)		14.5			26.2			68.5			75.9	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1059	36	70	1320	1	111	1	143	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3200	1583	3273	3200			1775	1561		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	3200	1583	3273	3200			1775	1561		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1151	39	76	1435	1	121	1	155	1	1	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1151	39	76	1436	0	0	122	155	0	2	1
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.2	99.9	99.9	8.4	107.1			19.3	19.3		5.3	5.3
Effective Green, g (s)	0.9	101.9	101.9	8.1	109.1			19.0	19.0		5.0	5.0
Actuated g/C Ratio	0.01	0.68	0.68	0.05	0.73			0.13	0.13		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	11	2174	1075	177	2327			225	198		61	53
v/s Ratio Prot	0.00	0.36		c0.02	c0.45			0.07			c0.00	
v/s Ratio Perm			0.02						c0.10			0.00
v/c Ratio	0.09	0.53	0.04	0.43	0.62			0.54	0.78		0.03	0.02
Uniform Delay, d1	74.1	12.0	7.9	68.7	10.1			61.4	63.5		70.2	70.1
Progression Factor	0.80	1.09	1.33	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.1	0.8	0.1	1.2	1.2			2.1	17.5		0.2	0.1
Delay (s)	62.4	13.9	10.6	69.9	11.4			63.5	81.0		70.3	70.2
Level of Service	E	B	B	E	B			E	F		E	E
Approach Delay (s)		13.8			14.3			73.3			70.3	
Approach LOS		B			B			E			E	

Intersection Summary

HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	921	10	7	1198	118	5	1	3	372	3	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1583	1770	1653		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1583	1770	1653		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1001	11	8	1302	128	5	1	3	404	3	204
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	118	1001	11	8	1302	128	5	4	0	404	3	204
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	14.7	83.2	83.2	0.6	68.9	68.9	0.6	2.7		20.9	22.6	22.6
Effective Green, g (s)	14.9	85.2	85.2	0.6	70.9	70.9	0.8	2.7		20.9	22.8	22.8
Actuated g/C Ratio	0.12	0.68	0.68	0.00	0.57	0.57	0.01	0.02		0.17	0.18	0.18
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	210	1087	1076	8	1809	895	11	36		572	339	288
v/s Ratio Prot	c0.07	c0.63		0.00	0.41		0.00	0.00		c0.12	0.00	
v/s Ratio Perm			0.01			0.08						c0.13
v/c Ratio	0.56	0.92	0.01	1.00	0.72	0.14	0.45	0.11		0.71	0.01	0.71
Uniform Delay, d1	52.2	17.2	6.5	62.4	20.0	12.9	62.1	60.2		49.4	42.0	48.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.8	12.8	0.0	318.2	1.6	0.1	43.9	1.4		4.0	0.0	8.0
Delay (s)	57.0	30.0	6.5	380.6	21.6	13.0	106.0	61.5		53.3	42.1	56.2
Level of Service	E	C	A	F	C	B	F	E		D	D	E
Approach Delay (s)		32.6			22.8			86.3			54.2	
Approach LOS		C			C			F			D	

Intersection Summary

HCM Average Control Delay	32.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	125.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	1172	64	13	1180	30	70	5	30	40	4	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1583	1770	1620			1781	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00			0.72	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1583	1353	1620			1335	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	1274	70	14	1283	33	76	5	33	43	4	78
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	1274	70	14	1283	33	76	38	0	0	47	78
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	8.4	107.5	107.5	1.5	100.6	100.6	12.8	12.8			12.8	12.8
Effective Green, g (s)	8.1	109.5	109.5	1.2	102.6	102.6	12.9	12.9			12.9	12.9
Actuated g/C Ratio	0.06	0.81	0.81	0.01	0.76	0.76	0.10	0.10			0.10	0.10
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	106	1292	1278	16	2421	1198	129	154			127	151
v/s Ratio Prot	c0.04	c0.80		0.01	0.40			0.02				
v/s Ratio Perm			0.04			0.02	c0.06				0.04	0.05
v/c Ratio	0.61	0.99	0.05	0.88	0.53	0.03	0.59	0.25			0.37	0.52
Uniform Delay, d1	62.2	12.3	2.6	67.1	6.7	4.1	58.8	56.8			57.5	58.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	10.1	21.6	0.0	161.3	0.3	0.0	6.7	0.8			1.8	3.0
Delay (s)	72.3	33.9	2.7	228.4	7.0	4.1	65.5	57.7			59.4	61.3
Level of Service	E	C	A	F	A	A	E	E			E	E
Approach Delay (s)		34.1			9.2			62.9			60.6	
Approach LOS		C			A			E			E	

Intersection Summary

HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	135.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1101	140	208	1006	217	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	3433	3200	1770	1562
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	3433	3200	1770	1562
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1197	152	226	1093	236	414
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1197	152	226	1093	236	414
Confl. Peds. (#/hr)			1		1	1
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	47.3	47.3	12.2	63.2	35.5	35.5
Effective Green, g (s)	49.3	49.3	11.9	65.2	35.2	35.2
Actuated g/C Ratio	0.45	0.45	0.11	0.60	0.32	0.32
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1455	720	377	1925	575	507
v/s Ratio Prot	c0.37		0.07	c0.34	0.13	
v/s Ratio Perm		0.10				c0.27
v/c Ratio	0.82	0.21	0.60	0.57	0.41	0.82
Uniform Delay, d1	25.7	17.8	46.0	13.1	28.5	33.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	0.1	2.1	0.3	0.5	9.8
Delay (s)	29.6	17.9	48.1	13.4	29.0	43.5
Level of Service	C	B	D	B	C	D
Approach Delay (s)	28.2			19.3	38.2	
Approach LOS	C			B	D	

Intersection Summary

HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	108.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1361	121	157	1132	7	82	1	161	4	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	3200	1583	3433	3200			1775	1568		1791	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	3200	1583	3433	3200			1775	1568		1791	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1479	132	171	1230	8	89	1	175	4	1	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1479	132	171	1238	0	0	90	175	0	5	4
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	1.2	95.5	95.5	12.3	106.3			21.8	21.8		2.7	2.7
Effective Green, g (s)	1.2	97.5	97.5	12.0	108.3			21.8	21.8		2.7	2.7
Actuated g/C Ratio	0.01	0.65	0.65	0.08	0.72			0.15	0.15		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	14	2080	1029	275	2310			258	228		32	28
v/s Ratio Prot	0.00	c0.46		c0.05	0.39			0.05			c0.00	
v/s Ratio Perm			0.08						c0.11			0.00
v/c Ratio	0.07	0.71	0.13	0.62	0.54			0.35	0.77		0.16	0.14
Uniform Delay, d1	73.8	17.1	10.0	66.8	9.5			57.7	61.7		72.5	72.5
Progression Factor	1.00	1.00	1.00	1.14	0.65			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.2	2.1	0.3	3.2	0.8			0.8	14.3		2.3	2.3
Delay (s)	76.0	19.2	10.3	79.3	6.9			58.5	76.0		74.8	74.9
Level of Service	E	B	B	E	A			E	E		E	E
Approach Delay (s)		18.5			15.7			70.0			74.8	
Approach LOS		B			B			E			E	

Intersection Summary

HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	1422	112	149	1215	1	72	2	110	1	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3200	1583	3273	3200			1776	1560		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	3200	1583	3273	3200			1776	1560		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1546	122	162	1321	1	78	2	120	1	1	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1546	122	162	1322	0	0	80	120	0	2	2
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.3	100.0	100.0	12.3	111.0			15.3	15.3		5.3	5.3
Effective Green, g (s)	1.0	102.0	102.0	12.0	113.0			15.0	15.0		5.0	5.0
Actuated g/C Ratio	0.01	0.68	0.68	0.08	0.75			0.10	0.10		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	12	2176	1076	262	2411			178	156		61	53
v/s Ratio Prot	0.00	c0.48		c0.05	0.41			0.05			0.00	
v/s Ratio Perm			0.08						c0.08			c0.00
v/c Ratio	0.17	0.71	0.11	0.62	0.55			0.45	0.77		0.03	0.04
Uniform Delay, d1	74.1	14.9	8.3	66.8	7.8			63.6	65.8		70.2	70.2
Progression Factor	1.15	1.61	1.12	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	4.7	1.4	0.2	3.7	0.9			1.3	19.3		0.2	0.2
Delay (s)	90.1	25.4	9.5	70.5	8.7			64.9	85.1		70.3	70.4
Level of Service	F	C	A	E	A			E	F		E	E
Approach Delay (s)		24.3			15.4			77.1			70.4	
Approach LOS		C			B			E			E	

Intersection Summary

HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Appendix E

Synchro Arterial Level of Service Reports

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Josselyn Cyn. Rd.	I	60	126.1	38.4	164.5	2.10	46.0	A
Olmsted Rd.	I	52	36.4	75.0	111.4	0.53	17.0	E
Hwy 218	I	45	87.9	15.7	103.6	1.09	37.9	B
Ragsdale Dr.	I	50	29.6	0.3	29.9	0.33	39.2	B
York Rd.	I	48	81.7	7.3	89.0	1.09	44.1	A
Boots Rd.	I	42	135.9	8.4	144.3	1.59	39.6	B
Laureles Grade Rd.	I	50	96.7	25.5	122.2	1.34	39.6	B
Corral de Tierra Rd.	I	55	113.3	28.4	141.7	1.73	44.0	A
San Benancio Rd.	I	60	64.8	82.9	147.7	1.08	26.3	D
Total	I		772.4	281.9	1054.3	10.87	37.1	B

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Benancio Rd.	III	14	610.1	39.9	650.0	2.42	13.4	E
Corral de Tierra Rd.	III	41	94.8	30.9	125.7	1.08	30.9	A
Laureles Grade Rd.	III	45	138.5	37.4	175.9	1.73	35.4	A
Pasadera Dr.	III	60	93.2	46.7	139.9	1.55	40.0	A
York Rd.	III	60	170.5	91.5	262.0	2.84	39.0	A
Ragsdale Dr.	III	60	65.3	18.9	84.2	1.09	46.6	A
Hwy 218	III	60	36.4	27.1	63.5	0.61	34.4	A
Olmsted Rd.	III	60	83.9	41.9	125.8	1.40	40.0	A
Josselyn Cyn. Rd.	III	30	63.0	12.7	75.7	0.53	25.0	B
Total	III		1355.7	347.0	1702.7	13.25	28.0	B

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Josselyn Cyn. Rd.	III	47	45.0	10.5	55.5	0.51	33.2	A
Olmsted Rd.	III	60	36.9	28.6	65.5	0.47	26.0	B
Hwy 218	III	46	85.0	11.3	96.3	1.09	40.8	A
Ragsdale Dr.	III	60	29.6	0.3	29.9	0.32	38.8	A
York Rd.	III	52	76.2	14.2	90.4	1.09	43.4	A
Boots Rd.	III	25	248.8	18.4	267.2	1.73	23.3	C
Laureles Grade Rd.	III	15	322.2	109.3	431.5	1.34	11.2	E
Corral de Tierra Rd.	III	36	173.1	120.6	293.7	1.73	21.2	C
San Benancio Rd.	III	60	108.0	190.0	298.0	1.80	21.7	C
Total	III		1124.8	503.2	1628.0	10.09	22.3	C

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Benancio Rd.	I	52	167.5	22.8	190.3	2.42	45.8	A
Corral de Tierra Rd.	I	47	34.9	12.1	47.0	0.36	27.6	C
Laureles Grade Rd.	I	60	227.3	35.6	262.9	3.79	51.9	A
Pasadera Dr.	I	54	89.5	32.5	122.0	1.34	39.6	B
York Rd.	I	60	409.1	111.7	520.8	6.82	47.1	A
Ragsdale Dr.	I	54	72.4	15.0	87.4	1.09	44.9	A
Hwy 218	I	60	73.9	32.1	106.0	1.23	41.8	B
Olmsted Rd.	I	60	107.8	201.8	309.6	1.80	20.9	E
Josselyn Cyn. Rd.	I	60	39.8	52.1	91.9	0.66	26.0	D
Total	I		1222.2	515.7	1737.9	19.51	40.4	B

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Josselyn Cyn. Rd.	I	60	126.1	69.0	195.1	2.10	38.8	B
Olmsted Rd.	I	52	36.4	93.2	129.6	0.53	14.6	F
Hwy 218	I	45	87.9	17.1	105.0	1.09	37.4	B
Ragsdale Dr.	I	50	29.6	2.4	32.0	0.33	36.6	B
York Rd.	I	48	81.7	10.9	92.6	1.09	42.4	A
Boots Rd.	I	43	132.7	10.3	143.0	1.59	39.9	B
Laureles Grade Rd.	I	51	94.8	21.0	115.8	1.34	41.7	B
Corral de Tierra Rd.	I	55	113.3	47.6	160.9	1.73	38.7	B
San Benancio Rd.	I	60	64.8	43.0	107.8	1.08	36.1	B
Total	I		767.3	314.5	1081.8	10.87	36.2	B

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Benancio Rd.	III	14	610.1	87.2	697.3	2.42	12.5	E
Corral de Tierra Rd.	III	41	94.8	165.9	260.7	1.08	14.9	D
Laureles Grade Rd.	III	45	138.5	77.8	216.3	1.73	28.8	B
Pasadera Dr.	III	60	93.2	115.1	208.3	1.55	26.8	B
York Rd.	III	60	170.5	129.3	299.8	2.84	34.1	A
Ragsdale Dr.	III	60	65.3	26.8	92.1	1.09	42.6	A
Hwy 218	III	60	36.4	28.8	65.2	0.61	33.5	A
Olmsted Rd.	III	60	83.9	48.7	132.6	1.40	38.0	A
Josselyn Cyn. Rd.	III	30	63.0	14.5	77.5	0.53	24.4	B
Total	III		1355.7	694.1	2049.8	13.25	23.3	C

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Josselyn Cyn. Rd.	III	47	45.0	11.2	56.2	0.51	32.8	A
Olmsted Rd.	III	60	36.9	33.8	70.7	0.47	24.1	B
Hwy 218	III	46	85.0	14.5	99.5	1.09	39.5	A
Ragsdale Dr.	III	60	29.6	0.3	29.9	0.32	38.8	A
York Rd.	III	52	76.2	19.6	95.8	1.09	40.9	A
Boots Rd.	III	25	248.8	31.0	279.8	1.73	22.2	C
Laureles Grade Rd.	III	15	322.2	121.9	444.1	1.34	10.9	E
Corral de Tierra Rd.	III	36	173.1	224.3	397.4	1.73	15.7	D
San Benancio Rd.	III	60	108.0	211.5	319.5	1.80	20.3	C
Total	III		1124.8	668.1	1792.9	10.09	20.3	C

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Benancio Rd.	I	52	167.5	44.2	211.7	2.42	41.2	B
Corral de Tierra Rd.	I	47	34.9	44.2	79.1	0.36	16.4	E
Laureles Grade Rd.	I	60	227.3	37.0	264.3	3.79	51.6	A
Pasadera Dr.	I	54	89.5	49.0	138.5	1.34	34.9	B
York Rd.	I	60	409.1	114.5	523.6	6.82	46.9	A
Ragsdale Dr.	I	54	72.4	16.4	88.8	1.09	44.2	A
Hwy 218	I	60	73.9	46.5	120.4	1.23	36.8	B
Olmsted Rd.	I	60	107.8	341.8	449.6	1.80	14.4	F
Josselyn Cyn. Rd.	I	60	39.8	104.7	144.5	0.66	16.5	E
Total	I		1222.2	798.3	2020.5	19.51	34.8	B

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Josselyn Cyn. Rd.	I	60	126.1	69.0	195.1	2.10	38.8	B
Olmsted Rd.	I	52	36.4	93.2	129.6	0.53	14.6	F
Hwy 218	I	45	87.9	16.5	104.4	1.09	37.6	B
Ragsdale Dr.	I	50	29.6	2.4	32.0	0.33	36.6	B
York Rd.	I	48	81.7	10.9	92.6	1.09	42.4	A
Boots Rd.	I	43	132.7	10.3	143.0	1.59	39.9	B
Laureles Grade Rd.	I	51	94.8	21.1	115.9	1.34	41.7	B
Corral de Tierra Rd.	I	55	113.3	47.8	161.1	1.73	38.7	B
San Benancio Rd.	I	60	64.8	43.7	108.5	1.08	35.8	B
Total	I		767.3	314.9	1082.2	10.87	36.2	B

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Benancio Rd.	III	14	610.1	87.2	697.3	2.42	12.5	E
Corral de Tierra Rd.	III	41	94.8	167.4	262.2	1.08	14.8	D
Laureles Grade Rd.	III	45	138.5	79.1	217.6	1.73	28.6	B
Pasadera Dr.	III	60	93.2	116.7	209.9	1.55	26.6	B
York Rd.	III	60	170.5	131.4	301.9	2.84	33.9	A
Ragsdale Dr.	III	60	65.3	26.8	92.1	1.09	42.6	A
Hwy 218	III	60	36.4	29.6	66.0	0.61	33.1	A
Olmsted Rd.	III	60	83.9	48.7	132.6	1.40	38.0	A
Josselyn Cyn. Rd.	III	30	63.0	14.5	77.5	0.53	24.4	B
Total	III		1355.7	701.4	2057.1	13.25	23.2	C

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Josselyn Cyn. Rd.	III	47	45.0	11.2	56.2	0.51	32.8	A
Olmsted Rd.	III	60	36.9	33.8	70.7	0.47	24.1	B
Hwy 218	III	46	85.0	14.5	99.5	1.09	39.5	A
Ragsdale Dr.	III	60	29.6	0.3	29.9	0.32	38.8	A
	III	52	76.2	19.7	95.9	1.09	40.9	A
Boots Rd.	III	25	248.8	31.5	280.3	1.73	22.2	C
Laureles Grade Rd.	III	15	322.2	123.5	445.7	1.34	10.8	E
Corral de Tierra Rd.	III	36	173.1	226.4	399.5	1.73	15.6	D
San Benancio Rd.	III	60	108.0	214.5	322.5	1.80	20.1	C
Total	III		1124.8	675.4	1800.2	10.09	20.2	C

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Benancio Rd.	I	52	167.5	44.2	211.7	2.42	41.2	B
Corral de Tierra Rd.	I	47	34.9	45.2	80.1	0.36	16.2	E
Laureles Grade Rd.	I	60	227.3	37.6	264.9	3.79	51.5	A
Pasadera Dr.	I	54	89.5	49.5	139.0	1.34	34.8	B
York Rd.	I	60	409.1	115.3	524.4	6.82	46.8	A
Ragsdale Dr.	I	54	72.4	16.4	88.8	1.09	44.2	A
Hwy 218	I	60	73.9	47.0	120.9	1.23	36.7	B
Olmsted Rd.	I	60	107.8	341.8	449.6	1.80	14.4	F
Josselyn Cyn. Rd.	I	60	39.8	104.7	144.5	0.66	16.5	E
Total	I		1222.2	801.7	2023.9	19.51	34.7	B

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Josselyn Cyn. Rd.	I	60	126.1	275.4	401.5	2.10	18.8	E
Olmsted Rd.	I	52	36.4	311.2	347.6	0.53	5.4	F
Hwy 218	I	45	87.9	40.5	128.4	1.09	30.6	C
Ragsdale Dr.	I	50	29.6	0.5	30.1	0.33	39.0	B
York Rd.	I	48	81.7	22.4	104.1	1.09	37.7	B
Boots Rd.	I	43	132.7	37.8	170.5	1.59	33.5	C
Laureles Grade Rd.	I	51	94.8	92.9	187.7	1.34	25.8	D
Corral de Tierra Rd.	I	55	113.3	209.1	322.4	1.73	19.3	E
San Benancio Rd.	I	60	64.8	229.2	294.0	1.08	13.2	F
Total	I		767.3	1219.0	1986.3	10.87	19.7	E

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Benancio Rd.	III	14	610.1	289.7	899.8	2.42	9.7	F
Corral de Tierra Rd.	III	41	94.8	406.0	500.8	1.08	7.8	F
Laureles Grade Rd.	III	45	138.5	260.1	398.6	1.73	15.6	D
Pasadera Dr.	III	60	93.2	316.3	409.5	1.55	13.7	E
York Rd.	III	60	170.5	324.9	495.4	2.84	20.6	C
Ragsdale Dr.	III	60	65.3	60.3	125.6	1.09	31.2	A
Hwy 218	III	60	36.4	110.4	146.8	0.61	14.9	D
Olmsted Rd.	III	60	83.9	222.8	306.7	1.40	16.4	D
Josselyn Cyn. Rd.	III	30	63.0	108.5	171.5	0.53	11.0	E
Total	III		1355.7	2099.0	3454.7	13.25	13.8	E

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Josselyn Cyn. Rd.	III	47	45.0	50.5	95.5	0.51	19.3	C
Olmsted Rd.	III	60	36.9	219.7	256.6	0.47	6.6	F
Hwy 218	III	46	85.0	23.6	108.6	1.09	36.2	A
Ragsdale Dr.	III	60	29.6	0.5	30.1	0.32	38.5	A
York Rd.	III	52	76.2	103.2	179.4	1.09	21.9	C
Boots Rd.	III	25	248.8	188.0	436.8	1.73	14.2	D
Laureles Grade Rd.	III	15	322.2	315.7	637.9	1.34	7.6	F
Corral de Tierra Rd.	III	36	173.1	401.3	574.4	1.73	10.8	E
San Benancio Rd.	III	60	108.0	433.5	541.5	1.80	12.0	E
Total	III		1124.8	1736.0	2860.8	10.09	12.7	E

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Benancio Rd.	I	52	167.5	215.9	383.4	2.42	22.8	D
Corral de Tierra Rd.	I	47	34.9	226.2	261.1	0.36	5.0	F
Laureles Grade Rd.	I	60	227.3	176.3	403.6	3.79	33.8	C
Pasadera Dr.	I	54	89.5	215.3	304.8	1.34	15.9	F
York Rd.	I	60	409.1	268.6	677.7	6.82	36.2	B
Ragsdale Dr.	I	54	72.4	31.6	104.0	1.09	37.7	B
Hwy 218	I	60	73.9	209.6	283.5	1.23	15.6	F
Olmsted Rd.	I	60	107.8	635.2	743.0	1.80	8.7	F
Josselyn Cyn. Rd.	I	60	39.8	301.5	341.3	0.66	7.0	F
Total	I		1222.2	2280.2	3502.4	19.51	20.1	E

Appendix F

Intersection Level of Service Calculation Worksheets

Background + Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	1094	11	17	1019	432	14	11	25	494	21	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3200		1770	3200	1568	1770	1669		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3200		1770	3200	1568	1770	1669		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	1189	12	18	1108	470	15	12	27	537	23	213
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	160	1201	0	18	1108	470	15	39	0	537	23	213
Heavy Vehicles (%)	2%	2%	2%	2%	4%	3%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	9.7	40.8		0.8	31.9	49.1	2.1	2.1		17.2	17.2	17.2
Effective Green, g (s)	9.9	42.8		1.0	33.9	51.7	2.3	2.3		18.5	18.5	18.5
Actuated g/C Ratio	0.12	0.53		0.01	0.42	0.64	0.03	0.03		0.23	0.23	0.23
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	217	1699		22	1346	1006	51	48		788	428	363
v/s Ratio Prot	c0.09	0.38		0.01	c0.35	0.11	0.01	c0.02		c0.16	0.01	
v/s Ratio Perm						0.19						0.13
v/c Ratio	0.74	0.71		0.82	0.82	0.47	0.29	0.81		0.68	0.05	0.59
Uniform Delay, d1	34.1	14.2		39.7	20.7	7.4	38.4	38.9		28.4	24.2	27.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	11.6	1.3		109.6	4.1	0.3	1.2	61.7		2.2	0.0	2.0
Delay (s)	45.7	15.5		149.3	24.8	7.6	39.5	100.7		30.6	24.3	29.7
Level of Service	D	B		F	C	A	D	F		C	C	C
Approach Delay (s)		19.0			21.2			83.7			30.1	
Approach LOS		B			C			F			C	

Intersection Summary

HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	752	3	2	1156	394	9	2	5	113	1	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1663		3433	1863	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1770	1663		3433	1863	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	275	817	3	2	1257	428	10	2	5	123	1	151
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	275	817	3	2	1257	428	10	7	0	123	1	151
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	17.8	111.3	111.3	0.8	94.1	94.1	1.5	3.1		16.7	17.9	17.9
Effective Green, g (s)	18.0	113.3	113.3	0.8	96.1	96.1	1.7	3.1		16.7	18.1	18.1
Actuated g/C Ratio	0.12	0.76	0.76	0.01	0.64	0.64	0.01	0.02		0.11	0.12	0.12
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	213	1209	1196	9	1026	1015	20	34		382	225	189
v/s Ratio Prot	c0.16	0.51		0.00	c0.79		0.01	0.00		c0.04	0.00	
v/s Ratio Perm			0.00			0.27						c0.10
v/c Ratio	1.29	0.68	0.00	0.22	1.23	0.42	0.50	0.21		0.32	0.00	0.80
Uniform Delay, d1	66.0	9.1	4.5	74.2	26.9	13.2	73.7	72.2		61.4	58.0	64.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	161.4	1.8	0.0	12.1	110.1	0.5	30.2	3.0		0.5	0.0	21.1
Delay (s)	227.4	10.9	4.5	86.4	137.0	13.7	103.8	75.2		61.9	58.0	85.2
Level of Service	F	B	A	F	F	B	F	E		E	E	F
Approach Delay (s)		65.3			105.7			92.0			74.7	
Approach LOS		E			F			F			E	

Intersection Summary

HCM Average Control Delay	88.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	149.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	792	46	21	1423	32	51	2	28	29	1	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1545	1770	1567			1772	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00			0.73	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1545	1370	1567			1348	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	861	50	23	1547	35	55	2	30	32	1	84
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	35	861	50	23	1547	35	55	32	0	0	33	84
Confl. Peds. (#/hr)				1		1			1	1		
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	3.1	107.5	107.5	3.8	108.2	108.2	12.5	12.5			12.5	12.5
Effective Green, g (s)	2.8	109.5	109.5	3.5	110.2	110.2	12.6	12.6			12.6	12.6
Actuated g/C Ratio	0.02	0.80	0.80	0.03	0.80	0.80	0.09	0.09			0.09	0.09
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	36	1273	1260	45	1281	1237	125	143			123	145
v/s Ratio Prot	c0.02	0.54		0.01	c0.97			0.02				
v/s Ratio Perm			0.03			0.02	0.04				0.02	c0.05
v/c Ratio	0.97	0.68	0.04	0.51	1.21	0.03	0.44	0.22			0.27	0.58
Uniform Delay, d1	67.4	6.2	3.0	66.2	13.7	2.8	59.2	58.0			58.2	60.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	138.2	1.6	0.0	9.5	101.0	0.0	2.5	0.8			1.2	5.5
Delay (s)	205.6	7.8	3.0	75.7	114.7	2.8	61.6	58.8			59.4	65.5
Level of Service	F	A	A	E	F	A	E	E			E	E
Approach Delay (s)		14.8			111.7			60.6			63.8	
Approach LOS		B			F			E			E	

Intersection Summary

HCM Average Control Delay	74.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	137.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	723	136	237	1270	206	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	3433	1600	1770	1546
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	3433	1600	1770	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	786	148	258	1380	224	266
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	786	148	258	1380	224	266
Confl. Peds. (#/hr)			1		1	1
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	75.5	75.5	11.8	91.0	19.3	19.3
Effective Green, g (s)	77.5	77.5	11.5	93.0	19.0	19.0
Actuated g/C Ratio	0.65	0.65	0.10	0.78	0.16	0.16
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1033	1022	329	1240	280	245
v/s Ratio Prot	0.49		0.08	c0.86	0.13	
v/s Ratio Perm		0.09				c0.17
v/c Ratio	0.76	0.14	0.78	1.11	0.80	1.09
Uniform Delay, d1	14.8	8.3	53.0	13.5	48.7	50.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.0	11.2	62.4	15.0	82.2
Delay (s)	18.0	8.4	64.2	75.9	63.7	132.7
Level of Service	B	A	E	E	E	F
Approach Delay (s)	16.5			74.1	101.2	
Approach LOS	B			E	F	

Intersection Summary

HCM Average Control Delay	60.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	919	56	88	1347	13	160	1	199	8	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1600	1583	3400	1600			1757	1583		1783	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1600	1583	3400	1600			1757	1583		1783	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	999	61	96	1464	14	174	1	216	9	1	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	999	61	96	1478	0	0	175	216	0	10	5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	3%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	1.0	92.1	92.1	7.4	98.2			29.8	29.8		3.0	3.0
Effective Green, g (s)	1.0	94.1	94.1	7.1	100.2			29.8	29.8		3.0	3.0
Actuated g/C Ratio	0.01	0.63	0.63	0.05	0.67			0.20	0.20		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	12	1004	993	161	1069			349	314		36	32
v/s Ratio Prot	0.00	0.62		c0.03	c0.92			0.10			c0.01	
v/s Ratio Perm			0.04						c0.14			0.00
v/c Ratio	0.17	1.00	0.06	0.60	1.38			0.50	0.69		0.28	0.16
Uniform Delay, d1	74.1	27.7	10.8	70.0	24.9			53.5	55.8		72.4	72.3
Progression Factor	1.00	1.00	1.00	0.98	1.34			1.00	1.00		1.00	1.00
Incremental Delay, d2	6.5	27.2	0.1	0.5	172.7			1.1	6.1		4.2	2.3
Delay (s)	80.6	55.0	11.0	69.4	206.0			54.6	61.9		76.6	74.5
Level of Service	F	D	B	E	F			D	E		E	E
Approach Delay (s)		52.5			197.7			58.7			75.9	
Approach LOS		D			F			E			E	

Intersection Summary

HCM Average Control Delay	128.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1059	37	72	1320	1	115	1	149	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.97		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	1600	1583	3273	1600			1775	1542		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	1600	1583	3273	1600			1775	1542		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1151	40	78	1435	1	125	1	162	1	1	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1151	40	78	1436	0	0	126	162	0	2	1
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.2	104.8	104.8	10.5	114.1			12.3	12.3		5.3	5.3
Effective Green, g (s)	0.9	106.8	106.8	10.2	116.1			12.0	12.0		5.0	5.0
Actuated g/C Ratio	0.01	0.71	0.71	0.07	0.77			0.08	0.08		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	11	1139	1127	223	1238			142	123		61	53
v/s Ratio Prot	0.00	0.72		c0.02	c0.90			0.07			c0.00	
v/s Ratio Perm			0.03						c0.11			0.00
v/c Ratio	0.09	1.01	0.04	0.35	1.16			0.89	1.32		0.03	0.02
Uniform Delay, d1	74.1	21.6	6.4	66.7	17.0			68.3	69.0		70.2	70.1
Progression Factor	0.85	1.15	1.35	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4	19.3	0.0	0.7	81.3			43.3	188.7		0.2	0.1
Delay (s)	64.1	44.1	8.6	67.4	98.3			111.6	257.7		70.3	70.2
Level of Service	E	D	A	E	F			F	F		E	E
Approach Delay (s)		42.9			96.7			193.8			70.3	
Approach LOS		D			F			F			E	

Intersection Summary

HCM Average Control Delay	84.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	864	13	29	1294	630	17	25	40	324	17	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3200		1770	3200	1559	1656	1673		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3200		1770	3200	1559	1656	1673		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	939	14	32	1407	685	18	27	43	352	18	182
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	223	953	0	32	1407	685	18	70	0	352	18	182
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.8	42.9		2.2	36.3	50.6	4.0	4.0		14.3	14.3	14.3
Effective Green, g (s)	9.0	44.9		2.4	38.3	53.2	4.2	4.2		15.6	15.6	15.6
Actuated g/C Ratio	0.11	0.54		0.03	0.46	0.64	0.05	0.05		0.19	0.19	0.19
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	192	1729		51	1475	998	84	85		644	350	297
v/s Ratio Prot	c0.13	0.30		0.02	c0.44	c0.13	0.01	c0.04		0.10	0.01	
v/s Ratio Perm						0.31						0.11
v/c Ratio	1.16	0.55		0.63	0.95	0.69	0.21	0.82		0.55	0.05	0.61
Uniform Delay, d1	37.0	12.5		39.9	21.6	9.6	37.9	39.1		30.5	27.7	31.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	115.2	0.3		21.7	13.9	1.8	0.5	43.2		0.8	0.0	3.2
Delay (s)	152.2	12.8		61.6	35.5	11.4	38.3	82.3		31.3	27.7	34.2
Level of Service	F	B		E	D	B	D	F		C	C	C
Approach Delay (s)		39.3			28.1			73.3			32.1	
Approach LOS		D			C			E			C	

Intersection Summary

HCM Average Control Delay	33.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	83.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	925	10	7	1200	118	5	1	3	372	3	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1653		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1770	1653		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1005	11	8	1304	128	5	1	3	404	3	204
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	118	1005	11	8	1304	128	5	4	0	404	3	204
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	7.8	105.7	105.7	0.8	98.5	98.5	0.8	3.3		20.0	22.1	22.1
Effective Green, g (s)	8.0	107.7	107.7	0.8	100.5	100.5	1.0	3.3		20.0	22.3	22.3
Actuated g/C Ratio	0.05	0.73	0.73	0.01	0.68	0.68	0.01	0.02		0.14	0.15	0.15
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	96	1166	1154	10	1088	1076	12	37		465	281	239
v/s Ratio Prot	c0.07	0.63		0.00	c0.82		0.00	0.00		c0.12	0.00	
v/s Ratio Perm			0.01			0.08						c0.13
v/c Ratio	1.23	0.86	0.01	0.80	1.20	0.12	0.42	0.11		0.87	0.01	0.85
Uniform Delay, d1	69.9	14.6	5.5	73.4	23.7	8.2	73.1	70.8		62.6	53.4	61.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	165.7	7.2	0.0	169.7	98.4	0.1	35.8	1.3		15.7	0.0	24.9
Delay (s)	235.6	21.8	5.5	243.1	122.1	8.3	108.9	72.1		78.3	53.4	86.0
Level of Service	F	C	A	F	F	A	F	E		E	D	F
Approach Delay (s)		43.9			112.6			92.6			80.8	
Approach LOS		D			F			F			F	

Intersection Summary

HCM Average Control Delay	82.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	147.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	1176	64	13	1182	30	70	5	30	40	4	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1620			1781	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00			0.72	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1353	1620			1335	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	1278	70	14	1285	33	76	5	33	43	4	78
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	1278	70	14	1285	33	76	38	0	0	47	78
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	5.3	112.0	112.0	1.6	108.3	108.3	13.1	13.1			13.1	13.1
Effective Green, g (s)	5.0	114.0	114.0	1.3	110.3	110.3	13.2	13.2			13.2	13.2
Actuated g/C Ratio	0.04	0.81	0.81	0.01	0.79	0.79	0.09	0.09			0.09	0.09
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	63	1298	1284	16	1256	1243	127	152			125	149
v/s Ratio Prot	c0.04	c0.80		0.01	c0.80			0.02				
v/s Ratio Perm			0.04			0.02	c0.06				0.04	0.05
v/c Ratio	1.03	0.98	0.05	0.88	1.02	0.03	0.60	0.25			0.38	0.52
Uniform Delay, d1	67.8	12.4	2.6	69.5	15.1	3.3	61.1	59.1			59.8	60.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	122.5	21.2	0.0	161.3	31.4	0.0	7.4	0.9			1.9	3.3
Delay (s)	190.3	33.6	2.6	230.8	46.5	3.3	68.5	59.9			61.7	63.9
Level of Service	F	C	A	F	D	A	E	E			E	E
Approach Delay (s)		39.3			47.4			65.6			63.1	
Approach LOS		D			D			E			E	

Intersection Summary

HCM Average Control Delay	44.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	140.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1105	140	208	1008	217	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	3433	1600	1770	1546
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	3433	1600	1770	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1201	152	226	1096	236	414
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1201	152	226	1096	236	414
Confl. Peds. (#/hr)			1		1	1
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	86.0	86.0	8.3	98.0	32.3	32.3
Effective Green, g (s)	88.0	88.0	8.0	100.0	32.0	32.0
Actuated g/C Ratio	0.63	0.63	0.06	0.71	0.23	0.23
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1006	995	196	1143	405	353
v/s Ratio Prot	c0.75		c0.07	0.69	0.13	
v/s Ratio Perm		0.10				c0.27
v/c Ratio	1.19	0.15	1.15	0.96	0.58	1.17
Uniform Delay, d1	26.0	10.7	66.0	18.1	48.1	54.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	97.1	0.1	111.6	17.4	2.1	103.7
Delay (s)	123.1	10.7	177.6	35.5	50.2	157.7
Level of Service	F	B	F	D	D	F
Approach Delay (s)	110.5			59.8	118.7	
Approach LOS	F			E	F	

Intersection Summary

HCM Average Control Delay	91.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1365	121	157	1134	7	82	1	161	4	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1600	1583	3433	1600			1775	1568		1791	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1600	1583	3433	1600			1775	1568		1791	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1484	132	171	1233	8	89	1	175	4	1	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1484	132	171	1241	0	0	90	175	0	5	4
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	0.8	92.5	92.5	11.7	103.1			25.4	25.4		2.7	2.7
Effective Green, g (s)	0.8	94.5	94.5	11.4	105.1			25.4	25.4		2.7	2.7
Actuated g/C Ratio	0.01	0.63	0.63	0.08	0.70			0.17	0.17		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	9	1008	997	261	1121			301	266		32	28
v/s Ratio Prot	0.00	c0.93		c0.05	c0.78			0.05			c0.00	
v/s Ratio Perm			0.08						c0.11			0.00
v/c Ratio	0.11	1.47	0.13	0.66	1.11			0.30	0.66		0.16	0.14
Uniform Delay, d1	74.2	27.8	11.2	67.4	22.4			54.5	58.2		72.5	72.5
Progression Factor	1.00	1.00	1.00	1.04	0.72			1.00	1.00		1.00	1.00
Incremental Delay, d2	5.4	217.9	0.3	1.3	51.8			0.6	5.8		2.3	2.3
Delay (s)	79.7	245.7	11.5	71.3	68.0			55.1	64.0		74.8	74.9
Level of Service	E	F	B	E	E			E	E		E	E
Approach Delay (s)		226.5			68.4			61.0			74.8	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM Average Control Delay	145.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

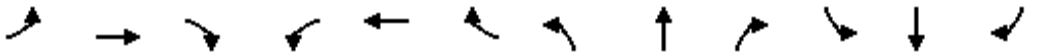
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	1422	116	156	1215	1	74	2	114	1	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.97		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	1600	1583	3273	1600			1776	1539		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	1600	1583	3273	1600			1776	1539		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1546	126	170	1321	1	80	2	124	1	1	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1546	126	170	1322	0	0	82	124	0	2	2
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.3	100.8	100.8	17.5	117.0			9.3	9.3		5.3	5.3
Effective Green, g (s)	1.0	102.8	102.8	17.2	119.0			9.0	9.0		5.0	5.0
Actuated g/C Ratio	0.01	0.69	0.69	0.11	0.79			0.06	0.06		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	12	1097	1085	375	1269			107	92		61	53
v/s Ratio Prot	0.00	c0.97		c0.05	c0.83			0.05			0.00	
v/s Ratio Perm			0.08						c0.08			c0.00
v/c Ratio	0.17	1.41	0.12	0.45	1.04			0.77	1.35		0.03	0.04
Uniform Delay, d1	74.1	23.6	8.1	62.0	15.5			69.5	70.5		70.2	70.2
Progression Factor	1.13	1.46	0.95	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	184.7	0.0	0.6	36.8			26.3	212.4		0.2	0.2
Delay (s)	84.3	219.1	7.7	62.6	52.3			95.8	282.9		70.3	70.4
Level of Service	F	F	A	E	D			F	F		E	E
Approach Delay (s)		203.0			53.5			208.4			70.4	
Approach LOS		F			D			F			E	

Intersection Summary

HCM Average Control Delay	137.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	752	3	2	1156	394	9	2	5	113	1	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1583	1770	1663		3433	1863	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1583	1770	1663		3433	1863	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	275	817	3	2	1257	428	10	2	5	123	1	151
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	275	817	3	2	1257	428	10	7	0	123	1	151
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	25.0	81.7	81.7	0.6	57.1	57.1	1.2	2.6		16.7	17.7	17.7
Effective Green, g (s)	25.2	83.7	83.7	0.6	59.1	59.1	1.4	2.6		16.7	17.9	17.9
Actuated g/C Ratio	0.21	0.70	0.70	0.01	0.49	0.49	0.01	0.02		0.14	0.15	0.15
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	373	1120	1108	9	1581	782	21	36		479	279	235
v/s Ratio Prot	0.16	c0.51		0.00	c0.39		0.01	0.00		c0.04	0.00	
v/s Ratio Perm			0.00			0.27						c0.10
v/c Ratio	0.74	0.73	0.00	0.22	0.80	0.55	0.48	0.19		0.26	0.00	0.64
Uniform Delay, d1	44.1	11.0	5.4	59.3	25.2	21.0	58.7	57.5		45.9	43.3	47.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.4	2.7	0.0	12.1	3.2	1.2	26.6	2.6		0.3	0.0	6.2
Delay (s)	52.5	13.8	5.4	71.4	28.4	22.2	85.3	60.1		46.2	43.3	54.0
Level of Service	D	B	A	E	C	C	F	E		D	D	D
Approach Delay (s)		23.5			26.9			75.0			50.5	
Approach LOS		C			C			E			D	

Intersection Summary

HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	119.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	792	46	21	1423	32	51	2	28	29	1	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1548	1770	1582			1775	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.74	1.00			0.71	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1548	1370	1582			1320	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	861	50	23	1547	35	55	2	30	32	1	84
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	35	861	50	23	1547	35	55	32	0	0	33	84
Confl. Peds. (#/hr)				1		1			1	1		
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	2.4	47.6	47.6	1.4	46.6	46.6	7.6	7.6			7.6	7.6
Effective Green, g (s)	2.1	49.6	49.6	1.1	48.6	48.6	7.7	7.7			7.7	7.7
Actuated g/C Ratio	0.03	0.70	0.70	0.02	0.69	0.69	0.11	0.11			0.11	0.11
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	53	1127	1115	28	2209	1069	150	173			144	173
v/s Ratio Prot	c0.02	c0.54		0.01	0.48			0.02				
v/s Ratio Perm			0.03			0.02	0.04				0.02	c0.05
v/c Ratio	0.66	0.76	0.04	0.82	0.70	0.03	0.37	0.18			0.23	0.49
Uniform Delay, d1	33.8	6.7	3.2	34.6	6.5	3.5	29.1	28.5			28.6	29.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	26.8	3.3	0.0	96.0	1.1	0.0	1.5	0.5			0.8	2.1
Delay (s)	60.5	10.0	3.2	130.5	7.6	3.5	30.6	29.0			29.5	31.6
Level of Service	E	A	A	F	A	A	C	C			C	C
Approach Delay (s)		11.5			9.3			30.0			31.0	
Approach LOS		B			A			C			C	

Intersection Summary

HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	723	136	237	1270	206	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	3433	3200	1770	1563
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	3433	3200	1770	1563
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	786	148	258	1380	224	266
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	786	148	258	1380	224	266
Confl. Peds. (#/hr)			1		1	1
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	20.3	20.3	9.8	33.8	19.4	19.4
Effective Green, g (s)	22.3	22.3	9.5	35.8	19.1	19.1
Actuated g/C Ratio	0.35	0.35	0.15	0.57	0.30	0.30
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1134	561	518	1821	537	475
v/s Ratio Prot	0.25		0.08	c0.43	0.13	
v/s Ratio Perm		0.09				c0.17
v/c Ratio	0.69	0.26	0.50	0.76	0.42	0.56
Uniform Delay, d1	17.4	14.5	24.5	10.3	17.5	18.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.2	0.6	1.8	0.5	1.5
Delay (s)	19.1	14.6	25.1	12.0	18.0	19.9
Level of Service	B	B	C	B	B	B
Approach Delay (s)	18.4			14.1	19.0	
Approach LOS	B			B	B	

Intersection Summary

HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	62.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	919	56	88	1347	13	160	1	199	8	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	3200	1583	3400	3200			1757	1583		1783	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	3200	1583	3400	3200			1757	1583		1783	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	999	61	96	1464	14	174	1	216	9	1	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	999	61	96	1478	0	0	175	216	0	10	5
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	3%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	1.3	94.6	94.6	9.1	102.1			25.6	25.6		3.0	3.0
Effective Green, g (s)	1.3	96.6	96.6	8.8	104.1			25.6	25.6		3.0	3.0
Actuated g/C Ratio	0.01	0.64	0.64	0.06	0.69			0.17	0.17		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	15	2061	1019	199	2221			300	270		36	32
v/s Ratio Prot	0.00	0.31		c0.03	c0.46			0.10			c0.01	
v/s Ratio Perm			0.04						c0.14			0.00
v/c Ratio	0.13	0.48	0.06	0.48	0.67			0.58	0.80		0.28	0.16
Uniform Delay, d1	73.8	13.8	9.9	68.4	13.0			57.3	59.7		72.4	72.3
Progression Factor	1.00	1.00	1.00	0.86	1.74			1.00	1.00		1.00	1.00
Incremental Delay, d2	4.0	0.8	0.1	1.1	1.3			2.9	15.5		4.2	2.3
Delay (s)	77.8	14.6	10.0	59.9	24.0			60.2	75.2		76.6	74.5
Level of Service	E	B	A	E	C			E	E		E	E
Approach Delay (s)		14.5			26.2			68.5			75.9	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1059	37	72	1320	1	115	1	149	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3200	1583	3273	3200			1775	1546		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	3200	1583	3273	3200			1775	1546		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1151	40	78	1435	1	125	1	162	1	1	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1151	40	78	1436	0	0	126	162	0	2	1
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.2	98.9	98.9	8.5	106.2			20.2	20.2		5.3	5.3
Effective Green, g (s)	0.9	100.9	100.9	8.2	108.2			19.9	19.9		5.0	5.0
Actuated g/C Ratio	0.01	0.67	0.67	0.05	0.72			0.13	0.13		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	11	2153	1065	179	2308			235	205		61	53
v/s Ratio Prot	0.00	0.36		c0.02	c0.45			0.07			c0.00	
v/s Ratio Perm			0.03						c0.10			0.00
v/c Ratio	0.09	0.53	0.04	0.44	0.62			0.54	0.79		0.03	0.02
Uniform Delay, d1	74.1	12.5	8.2	68.7	10.6			60.7	63.0		70.2	70.1
Progression Factor	0.80	1.12	1.37	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	3.1	0.8	0.1	1.2	1.3			1.8	17.9		0.2	0.1
Delay (s)	62.4	14.9	11.3	69.9	11.8			62.6	80.9		70.3	70.2
Level of Service	E	B	B	E	B			E	F		E	E
Approach Delay (s)		14.8			14.8			72.9			70.3	
Approach LOS		B			B			E			E	

Intersection Summary

HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	925	10	7	1200	118	5	1	3	372	3	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1583	1770	1653		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1583	1770	1653		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1005	11	8	1304	128	5	1	3	404	3	204
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	118	1005	11	8	1304	128	5	4	0	404	3	204
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	14.7	84.3	84.3	0.6	70.0	70.0	0.6	2.7		20.8	22.5	22.5
Effective Green, g (s)	14.9	86.3	86.3	0.6	72.0	72.0	0.8	2.7		20.8	22.7	22.7
Actuated g/C Ratio	0.12	0.68	0.68	0.00	0.57	0.57	0.01	0.02		0.16	0.18	0.18
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	209	1092	1081	8	1823	902	11	35		565	335	284
v/s Ratio Prot	c0.07	c0.63		0.00	0.41		0.00	0.00		c0.12	0.00	
v/s Ratio Perm			0.01			0.08						c0.13
v/c Ratio	0.56	0.92	0.01	1.00	0.72	0.14	0.45	0.11		0.72	0.01	0.72
Uniform Delay, d1	52.7	17.1	6.4	62.9	19.8	12.7	62.6	60.7		50.0	42.6	48.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.9	12.7	0.0	318.2	1.6	0.1	43.9	1.5		4.3	0.0	8.7
Delay (s)	57.6	29.8	6.4	381.1	21.3	12.9	106.5	62.1		54.3	42.6	57.5
Level of Service	E	C	A	F	C	B	F	E		D	D	E
Approach Delay (s)		32.5			22.6			86.8			55.3	
Approach LOS		C			C			F			E	

Intersection Summary

HCM Average Control Delay	32.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	126.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	1176	64	13	1182	30	70	5	30	40	4	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	1600	1583	1770	3200	1583	1770	1620			1781	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00			0.72	1.00
Satd. Flow (perm)	1770	1600	1583	1770	3200	1583	1353	1620			1335	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	1278	70	14	1285	33	76	5	33	43	4	78
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	1278	70	14	1285	33	76	38	0	0	47	78
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	8.4	107.5	107.5	1.5	100.6	100.6	12.8	12.8			12.8	12.8
Effective Green, g (s)	8.1	109.5	109.5	1.2	102.6	102.6	12.9	12.9			12.9	12.9
Actuated g/C Ratio	0.06	0.81	0.81	0.01	0.76	0.76	0.10	0.10			0.10	0.10
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	106	1292	1278	16	2421	1198	129	154			127	151
v/s Ratio Prot	c0.04	c0.80		0.01	0.40			0.02				
v/s Ratio Perm			0.04			0.02	c0.06				0.04	0.05
v/c Ratio	0.61	0.99	0.05	0.88	0.53	0.03	0.59	0.25			0.37	0.52
Uniform Delay, d1	62.2	12.5	2.6	67.1	6.7	4.1	58.8	56.8			57.5	58.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	10.1	22.2	0.0	161.3	0.3	0.0	6.7	0.8			1.8	3.0
Delay (s)	72.3	34.7	2.7	228.4	7.0	4.1	65.5	57.7			59.4	61.3
Level of Service	E	C	A	F	A	A	E	E			E	E
Approach Delay (s)		34.9			9.3			62.9			60.6	
Approach LOS		C			A			E			E	

Intersection Summary

HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	135.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1105	140	208	1008	217	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	3433	3200	1770	1561
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	3433	3200	1770	1561
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1201	152	226	1096	236	414
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1201	152	226	1096	236	414
Confl. Peds. (#/hr)			1		1	1
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	52.3	52.3	13.3	69.3	39.1	39.1
Effective Green, g (s)	54.3	54.3	13.0	71.3	38.8	38.8
Actuated g/C Ratio	0.46	0.46	0.11	0.60	0.33	0.33
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1471	728	378	1932	582	513
v/s Ratio Prot	c0.38		0.07	c0.34	0.13	
v/s Ratio Perm		0.10				c0.27
v/c Ratio	0.82	0.21	0.60	0.57	0.41	0.81
Uniform Delay, d1	27.6	19.1	50.1	14.1	30.7	36.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	0.1	2.1	0.3	0.5	9.0
Delay (s)	31.1	19.2	52.2	14.4	31.2	45.3
Level of Service	C	B	D	B	C	D
Approach Delay (s)	29.8			20.9	40.2	
Approach LOS	C			C	D	

Intersection Summary

HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	118.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	1365	121	157	1134	7	82	1	161	4	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	3200	1583	3433	3200			1775	1568		1791	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	3200	1583	3433	3200			1775	1568		1791	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1484	132	171	1233	8	89	1	175	4	1	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1484	132	171	1241	0	0	90	175	0	5	4
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	1.2	95.5	95.5	12.3	106.3			21.8	21.8		2.7	2.7
Effective Green, g (s)	1.2	97.5	97.5	12.0	108.3			21.8	21.8		2.7	2.7
Actuated g/C Ratio	0.01	0.65	0.65	0.08	0.72			0.15	0.15		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	14	2080	1029	275	2310			258	228		32	28
v/s Ratio Prot	0.00	c0.46		c0.05	0.39			0.05			c0.00	
v/s Ratio Perm			0.08						c0.11			0.00
v/c Ratio	0.07	0.71	0.13	0.62	0.54			0.35	0.77		0.16	0.14
Uniform Delay, d1	73.8	17.1	10.0	66.8	9.5			57.7	61.7		72.5	72.5
Progression Factor	1.00	1.00	1.00	1.14	0.65			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.2	2.1	0.3	3.2	0.8			0.8	14.3		2.3	2.3
Delay (s)	76.0	19.3	10.3	79.1	7.0			58.5	76.0		74.8	74.9
Level of Service	E	B	B	E	A			E	E		E	E
Approach Delay (s)		18.6			15.7			70.0			74.8	
Approach LOS		B			B			E			E	

Intersection Summary

HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	1422	116	156	1215	1	74	2	114	1	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3200	1583	3273	3200			1776	1544		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	3200	1583	3273	3200			1776	1544		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1546	126	170	1321	1	80	2	124	1	1	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1546	126	170	1322	0	0	82	124	0	2	2
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.3	99.3	99.3	12.7	110.7			15.6	15.6		5.3	5.3
Effective Green, g (s)	1.0	101.3	101.3	12.4	112.7			15.3	15.3		5.0	5.0
Actuated g/C Ratio	0.01	0.68	0.68	0.08	0.75			0.10	0.10		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	12	2161	1069	271	2404			181	157		61	53
v/s Ratio Prot	0.00	c0.48		c0.05	0.41			0.05			0.00	
v/s Ratio Perm			0.08						c0.08			c0.00
v/c Ratio	0.17	0.72	0.12	0.63	0.55			0.45	0.79		0.03	0.04
Uniform Delay, d1	74.1	15.3	8.6	66.6	7.9			63.4	65.8		70.2	70.2
Progression Factor	1.16	1.60	1.13	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	4.7	1.5	0.2	3.9	0.9			1.3	22.0		0.2	0.2
Delay (s)	90.3	26.0	9.9	70.5	8.8			64.7	87.7		70.3	70.4
Level of Service	F	C	A	E	A			E	F		E	E
Approach Delay (s)		24.8			15.8			78.6			70.4	
Approach LOS		C			B			E			E	

Intersection Summary

HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

TRIP GENERATION FOR CUMULATIVE PROJECTS

PROJECT	SIZE	DAILY TRIP RATE	DAILY TRIPS	AM PEAK HOUR PEAK HOUR VOL.	AM PEAK HOUR (% OF DAILY)	AM PEAK HOUR IN	AM PEAK HOUR OUT	PM PEAK HOUR PEAK HOUR VOL.	PM PEAK HOUR (% OF DAILY)	PM PEAK HOUR IN	PM PEAK HOUR OUT
City of Marina:											
1. K-8 School	850 Students		1,377	451	(33%)	248	203	128	(9%)	66	62
2. MBEST [2]	- -	-	16,894	1,155	(7%)	902	253	1,813	(11%)	603	1,210
3. CSUMB Students (2010-2025) [3]	6,389 Students	-	5,967	529	(9%)	423	106	529	(9%)	159	370
4. Dunes at Monterey Bay (University Villages) [4]											
Phases 2, 3, and Opportunity Phases	- -	-	66,345	4,328	(7%)	2,918	1,410	6,578	(10%)	2,858	3,720
City of Seaside:											
5. Ord Military Housing											
Seaside Development Area	- -	-	4,505	147	(3%)	65	82	410	(9%)	210	200
6. The Strand at Seaside [5]	- -	-	22,749	568	(2%)	341	227	1,828	(8%)	874	954
7. Del Monte Hotel	98 Rooms	8.23	807	51	(5%)	28	23	60	(6%)	35	25
8. Seaside Auto Center Redevelopment [6]	- -	-	-	-		-	-	-		-	-
9. Plaza de Espritu (Commercial/Retail) [7]	4,709 S.F.	44.32	209	6	(3%)	4	2	13	(6%)	6	7
10. Laguna Grande Plaza (Commercial/Retail) [7]	6,941 S.F.	44.32	308	9	(3%)	5	4	19	(6%)	8	11
11. Diaz Restaurants	2,000 S.F.	127.15	254	23	(9%)	12	11	22	(9%)	13	9
12. Ahmed Ali Retail Store	6,464 S.F.	44.32	286	9	(3%)	5	4	18	(6%)	8	10
13. West Broadway Corridor [8]											
Retail Commercial	50,000 S.F.	40.67	2,034	-	(-)	-	-	130	(6%)	56	74
Professional Office	50,000 S.F.	-	779	42	(3%)	37	5	135	(17%)	23	112
Multi Family Residential	100 Units	6.63	663	51	(3%)	10	41	62	(9%)	42	20
High-Turnover Sit-down Restaurant	220 Seats	4.83	1,063	103	(3%)	54	49	92	(9%)	53	39
City of Sand City:											
14. Monterey Bay Shores [9]											
Hotel with Conference Center & Restaurant	217 Rooms	8.92	1,936	145	(15%)	84	61	152	(17%)	74	78
Vacation Rentals [10]	100 Units	8.13	813	64	(3%)	16	48	81	(6%)	51	30
Condos	45 Units	5.86	264	20	(7%)	3	17	23	(10%)	15	8
Resort Condos	133 Units	5.86	779	59	(3%)	10	49	69	(21%)	46	23
15. Collections on Monterey Bay	150 Rooms [11]	8.23	1,235	78	(15%)	43	35	92	(17%)	53	39
16. South of Tioga (The Orosco Group) [12]											
Apartments	30 Units	6.72	202	15	(7%)	3	12	19	(9%)	12	7
Commercial/Retail	20,000 S.F.	44.32	886	27	(3%)	16	11	54	(6%)	24	30
Office	20,000 S.F.	11.01	220	31	(14%)	27	4	30	(14%)	5	25
City of Del Rey Oaks:											
17. The Resort at Del Rey Oaks	- -	-	9,773	553	(6%)	226	327	751	(8%)	423	328
City of Monterey											
18. Ryan Ranch Business Park											
101 Wilson Road (Medical Offices) [13]	26,453 S.F.	-	867	66	(8%)	52	14	91	(10%)	25	66
1 Ryan Court (Office/Indust. Research)	45,760 S.F.	11.01	504	71	(14%)	62	9	68	(13%)	12	56
19. 2711 Garden Road (Office)	23,080 S.F.	11.01	254	36	(14%)	32	4	34	(13%)	6	28
Unincorporated Monterey County:											
20. East Garrison [14]	- -	-	12,392	865	(7%)	112	753	1,130	(9%)	717	413
21. Monterey Horse Park [15]	- -	-	1,507	151	(10%)	132	19	204	(14%)	20	184
22. Corral De Tierra Shopping Center [16]	Mixed Use	-	5,100	95	(2%)	63	32	235	(5%)	108	127
23. Wang Subdivision [17]											
Single-Family Homes	23 Units	9.57	220	17	(8%)	4	13	23	(10%)	14	9
Inclusionary Housing	6 Units	5.86	35	3	(9%)	1	2	3	(9%)	2	1
24. Ferrini Ranch											
Single-Family Homes	212 Units	9.57	2,030	159	(8%)	40	119	213	(10%)	134	79
Wine Tasting [19]	15,000 S.F.	-	362	56	(15%)	47	9	89	(25%)	31	58
25. Laguna Seca Business Park											
Laguna Seca Villas (Condominiums) [18]	104 Units	-	664	53	(8%)	9	44	62	(9%)	42	20
26. Salinas Ag-Industrial Center [19]	257 Acres	-	16,219	2,198	(14%)	1,665	533	2,272	(14%)	662	1,610
Carmel Valley:											
27. September Ranch	110 Units	9.57	1,053	83	(8%)	21	62	111	(11%)	70	41
28. Rancho Canada	281 Units	9.57	2,689	211	(8%)	53	158	284	(11%)	179	105
TOTAL CUMULATIVE PROJECTS			184,243	12,528	(7%)	7,773	4,755	17,927	(10%)	7,739	10,188

Notes:

1. Traffic volumes are based on trip generation rates quoted by the Institute of Transportation Engineers, *Trip Generation*, 6th Edition, 1997, and 7th Edition, 2003, unless otherwise noted.
2. *Unversity of California Monterey Bay Education, Science and Technology Center (UCMBEST Center) Traffic Analysis Report*, Higgins Associates, October 31, 2003. Assumes 25% of project is built out by year 2015, with remaining 75% built out over the following 15-20 years.
3. Trip generation from *California State University at Monterey Bay (CSUMB) 2004 Master Plan Update Traffic Impact Study Report*, Higgins Associates, July 26, 2004.
4. Trip generation from *Marina University Villages Mixed Use Development Traffic Impact Study Report*, Higgins Associates, December 17, 2004.
5. The Strand at Seaside is a shopping center that includes a 250 room hotel and may include a multi-screen movie theater.
6. Seaside Auto Center Redevelopment would only reconfigure the access roadways to the auto center, and reconstruct the internal roadways.
7. ITE does not provide AM peak hour trip rates for the "specialty retail" land use. Rates used here are published by San Diego Association of Governments, *Brief Guilde of Vehicular Traffic Generation Rates for the San Diego Region*, July 1998.
8. Exact definition of project unknown. Analysis assumes definition within the report *Seaside Redevelopment Agency Grant Application Technical Supporting Information Associated with Traffic, Higgins Associates, April 29, 2002.*
9. Although project has been approved by the City of Sand City, its construction has been halted by the California Coastal Commission; therefore, its construction timeline is unknown. For that reason, this project is analyzed as a cumulative project.
10. Trip generation rates for Vacation Rentals assumes 85 percent of Single Family Detached Housing rates for the daily and AM peak hour and assumes 10 percent of the reduced daily rate as the PM peak hour rate.
11. Exact size of projects unknown. Analysis assumes 150 hotel rooms.
12. City of Sand City anticipating application submittal in near future, but uncertain of exact project definition. Analysis assumes project identical to "Design Center" (Approved project #28).
13. Daily and PM peak hour trip generation based upon fitted curve equations, rather than any specific trip generation rates.
14. Full buildout of East Garrison development will not occur until 2030. Fifty percent of the development is assumed to be constructed by the year 2015. Trip generation represents trips external to the development itself.
15. Letter to D. Munn, *Monterey Horse Park, Monterey County, California - Estimated Trip Generation of Proposed New Facility*, Higgins Associates, January 14, 2004.
16. AM and PM peak hour trip generation from *Corral De Tierra Mixed Use Devlopment Final Traffic Report*, Hexagon Transportation Consultants, April 8, 2005. Daily trip generation estimated, based upon trip generation assumptions utilized in peak hour trip generation derivation in said report.
17. Trip generation from *Wang Subdivision Traffic Impact Analysis*, Higgins Associates, December 21, 2005.
18. Daily, AM peak hour, and PM peak hour trip generation for the Laguna Seca Villas project taken from Laguna Seca Villas Initial Study, Monterey County Planning and Building Inspection Department, March 2006. Inbound and outbound distributions derived from ITE's *Trip Generation* (Source #1), above.
19. Trip generation for the Salinas Ag-Industrial Center project taken from *Salinas Ag-Industrial Center Traffic Impact Analysis Draft Report*, Higgins Associates, September 2, 2008.

Appendix H

Intersection Level of Service Calculation Worksheets

Cumulative Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	188	1567	13	18	1420	424	16	12	27	416	25	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3200		1770	3200	1568	1770	1670		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3200		1770	3200	1568	1770	1670		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	204	1703	14	20	1543	461	17	13	29	452	27	300
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	204	1717	0	20	1543	461	17	42	0	452	27	300
Heavy Vehicles (%)	2%	2%	2%	2%	4%	3%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	7.9	38.9		0.7	31.7	49.8	2.2	2.2		18.1	18.1	18.1
Effective Green, g (s)	8.1	40.9		0.9	33.7	52.4	2.4	2.4		19.4	19.4	19.4
Actuated g/C Ratio	0.10	0.51		0.01	0.42	0.66	0.03	0.03		0.24	0.24	0.24
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	180	1644		20	1355	1032	53	50		837	454	386
v/s Ratio Prot	c0.12	0.54		0.01	c0.48	0.11	0.01	c0.03		0.13	0.01	
v/s Ratio Perm						0.19						c0.19
v/c Ratio	1.13	1.04		1.00	1.14	0.45	0.32	0.84		0.54	0.06	0.78
Uniform Delay, d1	35.7	19.3		39.3	22.9	6.6	37.8	38.4		26.2	23.1	28.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	107.5	34.8		201.2	71.9	0.2	1.3	68.8		0.6	0.0	9.1
Delay (s)	143.2	54.1		240.6	94.9	6.8	39.1	107.2		26.8	23.1	37.2
Level of Service	F	D		F	F	A	D	F		C	C	D
Approach Delay (s)		63.6			76.2			87.6			30.7	
Approach LOS		E			E			F			C	

Intersection Summary

HCM Average Control Delay	63.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	1001	4	3	1502	564	13	10	8	252	2	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1737		3433	1863	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1770	1737		3433	1863	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	1088	4	3	1633	613	14	11	9	274	2	186
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	370	1088	4	3	1633	613	14	20	0	274	2	186
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	20.8	110.6	110.6	0.8	90.4	90.4	1.5	8.7		12.4	19.2	19.2
Effective Green, g (s)	21.0	112.6	112.6	0.8	92.4	92.4	1.7	8.7		12.4	19.4	19.4
Actuated g/C Ratio	0.14	0.75	0.75	0.01	0.61	0.61	0.01	0.06		0.08	0.13	0.13
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	247	1197	1184	9	982	972	20	100		283	240	202
v/s Ratio Prot	c0.21	0.68		0.00	c1.02		0.01	0.01		c0.08	0.00	
v/s Ratio Perm			0.00			0.39						c0.12
v/c Ratio	1.50	0.91	0.00	0.33	1.66	0.63	0.70	0.20		0.97	0.01	0.92
Uniform Delay, d1	64.8	14.9	4.8	74.6	29.0	18.3	74.1	67.6		68.9	57.2	64.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	244.2	10.5	0.0	20.6	302.8	1.7	81.3	1.0		44.3	0.0	42.1
Delay (s)	309.0	25.4	4.8	95.2	331.9	20.0	155.4	68.6		113.1	57.2	106.9
Level of Service	F	C	A	F	F	B	F	E		F	E	F
Approach Delay (s)		97.1			246.6			104.3			110.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	178.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.50		
Actuated Cycle Length (s)	150.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	121.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	1166	56	26	1922	55	64	2	37	33	1	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1545	1770	1562			1772	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00			0.71	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1545	1365	1562			1325	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	1267	61	28	2089	60	70	2	40	36	1	90
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	42	1267	61	28	2089	60	70	42	0	0	37	90
Confl. Peds. (#/hr)				1		1			1	1		
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	4.0	109.0	109.0	3.8	108.8	108.8	13.1	13.1			13.1	13.1
Effective Green, g (s)	3.7	111.0	111.0	3.5	110.8	110.8	13.2	13.2			13.2	13.2
Actuated g/C Ratio	0.03	0.79	0.79	0.03	0.79	0.79	0.09	0.09			0.09	0.09
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	47	1271	1258	44	1269	1225	129	148			125	150
v/s Ratio Prot	c0.02	0.79		0.02	c1.31			0.03				
v/s Ratio Perm			0.04			0.04	0.05				0.03	c0.06
v/c Ratio	0.89	1.00	0.05	0.64	1.65	0.05	0.54	0.28			0.30	0.60
Uniform Delay, d1	67.8	14.2	3.1	67.5	14.4	3.1	60.4	58.9			58.9	60.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	91.2	24.3	0.0	26.4	294.3	0.0	4.6	1.1			1.3	6.6
Delay (s)	159.0	38.5	3.1	93.9	308.8	3.1	65.0	59.9			60.2	67.3
Level of Service	F	D	A	F	F	A	E	E			E	E
Approach Delay (s)		40.6			297.6			63.1			65.3	
Approach LOS		D			F			E			E	

Intersection Summary

HCM Average Control Delay	189.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	139.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1063	173	293	1741	262	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	3433	1600	1770	1546
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	3433	1600	1770	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1155	188	318	1892	285	329
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1155	188	318	1892	285	329
Confl. Peds. (#/hr)			1		1	1
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	74.9	74.9	12.4	91.0	19.3	19.3
Effective Green, g (s)	76.9	76.9	12.1	93.0	19.0	19.0
Actuated g/C Ratio	0.64	0.64	0.10	0.78	0.16	0.16
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1025	1014	346	1240	280	245
v/s Ratio Prot	0.72		0.09	c1.18	0.16	
v/s Ratio Perm		0.12				c0.21
v/c Ratio	1.13	0.19	0.92	1.53	1.02	1.34
Uniform Delay, d1	21.5	8.8	53.5	13.5	50.5	50.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	69.8	0.1	28.4	240.8	58.4	179.1
Delay (s)	91.4	8.8	81.9	254.3	108.9	229.6
Level of Service	F	A	F	F	F	F
Approach Delay (s)	79.8			229.4	173.6	
Approach LOS	E			F	F	

Intersection Summary

HCM Average Control Delay	173.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	112.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1258	102	169	1797	19	229	2	286	12	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1600	1583	3400	1600			1758	1583		1785	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1600	1583	3400	1600			1758	1583		1785	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	1367	111	184	1953	21	249	2	311	13	2	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	7	1367	111	184	1974	0	0	251	311	0	15	9
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	3%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	1.0	88.6	88.6	6.1	93.4			33.0	33.0		4.6	4.6
Effective Green, g (s)	1.0	90.6	90.6	5.8	95.4			33.0	33.0		4.6	4.6
Actuated g/C Ratio	0.01	0.60	0.60	0.04	0.64			0.22	0.22		0.03	0.03
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	12	966	956	131	1018			387	348		55	49
v/s Ratio Prot	0.00	0.85		c0.05	c1.23			0.14			c0.01	
v/s Ratio Perm			0.07						c0.20			0.01
v/c Ratio	0.58	1.42	0.12	1.40	1.94			0.65	0.89		0.27	0.18
Uniform Delay, d1	74.3	29.7	12.6	72.1	27.3			53.2	56.8		71.1	70.9
Progression Factor	1.00	1.00	1.00	0.98	1.32			1.00	1.00		1.00	1.00
Incremental Delay, d2	56.2	193.0	0.2	186.3	422.9			3.7	23.9		2.7	1.8
Delay (s)	130.5	222.7	12.9	256.7	459.0			56.9	80.7		73.7	72.7
Level of Service	F	F	B	F	F			E	F		E	E
Approach Delay (s)		206.5			441.7			70.1			73.3	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	307.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	121.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	1512	42	76	1853	2	130	2	178	2	2	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.97		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	1600	1583	3273	1600			1775	1542		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	1600	1583	3273	1600			1775	1542		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1643	46	83	2014	2	141	2	193	2	2	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1643	46	83	2016	0	0	143	193	0	4	2
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.3	104.1	104.1	11.0	113.8			12.3	12.3		5.5	5.5
Effective Green, g (s)	1.0	106.1	106.1	10.7	115.8			12.0	12.0		5.2	5.2
Actuated g/C Ratio	0.01	0.71	0.71	0.07	0.77			0.08	0.08		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	12	1132	1120	233	1235			142	123		63	55
v/s Ratio Prot	0.00	1.03		c0.03	c1.26			0.08			c0.00	
v/s Ratio Perm			0.03						c0.13			0.00
v/c Ratio	0.17	1.45	0.04	0.36	1.63			1.01	1.57		0.06	0.04
Uniform Delay, d1	74.1	22.0	6.6	66.4	17.1			69.0	69.0		70.0	70.0
Progression Factor	0.88	1.22	1.34	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	203.6	0.0	0.7	288.3			77.4	291.5		0.3	0.2
Delay (s)	66.2	230.5	8.9	67.1	305.4			146.4	360.5		70.4	70.2
Level of Service	E	F	A	E	F			F	F		E	E
Approach Delay (s)		224.2			296.0			269.4			70.3	
Approach LOS		F			F			F			E	

Intersection Summary

HCM Average Control Delay	264.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.56		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	118.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	292	1243	15	30	1758	565	19	30	42	309	20	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3200		1770	3200	1561	1656	1682		3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3200		1770	3200	1561	1656	1682		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	317	1351	16	33	1911	614	21	33	46	336	22	248
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	317	1367	0	33	1911	614	21	79	0	336	22	248
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split			Split		Perm
Protected Phases	5	2		1	6	7	8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.8	42.1		2.1	35.4	52.8	4.0	4.0		17.4	17.4	17.4
Effective Green, g (s)	9.0	44.1		2.3	37.4	55.4	4.2	4.2		18.7	18.7	18.7
Actuated g/C Ratio	0.11	0.52		0.03	0.44	0.65	0.05	0.05		0.22	0.22	0.22
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2		5.3	5.3	5.3
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0		2.5	2.5	2.5
Lane Grp Cap (vph)	187	1654		48	1403	1014	82	83		753	408	347
v/s Ratio Prot	c0.18	0.43		0.02	c0.60	0.13	0.01	c0.05		0.10	0.01	
v/s Ratio Perm						0.26						c0.16
v/c Ratio	1.70	0.83		0.69	1.36	0.61	0.26	0.95		0.45	0.05	0.71
Uniform Delay, d1	38.2	17.4		41.1	24.0	8.6	39.0	40.4		28.8	26.3	30.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	334.8	3.5		33.8	167.6	0.9	0.6	81.7		0.3	0.0	6.4
Delay (s)	372.9	20.8		74.9	191.6	9.5	39.6	122.2		29.1	26.4	37.2
Level of Service	F	C		E	F	A	D	F		C	C	D
Approach Delay (s)		87.1			146.4			104.8			32.3	
Approach LOS		F			F			F			C	

Intersection Summary

HCM Average Control Delay	111.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	85.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	1263	12	10	1529	240	7	5	5	489	5	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1723		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1770	1723		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	1373	13	11	1662	261	8	5	5	532	5	250
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	133	1373	13	11	1662	261	8	10	0	532	5	250
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	7.8	103.9	103.9	1.6	97.5	97.5	0.8	3.3		22.4	24.5	24.5
Effective Green, g (s)	8.0	105.9	105.9	1.6	99.5	99.5	1.0	3.3		22.4	24.7	24.7
Actuated g/C Ratio	0.05	0.71	0.71	0.01	0.67	0.67	0.01	0.02		0.15	0.17	0.17
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	95	1136	1124	19	1067	1056	12	38		515	308	262
v/s Ratio Prot	c0.08	0.86		0.01	c1.04		0.00	0.01		c0.15	0.00	
v/s Ratio Perm			0.01			0.16						c0.16
v/c Ratio	1.40	1.21	0.01	0.58	1.56	0.25	0.67	0.26		1.03	0.02	0.95
Uniform Delay, d1	70.6	21.6	6.3	73.5	24.8	9.9	73.9	71.8		63.4	52.1	61.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	231.6	102.3	0.0	36.3	255.6	0.2	102.1	3.7		48.4	0.0	43.1
Delay (s)	302.2	124.0	6.3	109.8	280.4	10.1	176.0	75.4		111.8	52.1	104.8
Level of Service	F	F	A	F	F	B	F	E		F	D	F
Approach Delay (s)		138.6			243.0			120.1			109.2	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	180.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	149.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	117.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	1613	78	23	1615	35	86	6	37	44	5	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	1600	1583	1770	1600	1583	1770	1625			1782	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00			0.71	1.00
Satd. Flow (perm)	1770	1600	1583	1770	1600	1583	1346	1625			1331	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	1753	85	25	1755	38	93	7	40	48	5	85
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	72	1753	85	25	1755	38	93	47	0	0	53	85
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	5.3	110.5	110.5	2.3	107.5	107.5	14.9	14.9			14.9	14.9
Effective Green, g (s)	5.0	112.5	112.5	2.0	109.5	109.5	15.0	15.0			15.0	15.0
Actuated g/C Ratio	0.04	0.80	0.80	0.01	0.77	0.77	0.11	0.11			0.11	0.11
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	63	1272	1259	25	1238	1225	143	172			141	168
v/s Ratio Prot	c0.04	c1.10		0.01	c1.10			0.03				
v/s Ratio Perm			0.05			0.02	c0.07				0.04	0.05
v/c Ratio	1.14	1.38	0.07	1.00	1.42	0.03	0.65	0.27			0.38	0.51
Uniform Delay, d1	68.2	14.5	3.1	69.8	16.0	3.7	60.7	58.2			58.9	59.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	157.6	175.2	0.0	180.0	192.7	0.0	10.1	0.9			1.7	2.4
Delay (s)	225.8	189.7	3.2	249.8	208.7	3.7	70.9	59.1			60.6	62.1
Level of Service	F	F	A	F	F	A	E	E			E	E
Approach Delay (s)		182.7			205.0			66.9			61.5	
Approach LOS		F			F			E			E	

Intersection Summary

HCM Average Control Delay	184.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	141.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	104.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1516	178	243	1397	276	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	1583	3433	1600	1770	1546
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1600	1583	3433	1600	1770	1546
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1648	193	264	1518	300	500
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1648	193	264	1518	300	500
Confl. Peds. (#/hr)			1		1	1
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	86.0	86.0	8.3	98.0	32.3	32.3
Effective Green, g (s)	88.0	88.0	8.0	100.0	32.0	32.0
Actuated g/C Ratio	0.63	0.63	0.06	0.71	0.23	0.23
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	3.0
Lane Grp Cap (vph)	1006	995	196	1143	405	353
v/s Ratio Prot	c1.03		0.08	c0.95	0.17	
v/s Ratio Perm		0.12				c0.32
v/c Ratio	1.64	0.19	1.35	1.33	0.74	1.42
Uniform Delay, d1	26.0	11.0	66.0	20.0	50.1	54.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	291.7	0.1	186.0	153.8	7.1	203.4
Delay (s)	317.7	11.1	252.0	173.8	57.3	257.4
Level of Service	F	B	F	F	E	F
Approach Delay (s)	285.6			185.4	182.3	
Approach LOS	F			F	F	

Intersection Summary

HCM Average Control Delay	226.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.58		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	1745	228	301	1480	10	154	2	311	6	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	1600	1583	3433	1600			1775	1568		1793	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	1600	1583	3433	1600			1775	1568		1793	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	1897	248	327	1609	11	167	2	338	7	2	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	1897	248	327	1620	0	0	169	338	0	9	7
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	0.8	92.6	92.6	5.3	96.8			31.5	31.5		2.9	2.9
Effective Green, g (s)	0.8	94.6	94.6	5.0	98.8			31.5	31.5		2.9	2.9
Actuated g/C Ratio	0.01	0.63	0.63	0.03	0.66			0.21	0.21		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	9	1009	998	114	1054			373	329		35	31
v/s Ratio Prot	0.00	c1.19		c0.10	1.01			0.10			c0.01	
v/s Ratio Perm			0.16						c0.22			0.00
v/c Ratio	0.33	1.88	0.25	2.87	1.54			0.45	1.03		0.26	0.23
Uniform Delay, d1	74.3	27.7	12.1	72.5	25.6			51.7	59.2		72.5	72.4
Progression Factor	1.00	1.00	1.00	1.04	0.77			1.00	1.00		1.00	1.00
Incremental Delay, d2	20.6	399.8	0.6	843.0	242.1			0.9	56.8		3.9	3.7
Delay (s)	94.9	427.5	12.7	918.2	261.9			52.6	116.1		76.4	76.1
Level of Service	F	F	B	F	F			D	F		E	E
Approach Delay (s)		379.2			372.1			94.9			76.3	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	343.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	125.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	1930	132	161	1703	2	85	3	122	2	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.97		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	1600	1583	3273	1600			1777	1539		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	1600	1583	3273	1600			1777	1539		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	2098	143	175	1851	2	92	3	133	2	2	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	2098	143	175	1853	0	0	95	133	0	4	3
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	1.3	100.9	100.9	17.2	116.8			9.3	9.3		5.5	5.5
Effective Green, g (s)	1.0	102.9	102.9	16.9	118.8			9.0	9.0		5.2	5.2
Actuated g/C Ratio	0.01	0.69	0.69	0.11	0.79			0.06	0.06		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	12	1098	1086	369	1267			107	92		63	55
v/s Ratio Prot	0.00	c1.31		c0.05	c1.16			0.05			c0.00	
v/s Ratio Perm			0.09						c0.09			0.00
v/c Ratio	0.25	1.91	0.13	0.47	1.46			0.89	1.45		0.06	0.05
Uniform Delay, d1	74.1	23.5	8.1	62.4	15.6			70.0	70.5		70.0	70.0
Progression Factor	1.10	1.26	0.86	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	410.1	0.0	0.7	212.5			52.5	251.2		0.3	0.3
Delay (s)	82.2	439.9	7.0	63.1	228.1			122.5	321.7		70.4	70.3
Level of Service	F	F	A	E	F			F	F		E	E
Approach Delay (s)		411.8			213.9			238.7			70.3	
Approach LOS		F			F			F			E	

Intersection Summary

HCM Average Control Delay	313.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.78		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	122.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	188	1567	13	18	1420	424	16	12	27	416	25	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.2	4.0	4.0	2.9
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3200		1770	3200	1568	1770	1863	1583	3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3200		1770	3200	1568	1770	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	204	1703	14	20	1543	461	17	13	29	452	27	300
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	28	0	0	47
Lane Group Flow (vph)	204	1717	0	20	1543	461	17	13	1	452	27	253
Heavy Vehicles (%)	2%	2%	2%	2%	4%	3%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split		Perm	Split		pm+ov
Protected Phases	5	2		1	6	7	8	8		7	7	5
Permitted Phases						6			8			7
Actuated Green, G (s)	6.5	54.6		0.7	48.8	65.2	2.3	2.3	2.3	16.4	16.4	22.9
Effective Green, g (s)	6.7	56.6		0.9	50.8	67.8	2.5	2.5	2.3	17.7	17.7	25.5
Actuated g/C Ratio	0.07	0.60		0.01	0.54	0.72	0.03	0.03	0.02	0.19	0.19	0.27
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2	4.2	5.3	5.3	4.2
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0	2.0	2.5	2.5	2.5
Lane Grp Cap (vph)	245	1933		17	1735	1135	47	50	39	648	352	431
v/s Ratio Prot	c0.06	c0.54		0.01	0.48	0.08	c0.01	0.01		c0.13	0.01	0.05
v/s Ratio Perm						0.22			0.00			0.11
v/c Ratio	0.83	0.89		1.18	0.89	0.41	0.36	0.26	0.02	0.70	0.08	0.59
Uniform Delay, d1	42.9	15.8		46.4	19.0	5.1	44.8	44.7	44.6	35.5	31.3	29.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.5	5.4		279.8	6.0	0.2	1.7	1.0	0.1	3.0	0.1	1.7
Delay (s)	63.5	21.2		326.2	24.9	5.2	46.5	45.7	44.7	38.5	31.3	31.2
Level of Service	E	C		F	C	A	D	D	D	D	C	C
Approach Delay (s)		25.7			23.4			45.4			35.5	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	93.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	1001	4	3	1502	564	13	10	8	252	2	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3200	1583	1770	3200	1583	1770	1737		3433	1863	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3200	1583	1770	3200	1583	1770	1737		3433	1863	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	1088	4	3	1633	613	14	11	9	274	2	186
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	370	1088	4	3	1633	613	14	20	0	274	2	186
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	10.9	60.9	60.9	0.7	50.5	50.5	1.5	6.0		11.4	15.5	15.5
Effective Green, g (s)	11.1	62.9	62.9	0.7	52.5	52.5	1.7	6.0		11.4	15.7	15.7
Actuated g/C Ratio	0.11	0.65	0.65	0.01	0.54	0.54	0.02	0.06		0.12	0.16	0.16
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	393	2075	1027	13	1732	857	31	107		403	302	254
v/s Ratio Prot	c0.11	0.34		0.00	c0.51		0.01	0.01		c0.08	0.00	
v/s Ratio Perm			0.00			0.39						c0.12
v/c Ratio	0.94	0.52	0.00	0.23	0.94	0.72	0.45	0.19		0.68	0.01	0.73
Uniform Delay, d1	42.6	9.1	6.0	47.9	20.8	16.7	47.2	43.2		41.1	34.1	38.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	31.3	0.4	0.0	8.9	11.1	3.3	17.0	0.8		4.5	0.0	10.7
Delay (s)	73.9	9.5	6.0	56.8	32.0	19.9	64.2	44.0		45.6	34.1	49.4
Level of Service	E	A	A	E	C	B	E	D		D	C	D
Approach Delay (s)		25.8			28.7			52.3			47.1	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	1166	56	26	1922	55	64	2	37	33	1	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3200	1583	1770	3200	1547	1770	1577			1774	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00			0.70	1.00
Satd. Flow (perm)	1770	3200	1583	1770	3200	1547	1365	1577			1304	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	1267	61	28	2089	60	70	2	40	36	1	90
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	42	1267	61	28	2089	60	70	42	0	0	37	90
Confl. Peds. (#/hr)				1		1			1	1		
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	3.0	68.3	68.3	3.6	68.9	68.9	9.0	9.0			9.0	9.0
Effective Green, g (s)	2.7	70.3	70.3	3.3	70.9	70.9	9.1	9.1			9.1	9.1
Actuated g/C Ratio	0.03	0.74	0.74	0.03	0.75	0.75	0.10	0.10			0.10	0.10
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	50	2376	1175	62	2396	1158	131	152			125	152
v/s Ratio Prot	c0.02	0.40		0.02	c0.65			0.03				
v/s Ratio Perm			0.04			0.04	0.05				0.03	c0.06
v/c Ratio	0.84	0.53	0.05	0.45	0.87	0.05	0.53	0.28			0.30	0.59
Uniform Delay, d1	45.8	5.2	3.3	44.8	8.6	3.1	40.8	39.7			39.8	41.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	70.9	0.3	0.0	5.2	3.9	0.0	4.1	1.0			1.3	6.1
Delay (s)	116.7	5.5	3.3	50.0	12.5	3.1	44.9	40.7			41.1	47.1
Level of Service	F	A	A	D	B	A	D	D			D	D
Approach Delay (s)		8.8			12.8			43.4			45.4	
Approach LOS		A			B			D			D	

Intersection Summary

HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	94.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1063	173	293	1741	262	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	3433	3200	1770	1571
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	3433	3200	1770	1571
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1155	188	318	1892	285	329
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1155	188	318	1892	285	329
Confl. Peds. (#/hr)			1		1	1
Turn Type		Perm	Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	26.5	26.5	9.1	39.3	14.7	23.8
Effective Green, g (s)	28.5	28.5	8.8	41.3	14.4	23.2
Actuated g/C Ratio	0.45	0.45	0.14	0.65	0.23	0.36
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	2.5
Lane Grp Cap (vph)	1432	708	474	2075	400	671
v/s Ratio Prot	0.36		0.09	c0.59	c0.16	0.07
v/s Ratio Perm		0.12				0.14
v/c Ratio	0.81	0.27	0.67	0.91	0.71	0.49
Uniform Delay, d1	15.2	11.0	26.1	9.6	22.7	15.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.1	3.4	6.6	5.9	0.4
Delay (s)	18.5	11.2	29.5	16.2	28.6	16.1
Level of Service	B	B	C	B	C	B
Approach Delay (s)	17.5			18.1	21.9	
Approach LOS	B			B	C	

Intersection Summary

HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	63.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1258	102	169	1797	19	229	2	286	12	2	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	3.7		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	3200	1583	3400	3200			1758	1583		1785	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	3200	1583	3400	3200			1758	1583		1785	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	1367	111	184	1953	21	249	2	311	13	2	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	7	1367	111	184	1974	0	0	251	311	0	15	9
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	3%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		pm+ov	Split		Perm
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	0.8	78.0	78.0	12.3	89.2			27.5	39.8		4.5	4.5
Effective Green, g (s)	0.8	80.0	80.0	12.0	91.2			27.5	39.8		4.5	4.5
Actuated g/C Ratio	0.01	0.57	0.57	0.09	0.65			0.20	0.28		0.03	0.03
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	3.7		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	2.5		3.0	3.0
Lane Grp Cap (vph)	10	1829	905	291	2085			345	450		57	51
v/s Ratio Prot	0.00	0.43		0.05	c0.62			c0.14	c0.06		c0.01	
v/s Ratio Perm			0.07						0.14			0.01
v/c Ratio	0.70	0.75	0.12	0.63	0.95			0.73	0.69		0.26	0.18
Uniform Delay, d1	69.5	22.4	13.8	61.9	22.2			52.7	44.6		66.1	65.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	120.0	2.8	0.3	3.9	10.6			7.5	4.2		2.5	1.7
Delay (s)	189.5	25.3	14.1	65.8	32.8			60.2	48.8		68.6	67.6
Level of Service	F	C	B	E	C			E	D		E	E
Approach Delay (s)		25.2			35.6			53.9			68.2	
Approach LOS		C			D			D			E	

Intersection Summary			
HCM Average Control Delay	34.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	1512	42	76	1853	2	130	2	178	2	2	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3200	1583	3273	3200			1775	1561		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	3200	1583	3273	3200			1775	1561		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1643	46	83	2014	2	141	2	193	2	2	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2	1643	46	83	2016	0	0	143	193	0	4	2
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	0.6	99.3	99.3	9.2	107.9			18.9	18.9		5.5	5.5
Effective Green, g (s)	0.3	101.3	101.3	8.9	109.9			18.6	18.6		5.2	5.2
Actuated g/C Ratio	0.00	0.68	0.68	0.06	0.73			0.12	0.12		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	4	2161	1069	194	2345			220	194		63	55
v/s Ratio Prot	0.00	0.51		c0.03	c0.63			0.08			c0.00	
v/s Ratio Perm			0.03						c0.12			0.00
v/c Ratio	0.50	0.76	0.04	0.43	0.86			0.65	0.99		0.06	0.04
Uniform Delay, d1	74.8	16.2	8.1	68.1	14.5			62.6	65.7		70.0	70.0
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	74.4	2.6	0.1	1.1	4.4			6.0	62.8		0.3	0.2
Delay (s)	149.2	18.8	8.2	69.2	18.9			68.6	128.4		70.4	70.2
Level of Service	F	B	A	E	B			E	F		E	E
Approach Delay (s)		18.7			20.9			103.0			70.3	
Approach LOS		B			C			F			E	

Intersection Summary

HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	292	1243	15	30	1758	565	19	30	42	309	20	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.2	4.0	4.0	2.9
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3200		1770	3200	1566	1656	1863	1543	3433	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3200		1770	3200	1566	1656	1863	1543	3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	317	1351	16	33	1911	614	21	33	46	336	22	248
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	45	0	0	23
Lane Group Flow (vph)	317	1367	0	33	1911	614	21	33	1	336	22	225
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		pm+ov	Split		Perm	Split		pm+ov
Protected Phases	5	2		1	6	7	8	8		7	7	5
Permitted Phases						6			8			7
Actuated Green, G (s)	14.3	98.3		3.9	87.9	106.6	3.1	3.1	3.1	18.7	18.7	33.0
Effective Green, g (s)	14.5	100.3		4.1	89.9	109.2	3.3	3.3	3.1	20.0	20.0	35.6
Actuated g/C Ratio	0.10	0.70		0.03	0.63	0.76	0.02	0.02	0.02	0.14	0.14	0.25
Clearance Time (s)	4.2	6.0		4.2	6.0	5.3	4.2	4.2	4.2	5.3	5.3	4.2
Vehicle Extension (s)	2.5	2.5		3.0	2.5	2.5	2.0	2.0	2.0	2.5	2.5	2.5
Lane Grp Cap (vph)	346	2234		51	2002	1190	38	43	33	478	259	392
v/s Ratio Prot	c0.09	0.43		0.02	c0.60	0.07	0.01	c0.02		c0.10	0.01	0.06
v/s Ratio Perm						0.32			0.00			0.08
v/c Ratio	0.92	0.61		0.65	0.95	0.52	0.55	0.77	0.03	0.70	0.08	0.57
Uniform Delay, d1	64.0	11.4		69.1	25.0	6.8	69.5	69.8	68.8	59.0	53.9	47.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.0	0.4		24.8	11.2	0.3	9.5	51.8	0.1	4.3	0.1	1.7
Delay (s)	92.0	11.9		93.9	36.2	7.1	79.0	121.6	69.0	63.3	54.0	49.1
Level of Service	F	B		F	D	A	E	F	E	E	D	D
Approach Delay (s)		26.9			30.0			88.4			57.1	
Approach LOS		C			C			F			E	

Intersection Summary

HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	143.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	1263	12	10	1529	240	7	5	5	489	5	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3200	1583	1770	3200	1583	1770	1723		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3200	1583	1770	3200	1583	1770	1723		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	1373	13	11	1662	261	8	5	5	532	5	250
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	133	1373	13	11	1662	261	8	10	0	532	5	250
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	4.8	61.9	61.9	0.7	57.6	57.6	0.7	3.0		19.1	21.0	21.0
Effective Green, g (s)	5.0	63.9	63.9	0.7	59.6	59.6	0.9	3.0		19.1	21.2	21.2
Actuated g/C Ratio	0.05	0.62	0.62	0.01	0.58	0.58	0.01	0.03		0.19	0.21	0.21
Clearance Time (s)	4.2	6.0	6.0	4.0	6.0	6.0	4.2	4.0		4.0	4.2	4.2
Vehicle Extension (s)	4.5	4.5	4.5	3.0	4.5	4.5	4.5	3.0		3.0	3.5	3.5
Lane Grp Cap (vph)	167	1991	985	12	1857	919	16	50		638	385	327
v/s Ratio Prot	c0.04	0.43		0.01	c0.52		0.00	0.01		c0.15	0.00	
v/s Ratio Perm			0.01			0.16						c0.16
v/c Ratio	0.80	0.69	0.01	0.92	0.89	0.28	0.50	0.20		0.83	0.01	0.76
Uniform Delay, d1	48.3	12.8	7.4	51.0	18.8	10.8	50.7	48.7		40.3	32.4	38.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.8	1.2	0.0	212.2	6.3	0.3	36.7	2.0		9.2	0.0	10.5
Delay (s)	73.1	14.0	7.4	263.1	25.1	11.1	87.4	50.6		49.5	32.4	48.9
Level of Service	E	B	A	F	C	B	F	D		D	C	D
Approach Delay (s)		19.1			24.6			67.0			49.2	
Approach LOS		B			C			E			D	

Intersection Summary

HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	1613	78	23	1615	35	86	6	37	44	5	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	3200	1583	1770	3200	1583	1770	1625			1782	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.72	1.00			0.71	1.00
Satd. Flow (perm)	1770	3200	1583	1770	3200	1583	1346	1625			1327	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	1753	85	25	1755	38	93	7	40	48	5	85
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	72	1753	85	25	1755	38	93	47	0	0	53	85
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	3.5	50.0	50.0	1.4	47.9	47.9	8.6	8.6			8.6	8.6
Effective Green, g (s)	3.2	52.0	52.0	1.1	49.9	49.9	8.7	8.7			8.7	8.7
Actuated g/C Ratio	0.04	0.70	0.70	0.01	0.68	0.68	0.12	0.12			0.12	0.12
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0	6.0	4.1	4.1			4.1	4.1
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	77	2255	1115	26	2164	1070	159	192			156	187
v/s Ratio Prot	c0.04	0.55		0.01	c0.55			0.03				
v/s Ratio Perm			0.05			0.02	c0.07				0.04	0.05
v/c Ratio	0.94	0.78	0.08	0.96	0.81	0.04	0.58	0.24			0.34	0.45
Uniform Delay, d1	35.2	7.1	3.4	36.3	8.6	4.0	30.8	29.6			29.9	30.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	80.0	1.9	0.0	159.0	2.5	0.0	5.4	0.7			1.3	1.8
Delay (s)	115.2	9.0	3.4	195.3	11.1	4.0	36.2	30.2			31.2	32.1
Level of Service	F	A	A	F	B	A	D	C			C	C
Approach Delay (s)		12.7			13.5			34.2			31.8	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1516	178	243	1397	276	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.97	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3200	1583	3433	3200	1770	1571
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3200	1583	3433	3200	1770	1571
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1648	193	264	1518	300	500
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1648	193	264	1518	300	500
Confl. Peds. (#/hr)			1		1	1
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%
Turn Type		Perm	Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases		2				8
Actuated Green, G (s)	44.9	44.9	13.1	61.7	17.3	30.4
Effective Green, g (s)	46.9	46.9	12.8	63.7	17.0	29.8
Actuated g/C Ratio	0.53	0.53	0.14	0.72	0.19	0.34
Clearance Time (s)	6.0	6.0	3.7	6.0	3.7	3.7
Vehicle Extension (s)	2.5	2.5	2.5	2.5	3.0	2.5
Lane Grp Cap (vph)	1692	837	495	2298	339	599
v/s Ratio Prot	c0.52		0.08	0.47	0.17	c0.12
v/s Ratio Perm		0.12				0.20
v/c Ratio	0.97	0.23	0.53	0.66	0.88	0.83
Uniform Delay, d1	20.3	11.2	35.2	6.7	34.9	27.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.0	0.1	0.9	0.6	22.9	9.6
Delay (s)	36.3	11.3	36.0	7.4	57.8	36.8
Level of Service	D	B	D	A	E	D
Approach Delay (s)	33.7			11.6	44.7	
Approach LOS	C			B	D	

Intersection Summary

HCM Average Control Delay	26.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	1745	228	301	1480	10	154	2	311	6	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	3.7		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)	1770	3200	1583	3433	3200			1775	1568		1793	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (perm)	1770	3200	1583	3433	3200			1775	1568		1793	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	1897	248	327	1609	11	167	2	338	7	2	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	1897	248	327	1620	0	0	169	338	0	9	7
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		pm+ov	Split		Perm
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	0.8	91.5	91.5	17.3	107.7			20.6	37.9		2.9	2.9
Effective Green, g (s)	0.8	93.5	93.5	17.0	109.7			20.6	37.9		2.9	2.9
Actuated g/C Ratio	0.01	0.62	0.62	0.11	0.73			0.14	0.25		0.02	0.02
Clearance Time (s)	4.0	6.0	6.0	3.7	6.0			4.0	3.7		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			3.0	2.5		3.0	3.0
Lane Grp Cap (vph)	9	1995	987	389	2340			244	396		35	31
v/s Ratio Prot	0.00	c0.59		0.10	0.51			0.10	c0.10		c0.01	
v/s Ratio Perm			0.16						0.12			0.00
v/c Ratio	0.33	0.95	0.25	0.84	0.69			0.69	0.85		0.26	0.23
Uniform Delay, d1	74.3	26.1	12.6	65.2	11.0			61.7	53.4		72.5	72.4
Progression Factor	1.00	1.00	1.00	1.09	0.53			1.00	1.00		1.00	1.00
Incremental Delay, d2	20.6	11.5	0.6	10.5	1.2			8.2	16.0		3.9	3.7
Delay (s)	94.9	37.6	13.2	81.3	7.0			69.9	69.4		76.4	76.1
Level of Service	F	D	B	F	A			E	E		E	E
Approach Delay (s)		34.9			19.5			69.6			76.3	
Approach LOS		C			B			E			E	

Intersection Summary

HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.4
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	1930	132	161	1703	2	85	3	122	2	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3200	1583	3273	3200			1777	1559		1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (perm)	1770	3200	1583	3273	3200			1777	1559		1817	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	2098	143	175	1851	2	92	3	133	2	2	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	2098	143	175	1853	0	0	95	133	0	4	3
Confl. Peds. (#/hr)				1		1			1	1		
Heavy Vehicles (%)	2%	2%	2%	7%	3%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2						3			4
Actuated Green, G (s)	0.6	103.1	103.1	11.5	114.0			12.8	12.8		5.5	5.5
Effective Green, g (s)	0.3	105.1	105.1	11.2	116.0			12.5	12.5		5.2	5.2
Actuated g/C Ratio	0.00	0.70	0.70	0.07	0.77			0.08	0.08		0.03	0.03
Clearance Time (s)	3.7	6.0	6.0	3.7	6.0			3.7	3.7		3.7	3.7
Vehicle Extension (s)	3.0	3.0	3.0	2.5	3.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	4	2242	1109	244	2475			148	130		63	55
v/s Ratio Prot	0.00	c0.66		c0.05	c0.58			0.05			c0.00	
v/s Ratio Perm			0.09						c0.09			0.00
v/c Ratio	0.75	0.94	0.13	0.72	0.75			0.64	1.02		0.06	0.05
Uniform Delay, d1	74.8	19.5	7.4	67.9	9.2			66.6	68.8		70.0	70.0
Progression Factor	0.86	0.38	0.38	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	147.6	4.2	0.1	9.0	2.1			8.1	85.2		0.3	0.3
Delay (s)	211.8	11.6	2.9	76.9	11.3			74.7	154.0		70.4	70.3
Level of Service	F	B	A	E	B			E	F		E	E
Approach Delay (s)		11.3			16.9			120.9			70.3	
Approach LOS		B			B			F			E	

Intersection Summary

HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

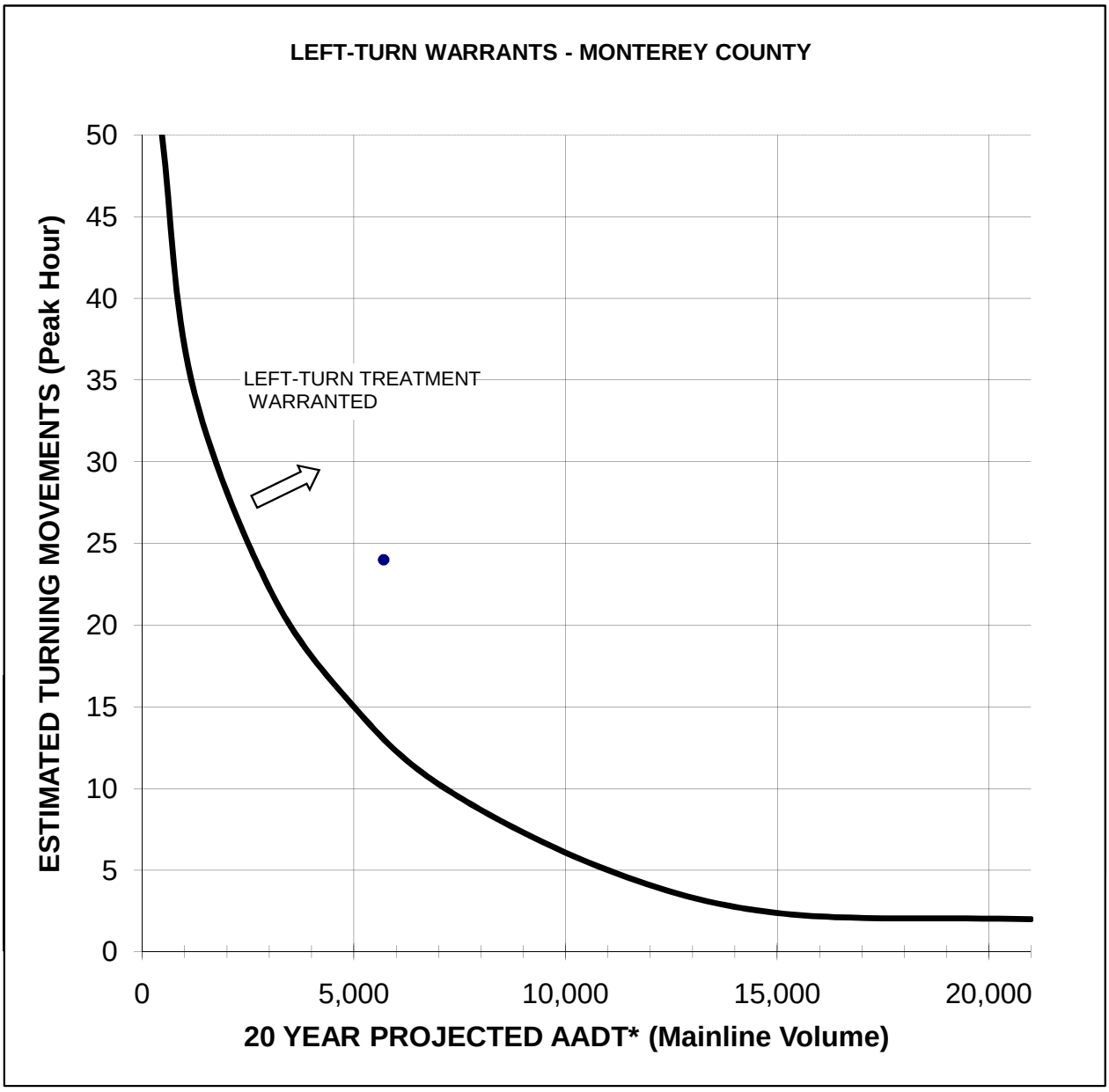
c Critical Lane Group

From Meyer Road Looking West toward San Benancio Road

From Meyer Road Looking North on San Benancio Road

From Meyer Road Looking South on San Benancio Road

Appendix J
San Benancio / Meyer Road Intersection
Southbound Approach



Analysis Scenario	Left Turn Volume	20-Yr. Mainline Volume*	Warrant Met?
A. Back+Project PM	24	5700	Yes

Adapted from Monterey County Left Turn Policy, adopted on February 26, 1980.

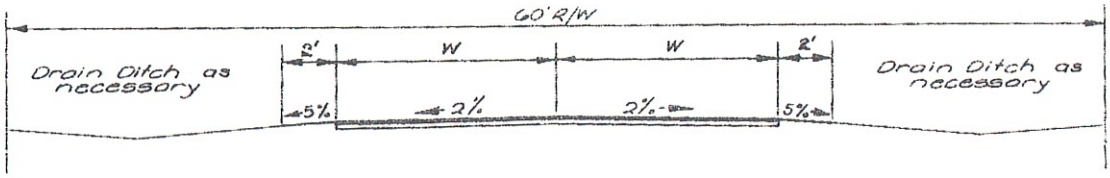
*Note: The mainline volume of 5,700 vehicles per day is the 2005 annual average daily traffic volume on San Benancio Road

APPENDIX K
LEVEL OF SERVICE THRESHOLD VOLUMES FOR VARIOUS ROADWAY TYPES
TOTAL DAILY VOLUMES IN BOTH DIRECTIONS (ADT)

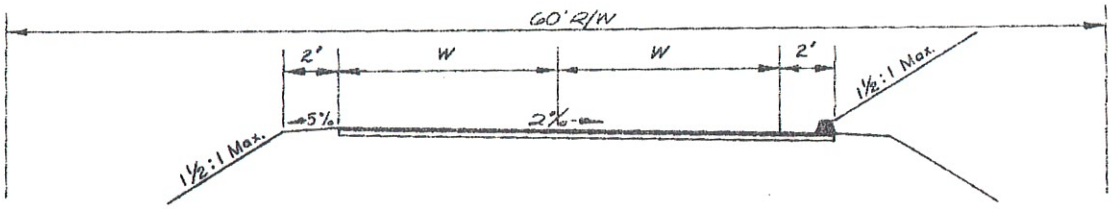
ROADWAY TYPE	CODE	LOS A	LOS B	LOS C	LOS D	LOS E
10-Lane Freeway	10F	64,000	99,000	139,000	160,000	182,000
8-Lane Freeway	8F	51,000	79,000	112,000	136,000	146,000
6-Lane Freeway	6F	39,000	59,000	85,000	102,000	110,000
8-Lane Expressway	8E	35,000	54,000	75,000	90,000	98,000
6-Lane Expressway	6E	28,000	42,000	56,000	67,000	74,000
4-Lane Freeway	4F	26,000	40,000	57,000	69,000	74,000
8-Lane Divided Arterial (w/ left-turn lane)	9	40,000	47,000	54,000	61,000	68,000
6-Lane Divided Arterial (w/ left-turn lane)	7	32,000	38,000	43,000	49,000	54,000
4-Lane Expressway	4E	18,000	27,000	36,000	45,000	50,000
4-Lane Divided Arterial (w/ left-turn lane)	5	22,000	25,000	29,000	32,500	36,000
4-Lane Undivided Arterial (no left-turn lane)	4	16,000	19,000	22,000	24,000	27,000
2-Lane Rural Highway	2R	4,000	8,000	12,000	17,000	25,000
2-Lane Arterial (w/ left-turn lane)	3	11,000	12,500	14,500	16,000	18,000
2-Lane Collector	2	6,000	7,500	9,000	10,500	12,000
2-Lane Local	1	1,200	1,400	1,600	1,800	2,000
1-Lane Freeway Diamond Ramp	1D	11,000	12,800	14,700	16,500	18,300
2-Lane Freeway Diamond Ramp	2D	22,000	25,600	29,400	33,000	36,600
1-Lane Freeway Loop Ramp	1L	9,000	10,500	12,000	13,500	15,000
2-Lane Freeway Loop Ramp	2L	16,000	18,700	21,300	24,000	26,700

Notes:

1. The above threshold volumes for preliminary planning purposes only. If available, the results of detailed level of service analyses will typically have priority over the levels of service derived from this table. In that case this table can be used by the analyst for providing additional considerations for recommending the appropriate general roadway type for the specific condition being analyzed.
2. All above facilities assume a 60%/40% peak hour directional split. All above facilities assume peak hour representing approximately 10% of the Average Daily Traffic (ADT), except for mainline freeway facilities, which assume peak hour representing 9% of the Average Daily Traffic (ADT).
3. Based on *Highway Capacity Manual*, Transportation Research Board, 2000.
4. Freeway thresholds are consistent with conditions utilizing a .95 peak hour factor, with 2% trucks and slightly over a one-mile average interchange spacing.
5. Expressways are consistent with the average of a multi-lane highway (with no signals) and Class 1 arterial (with an average signal spacing of 0.8 signals per mile and a .45 G/C ratio).
6. Arterial thresholds are consistent with the average of Class 1 and Class 2 arterials with an assumed signal density of two signals per mile. This assumes a divided arterial with left-turn lanes. Thresholds for four-lane undivided arterials assume approximately two-thirds the capacity of a four-lane divided arterial due to the impedance in traffic flow resulting from left-turning vehicles waiting in the inside through lane, thus significantly reducing the capacity of the roadway.
7. Rural highways are generally consistent with the *2000 Highway Capacity Manual* rural highway, assuming 8% trucks, 4% RV's, 20% no-passing, and level terrain. The greatest difference is that it assumes a maximum capacity (upper end of LOS E) of 25,000 rather than the 28,000 calculated using the new *Highway Capacity Manual*.
8. Two-lane collectors assume approximately three-fourths of the capacity of a two-lane arterial with left-turn lanes. This is based on the assumption that left-turn channelization is not provided on a two-lane collector.
9. Local street level of service thresholds are based upon "Neighborhood Traffic Related Quality-of-Life Considerations" which assumes a standard suburban neighborhood, 40-foot roadway width, and 25 mile per hour speed limit with normal speed violation rates.
10. Capacities for Diamond Ramps and Loop Ramps may be slightly higher or lower than the planning level capacities indicated above. The *2000 Highway Capacity Manual* (2000 HCM) states that the capacity of a one-lane diamond to be 2,200 vehicles per hour (vph), and 1,800 vph for a small radius loop ramp. Two-lane freeway ramp capacities are estimated in the 2000 HCM to be 4,400vph for a two-lane diamond, and 3,200vph 20 for a two-lane small radius loop. Varying intermediate capacities are provided for incremental conditions between these extremes. Capacities given for each service level assume the same level of service for the adjoining merging roadway as well as level of service being determined by volume-to-capacity and not attainable speed. Level of service will be controlled by freeway level of service if worse than ramp. Mitigations of level of service deficiencies may include the addition of a lane on the freeway ramp, the addition of an auxiliary lane on the freeway mainline, the addition of approach lanes at the ramp junction with the local intersecting street, and/or geometric modifications to improve the efficiency of the ramp itself or its termini. The appropriate mitigation should be determined on a case-by-case basis, considering freeway main line volumes and weaving, the extent that the freeway ramp volume exceeds the above planning thresholds, and the level of service of the ramp intersection with the local street.
11. All volumes are approximate and assume ideal roadway characteristics.



RURAL ROAD



RURAL SIDEHILL ROAD

Street Classification	W	
	Under 5ac.	Over 5ac.
Secondary Road	11'	10'
Tertiary Road	10'	9'
Cul-de-sac Road	9'	8'

MONTEREY COUNTY DEPT. OF PUBLIC WORKS

STANDARD DETAILS

RURAL ROAD (PRIVATE ONLY)

APPROVED Bruce W. McClain DATE 10-24-77

REVISED	DATE

PLATE NO. 5

Source:
Standard Details
County of Monterey, California
October 1977

such intersection shall be rounded with a curve having a radius of not less than 15 feet. In any case, a greater curve radius may be required if streets or alleys intersect other than at right angles.

O. TEMPORARY TERMINUS

Streets which are to be extended and whose temporary terminus cannot be seen may require a temporary turning circle. A defeasible easement shall be provided for uniform sidewalk width or to contain shoulders and slopes. The turning circle shall conform to the requirements of Section 3.45c of Ordinance 1713.

P. PRIVATE ROAD INTERSECTIONS

A private road intersecting with a county road, when planned to serve private road subdivisions that provide access to more than 20 dwelling units or when planned to handle an average daily traffic of 200 vehicles per day shall be designed in accordance to the Standard Street Classification applicable including location, alignment, grade and improvements.

Q. HORIZONTAL ALIGNMENT

The centerline curve radius of all streets and highways shall conform to acceptable engineering standards of design as shown in the latest edition of the California Department of Transportation Planning Manual Part VII. Generally, horizontal curves shall be as long as practical. Use of superelevated curves shall be avoided by increasing the centerline radius where practical. Super-elevation shall not exceed 8%. The runoff length shall provide a maximum superelevation runoff rate of 3% per second at design speed in any travel lane.

Except in hillside subdivisions where approved on the tentative map, the use of compound curves and reverse curves shall be held to a minimum. As far as practical, tangents shall be provided between all curves and be not less

Source:
Roadway Design Standards
County of Monterey, California
October 1977

Topic 205 - Road Connections and Driveways

205.1 Access Openings on Expressways

Access openings are used only on expressways. The term access opening applies to openings through the right of way line which serve abutting land ownerships whose remaining access rights have been acquired by the State.

(1) Criteria for Location. To discourage wrong-way movements, access openings should be located directly opposite or at least 300 feet from a median opening. The access opening should not be spaced closer than 1/2 mile to an adjacent public road intersection or to another private access opening that is wider than 30 feet.

Sight distance equivalent to that required for public road intersections shall be provided (see Index 405.1).

(2) Width. The normal access opening width should be 30 feet. A greater width may result in large savings in right of way costs in some instances, but should be considered with caution because of the possibility that public use might develop. Conversion of a private opening into a public road connection requires the consent of the CTC, which cannot be committed in advance (see Section 3-7 of the Project Development Procedures Manual).

(3) Recessed Openings. Recessed openings, as shown on Figure 205.1, are desirable at all points where private access is permitted and should be provided whenever they can be obtained without requiring alterations to existing adjacent improvements. When recessed openings are required, the opening should be located a minimum distance of 75 feet from the nearest edge of the traveled way.

(4) Joint Openings. A joint access opening serving two or more parcels of land is desirable whenever feasible. If the property line is not normal to the right of way line, care should be taken in designing the joint opening so that both owners are adequately served.

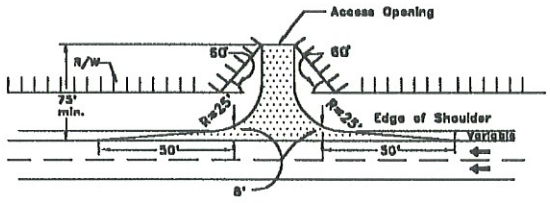
(5) Surfacing. All points of private access should be surfaced with adequate width and depth of pavement to serve the anticipated traffic. The surfacing should extend from the edge of the traveled way to the right of way line.

205.2 Private Road Connections

The minimum private road connection design is shown on Figure 205.1. Sight distance requirements for the minimum private road connection are shown on Figure 405.7 (see Index 405.1).

Figure 205.1

Access Openings on Expressways



RECESSED OPENING

NOTES:

- By widening the expressway shoulder, deceleration lanes may be provided where justified.
- This detail, without the recess, may be used on conventional highways.

205.3 Urban Driveways

These instructions apply to the design of driveways to serve property abutting on State highways in cities or where urban type development is encountered.

For driveways on frontage roads and in rural areas see Index 205.4. Details for driveway construction are shown on the Standard Plans. For corner sight distance, see Index 405.1(2)(c).

(1) Correlation with Local Standards. Where there is a local requirement regulating driveway construction, the higher standard will normally govern.

Appendix O

Freeway Mitigation Reduction in Travel Time Estimations

Freeway Mitigation Travel Time Comparison - Harper Canyon / Encina Hills Subdivision

	Existing AM Peak Hour Volumes			**Background + Project AM Peak Hour Volumes**			Approximate Reduction in Travel Time with Freeway Extension (seconds)	Approximate Increase in Travel Time with Project Over Entire Corridor (seconds)	Net Reduction in Travel Time with Freeway Extension Over Entire Corridor (seconds)
	Existing 2-Lane Rural Highway			Proposed 4-Lane Freeway					
	Speed		Travel Time	Speed		Travel Time			
EB	47 68.9	mi/hr ft/s	92	65 95.3	mi/hr ft/s	66	-26	0	-26
WB	8 11.7	mi/hr ft/s	540	13.7 20.1	mi/hr ft/s	315	-225	7	-218

Synchro Arterial Travel Time Results

	Back AM	B+P AM	Difference	Rounded[5]
EB	761.2	756.0	-5.2	0
WB	1109.3	1116.6	7.3	7.0

	Existing PM Peak Hour Volumes			**Background + Project PM Peak Hour Volumes**			Approximate Reduction in Travel Time with Freeway Extension (seconds)	Approximate Increase in Travel Time with Project Over Entire Corridor (seconds)	Net Reduction in Travel Time with Freeway Extension Over Entire Corridor (seconds)
	Existing 2-Lane Rural Highway			Proposed 4-Lane Freeway					
	Speed		Travel Time	Speed		Travel Time			
EB	53 77.7	mi/hr ft/s	82	65 95.3	mi/hr ft/s	66	-16	8	-8
WB	51 74.8	mi/hr ft/s	85	65 95.3	mi/hr ft/s	66	-19	17	-2

	Back PM	B+P PM	Difference	Rounded[5]
EB	1169.3	1177.7	8.4	8.0
WB	1275.0	1292.2	17.2	17.0

Total	**-286**	**32**	**-254**
Project Percent		11%	

Notes:
1. All travel times are in seconds.
2. Segment length = 1.2 miles (6,336 feet).
3. Segment extends from existing 4-lane section (adjacent to Toro Park) to west end of Toro Park Estates (see attached graphic).
4. Increases in travel times with project are based on "Background" vs. "Background + Project" AM and PM peak hour volumes in Synchro arterial analysis reports.
5. Negative numbers were "rounded" to zero.

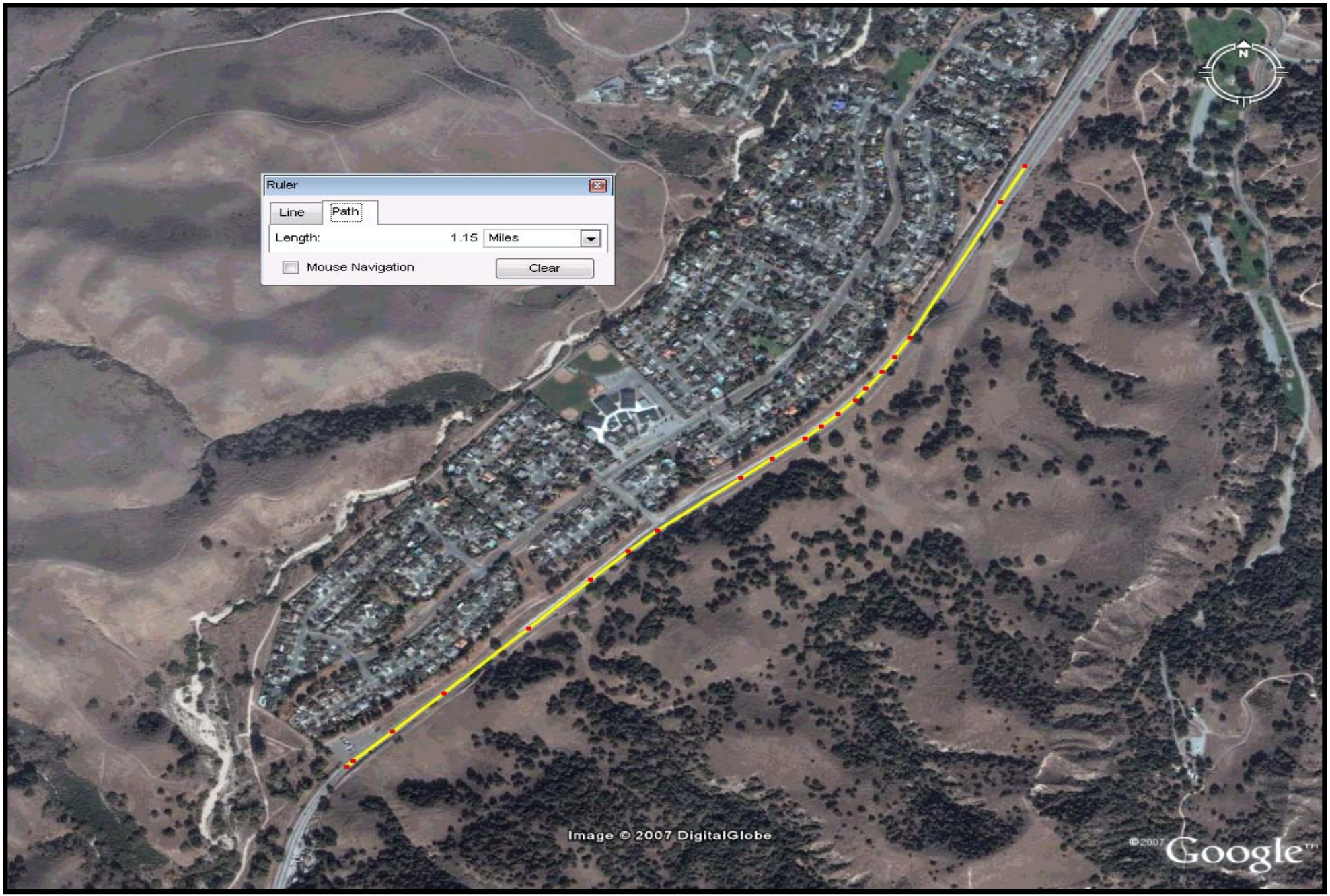

Ruler
Line
Path
Length:
1.15
Miles
Mouse Navigation
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Image © 2007 DigitalGlobe
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Appendix P

Synchro Travel Time Reports

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Olmsted Rd.	I	60	32.0	92.6	124.6	0.39	11.3	F
Hwy 218	I	60	76.2	17.1	93.3	1.27	49.0	A
Ragsdale Dr.	I	60	25.7	2.4	28.1	0.26	33.9	C
York Rd.	I	60	65.3	15.2	80.5	1.09	48.7	A
Boots Rd.	I	60	104.4	9.8	114.2	1.74	54.8	A
Laureles Grade Rd.	I	60	80.4	21.0	101.4	1.34	47.6	A
Corral de Tierra Rd.	I	60	104.4	50.4	154.8	1.74	40.5	B
San Benancio Rd.	I	60	31.6	32.7	64.3	0.36	20.3	E
Total	I		520.0	241.2	761.2	8.20	38.8	B

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Corral de Tierra Rd.	I	60	31.6	164.3	195.9	0.36	6.7	F
Laureles Grade Rd.	I	60	104.4	77.8	182.2	1.74	34.4	B
Pasadera Dr.	I	60	80.4	99.6	180.0	1.34	26.8	D
York Rd.	I	60	104.4	129.1	233.5	1.74	26.8	D
Ragsdale Dr.	I	60	65.3	26.8	92.1	1.09	42.6	A
Hwy 218	I	60	25.7	29.2	54.9	0.26	17.3	E
Olmsted Rd.	I	60	76.2	48.2	124.4	1.27	36.7	B
Josselyn Cyn. Rd.	I	60	32.0	14.3	46.3	0.39	30.3	C
Total	I		520.0	589.3	1109.3	8.20	26.6	D

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Olmsted Rd.	I	60	32.0	86.4	118.4	0.39	11.9	F
Hwy 218	I	60	76.2	17.1	93.3	1.27	49.0	A
Ragsdale Dr.	I	60	25.7	2.5	28.2	0.26	33.8	C
York Rd.	I	60	65.3	15.2	80.5	1.09	48.7	A
Boots Rd.	I	60	104.4	9.8	114.2	1.74	54.8	A
Laureles Grade Rd.	I	60	80.4	21.2	101.6	1.34	47.5	A
Corral de Tierra Rd.	I	60	104.4	50.5	154.9	1.74	40.4	B
San Benancio Rd.	I	60	31.6	33.3	64.9	0.36	20.1	E
Total	I		520.0	236.0	756.0	8.20	39.0	B

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Corral de Tierra Rd.	I	60	31.6	166.0	197.6	0.36	6.6	F
Laureles Grade Rd.	I	60	104.4	79.1	183.5	1.74	34.1	B
Pasadera Dr.	I	60	80.4	101.2	181.6	1.34	26.6	D
York Rd.	I	60	104.4	131.1	235.5	1.74	26.6	D
Ragsdale Dr.	I	60	65.3	28.8	94.1	1.09	41.7	B
Hwy 218	I	60	25.7	29.2	54.9	0.26	17.3	E
Olmsted Rd.	I	60	76.2	46.5	122.7	1.27	37.3	B
Josselyn Cyn. Rd.	I	60	32.0	14.7	46.7	0.39	30.1	C
Total	I		520.0	596.6	1116.6	8.20	26.4	D

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Olmsted Rd.	I	60	32.0	33.8	65.8	0.39	21.3	D
Hwy 218	I	60	76.2	14.5	90.7	1.27	50.4	A
Ragsdale Dr.	I	60	25.7	0.3	26.0	0.26	36.6	B
York Rd.	I	60	65.3	19.5	84.8	1.09	46.2	A
Boots Rd.	I	60	104.4	30.8	135.2	1.74	46.3	A
Laureles Grade Rd.	I	60	80.4	121.9	202.3	1.34	23.8	D
Corral de Tierra Rd.	I	60	104.4	224.3	328.7	1.74	19.1	E
San Benancio Rd.	I	60	31.6	204.2	235.8	0.36	5.5	F
Total	I		520.0	649.3	1169.3	8.20	25.2	D

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Corral de Tierra Rd.	I	60	31.6	46.2	77.8	0.36	16.8	E
Laureles Grade Rd.	I	60	104.4	37.0	141.4	1.74	44.3	A
Pasadera Dr.	I	60	80.4	48.9	129.3	1.34	37.3	B
York Rd.	I	60	104.4	113.9	218.3	1.74	28.7	C
Ragsdale Dr.	I	60	65.3	16.3	81.6	1.09	48.1	A
Hwy 218	I	60	25.7	46.3	72.0	0.26	13.2	F
Olmsted Rd.	I	60	76.2	341.8	418.0	1.27	10.9	F
Josselyn Cyn. Rd.	I	60	32.0	104.6	136.6	0.39	10.3	F
Total	I		520.0	755.0	1275.0	8.20	23.1	D

Arterial Level of Service: EB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Olmsted Rd.	I	60	32.0	38.9	70.9	0.39	19.8	E
Hwy 218	I	60	76.2	14.5	90.7	1.27	50.4	A
Ragsdale Dr.	I	60	25.7	0.3	26.0	0.26	36.6	B
York Rd.	I	60	65.3	19.7	85.0	1.09	46.1	A
Boots Rd.	I	60	104.4	31.4	135.8	1.74	46.1	A
Laureles Grade Rd.	I	60	80.4	123.5	203.9	1.34	23.7	D
Corral de Tierra Rd.	I	60	104.4	226.4	330.8	1.74	18.9	E
San Benancio Rd.	I	60	31.6	203.0	234.6	0.36	5.6	F
Total	I		520.0	657.7	1177.7	8.20	25.1	D

Arterial Level of Service: WB Highway 68

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Corral de Tierra Rd.	I	60	31.6	47.2	78.8	0.36	16.6	E
Laureles Grade Rd.	I	60	104.4	37.6	142.0	1.74	44.1	A
Pasadera Dr.	I	60	80.4	49.4	129.8	1.34	37.2	B
York Rd.	I	60	104.4	114.7	219.1	1.74	28.6	C
Ragsdale Dr.	I	60	65.3	14.8	80.1	1.09	49.0	A
Hwy 218	I	60	25.7	46.8	72.5	0.26	13.1	F
Olmsted Rd.	I	60	76.2	351.2	427.4	1.27	10.7	F
Josselyn Cyn. Rd.	I	60	32.0	110.5	142.5	0.39	9.9	F
Total	I		520.0	772.2	1292.2	8.20	22.8	D

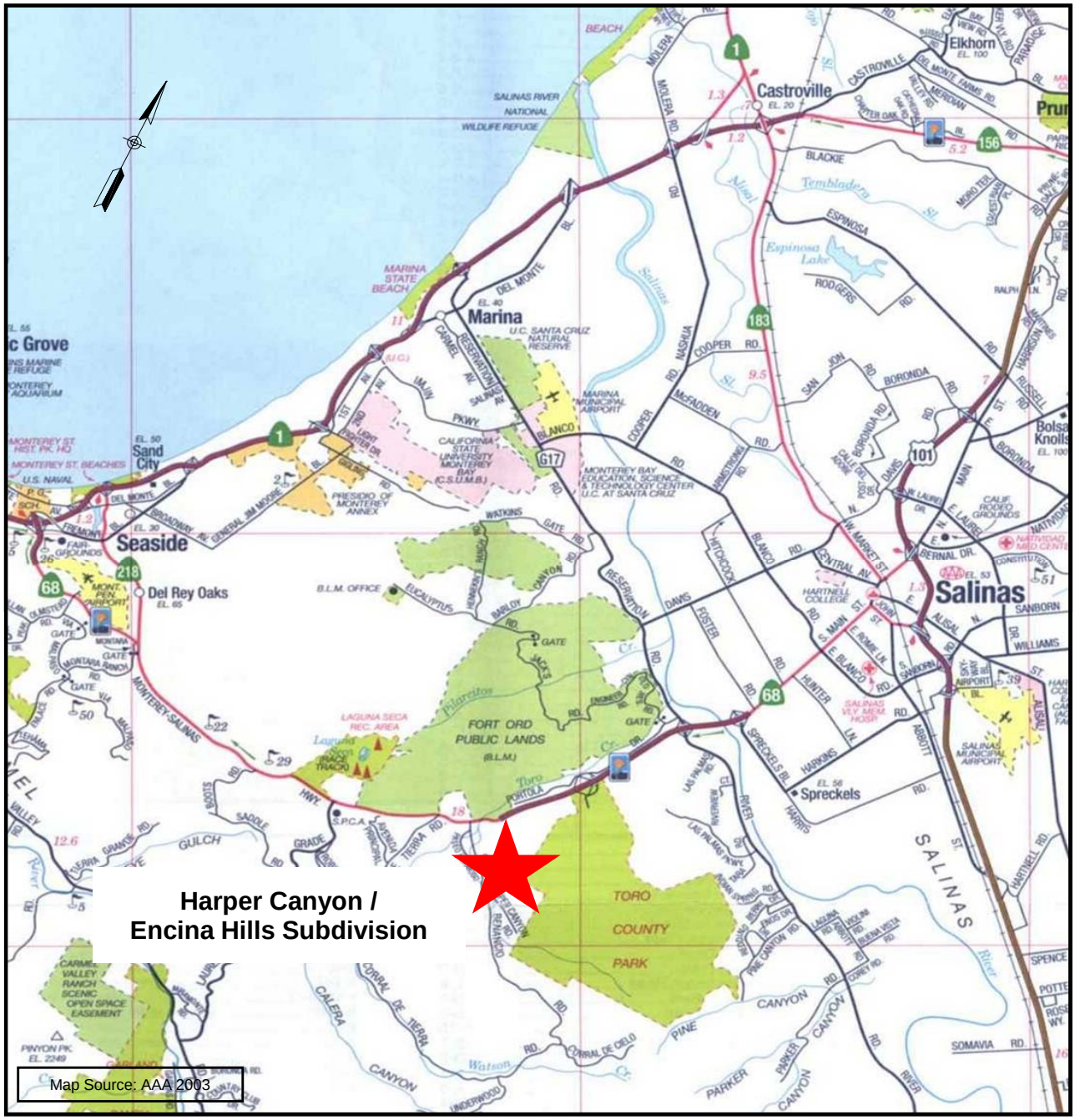


Exhibit 1A

Project Location Map

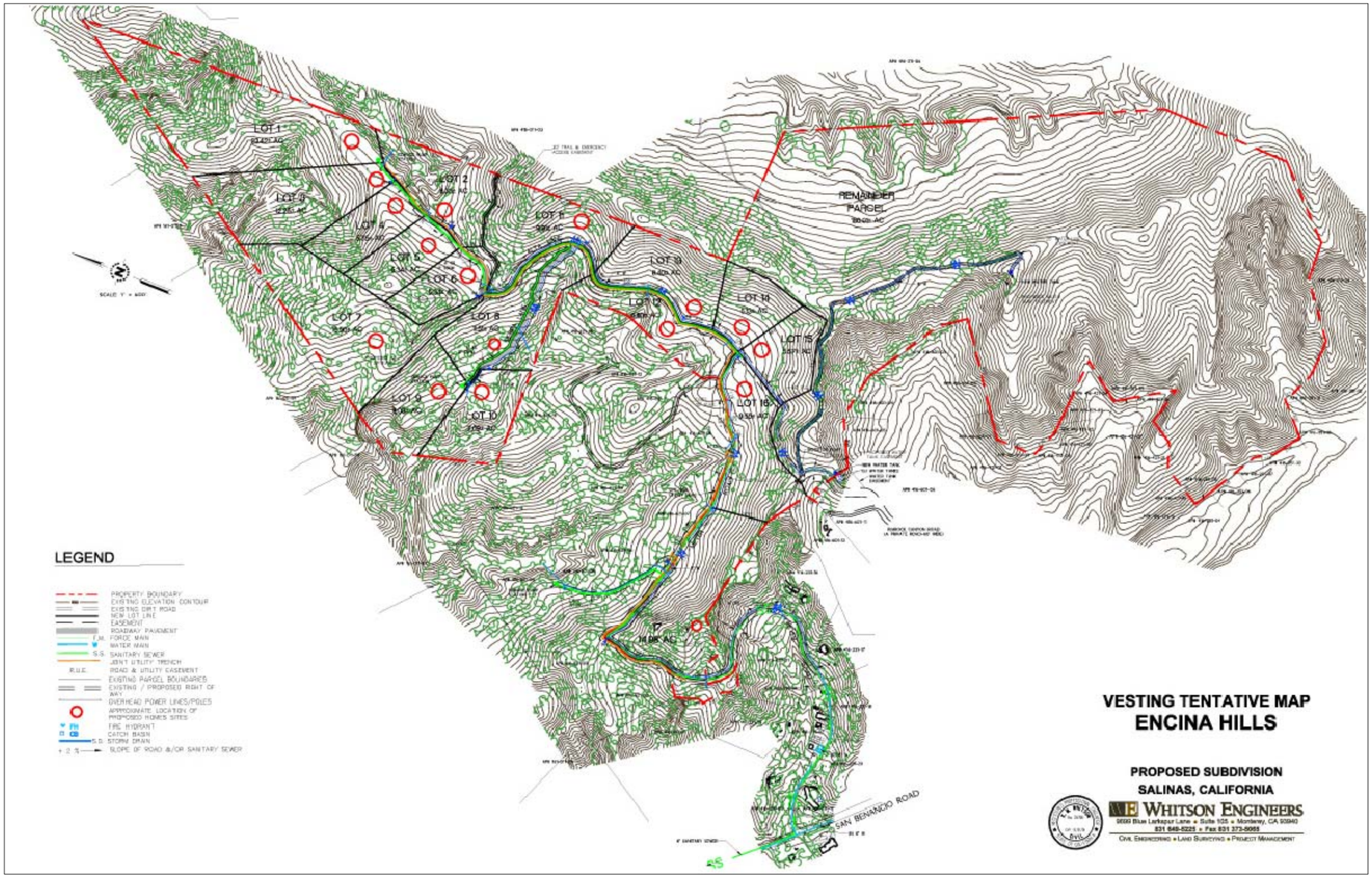
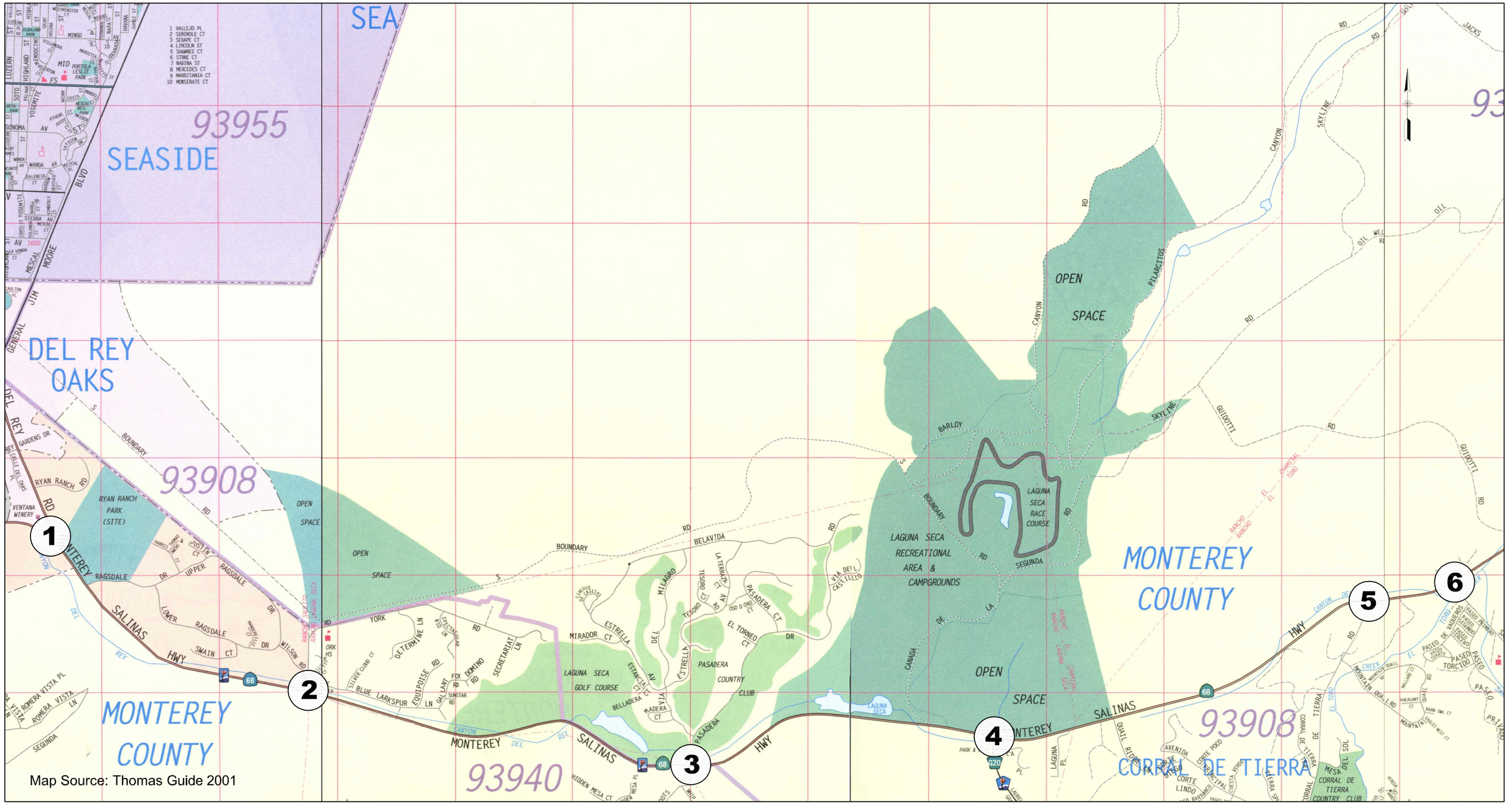


Exhibit 1B
Project Site Plan

Drawing: I:\2009\Jobs\262113 – Harper Canyon Revisions\Exhibit 1B.dwg
Layout: Site Plan Dec 15, 2009, 9:09am

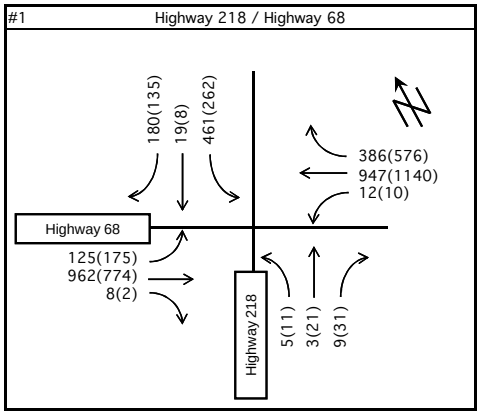


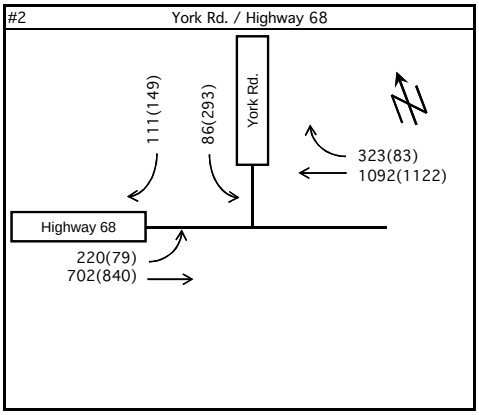
Map Source: Thomas Guide 2001

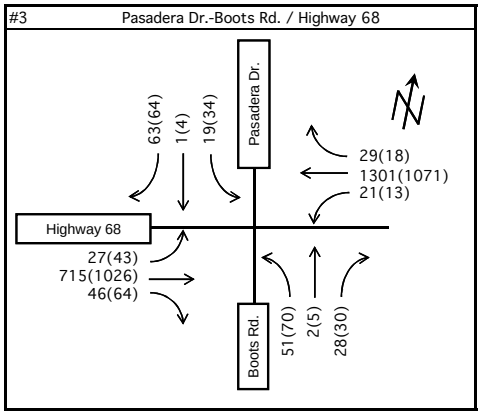
Study Intersection Number (X)

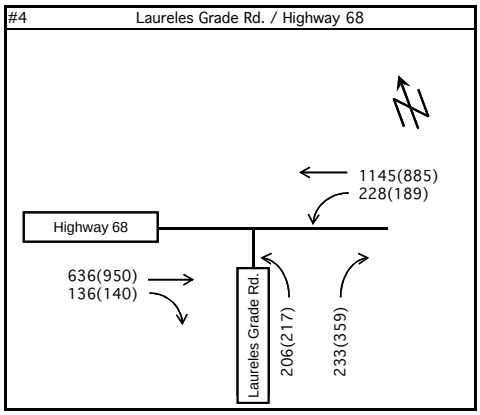
Exhibit 2
Study Area

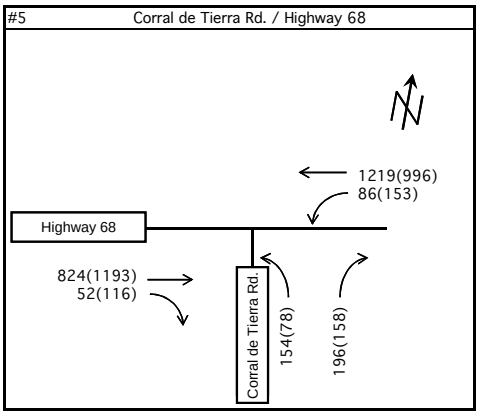
Drawing: J:\2005\101-150\5-117\5-117 Study Intersections.dwg
Layout: Exhibit 2
Dec 19, 2005, 2:30pm

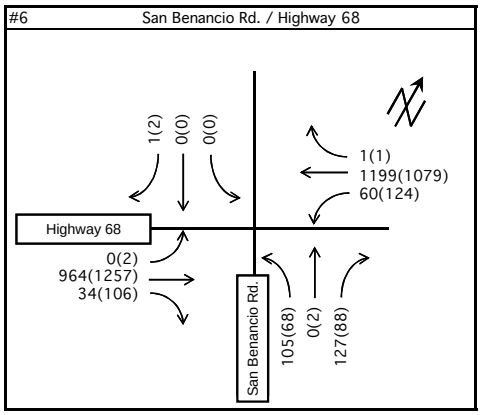


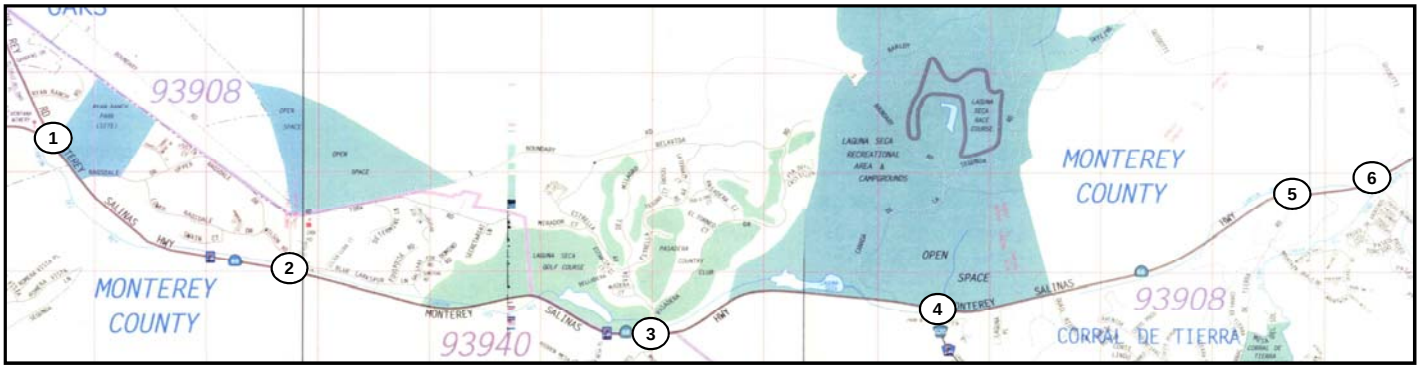












Notes:

1. XX (YY) = AM (PM)

2. Turning movement counts were conducted on the following dates:

   8/15/06 - Intersection #1 (AM & PM Peak Hours)
   8/16/06 - Intersection #2, 3, 6 (AM & PM Peak Hours)
   8/16/06 - Intersection #4 (PM Peak Hour)
   8/22/06 - Intersection #5 (AM & PM Peak Hours)
   8/29/06 - Intersection #4 (AM Peak Hour)

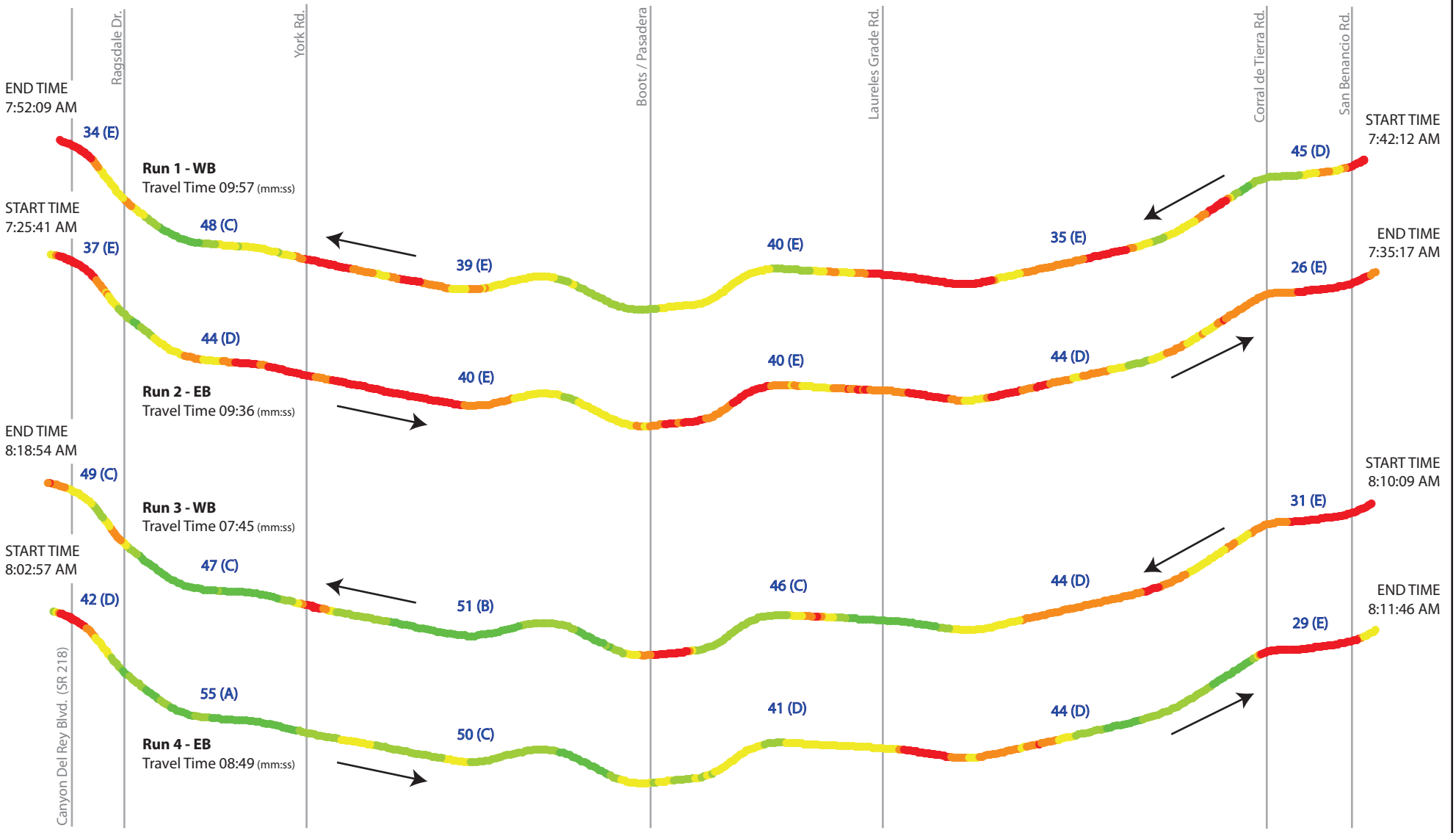
Intersection						Existing Conditions				Background Conditions				Background + Project Conditions				Cumulative + Project Conditions			
						AM Peak Hr		PM Peak Hr		AM Peak Hr		PM Peak Hr		AM Peak Hr		PM Peak Hr		AM Peak Hr		PM Peak Hr	
	N-S Street	E-W Street	Existing Lane Configuration	Existing Intersection Control	LOS Standard (Jurisdiction)	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	Highway 218	Highway 68	NB 1-L, 1-T/R SB 2-L, 1-T, 1-R EB 1-L, 1-T, 1-T/R WB 1-L, 2-T, 1-R	Signal	C/D (Caltrans)	21.6	C	24.3	C	22.8	C	32.9	C	23.1	C	33.0	C	63.9	E	111.4	F
					RI #6													26.6	C	33.5	C
2	York Road	Highway 68	SB 1-L, 1-R EB 1-L, 1-T WB 1-T, 1-R	Signal	C/D (Caltrans) Including 2nd SBL & 4th Leg	63.6	E	76.3	E	87.5	F	81.7	F	**88.4**	**F**	**82.1**	**F**	178.5	F	180.5	F
					RI #1	21.6	C	23.3	C	28.0	C	32.5	C	28.0	C	32.5	C				
					RI #7													29.9	C	27.4	C
3	Pasadera Drive-Boots Road	Highway 68	NB 1-L, 1-T/R SB 1-L/T, 1-R EB 1-L, 1-T, 1-R WB 1-L, 1-T, 1-R	Signal	C/D (Caltrans)	36.8	D	29.6	C	73.8	E	44.4	D	74.8	E	44.9	D	189.9	F	184.6	F
					RI #2	10.3	B	19.9	B	11.4	B	25.2	C	11.6	B	25.6	C				
					RI #8													13.3	B	14.5	B
4	Laureles Grade Road	Highway 68	NB 1-L, 1-R EB 1-T, 1-R WB 1-L, 1-T	Signal	C/D (Caltrans) Including 2nd WBL	38.8	D	82.6	F	60.3	E	91.2	F	**60.9**	**E**	**91.9**	**F**	173.0	F	226.5	F
					RI #3	15.4	B	29.6	C	15.3	B	26.7	C	16.2	B	28.3	C				
					RI #9													18.5	B	26.8	C
5	Corral de Tierra Road	Highway 68	NB 1-L, 1-R EB 1-T, 1-R WB 1-L, 1-T	Signal	C/D (Caltrans) Including 2nd WBL & 4th Leg	35.6	D	68.1	E	127.6	F	143.7	F	**128.5**	**F**	**145.2**	**F**	*	F	*	F
					RI #4	19.0	B	22.1	C	27.8	C	21.6	C	27.8	C	21.6	C				
					RI #10													34.6	C	32.3	C
6	San Benancio Road	Highway 68	NB 1-L/T, 1-R SB 1-L/T, 1-R EB 1-L, 1-T, 1-R WB 1-L, 1-T/R	Signal	C/D (Caltrans) Including 2nd WBL	71.5	E	113.2	F	82.5	F	135.2	F	**84.6**	**F**	**137.1**	**F**	264.1	F	*	F
					RI #5	22.1	C	17.5	B	19.6	B	23.6	C	20.5	C	24.2	C	26.7	C	19.5	B

Notes:

1. L, T, R = Left, Through, Right
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound
3. WA = Worst Approach
4. Levels of service in **BOLD** represent significant project impacts.
5. Recommended improvements (RI) and Mitigation Measures (MM) are described on Exhibit 7.

Highway 68 Between SR 218 and San Benancio Road

Total Distance Approximately 6.5 Miles



Legend

- LOS A > 55 mph
- LOS B 50.1 - 55 mph
- LOS C 45.1 - 50 mph
- LOS D 40.1 - 45 mph
- LOS E 25.1 - 40 mph
- LOS F ≤ 25 mph

XX (Y) = Avg. Speed (LOS)

N

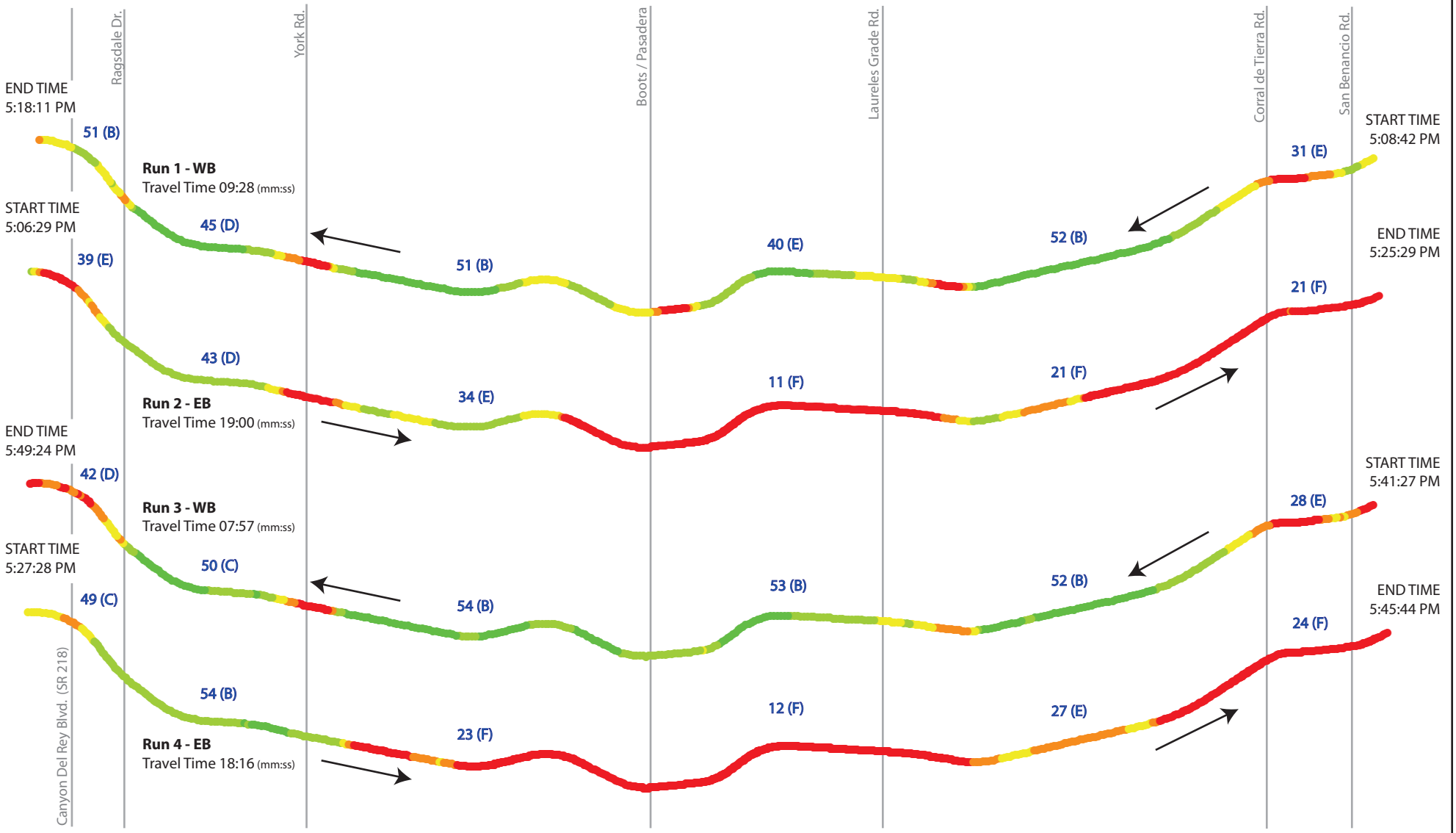
HIGGINS ASSOCIATES
CIVIL & TRAFFIC ENGINEERS

EXHIBIT 5A

AM Peak Hr. Average Travel Speeds
Along SR 68 Corridor

Highway 68 Between SR 218 and San Benancio Road

Total Distance Approximately 6.5 Miles



Legend

- LOS A > 55 mph
- LOS B 50.1 - 55 mph
- LOS C 45.1 - 50 mph
- LOS D 40.1 - 45 mph
- LOS E 25.1 - 40 mph
- LOS F ≤ 25 mph

XX (Y) = Avg. Speed (LOS)

N

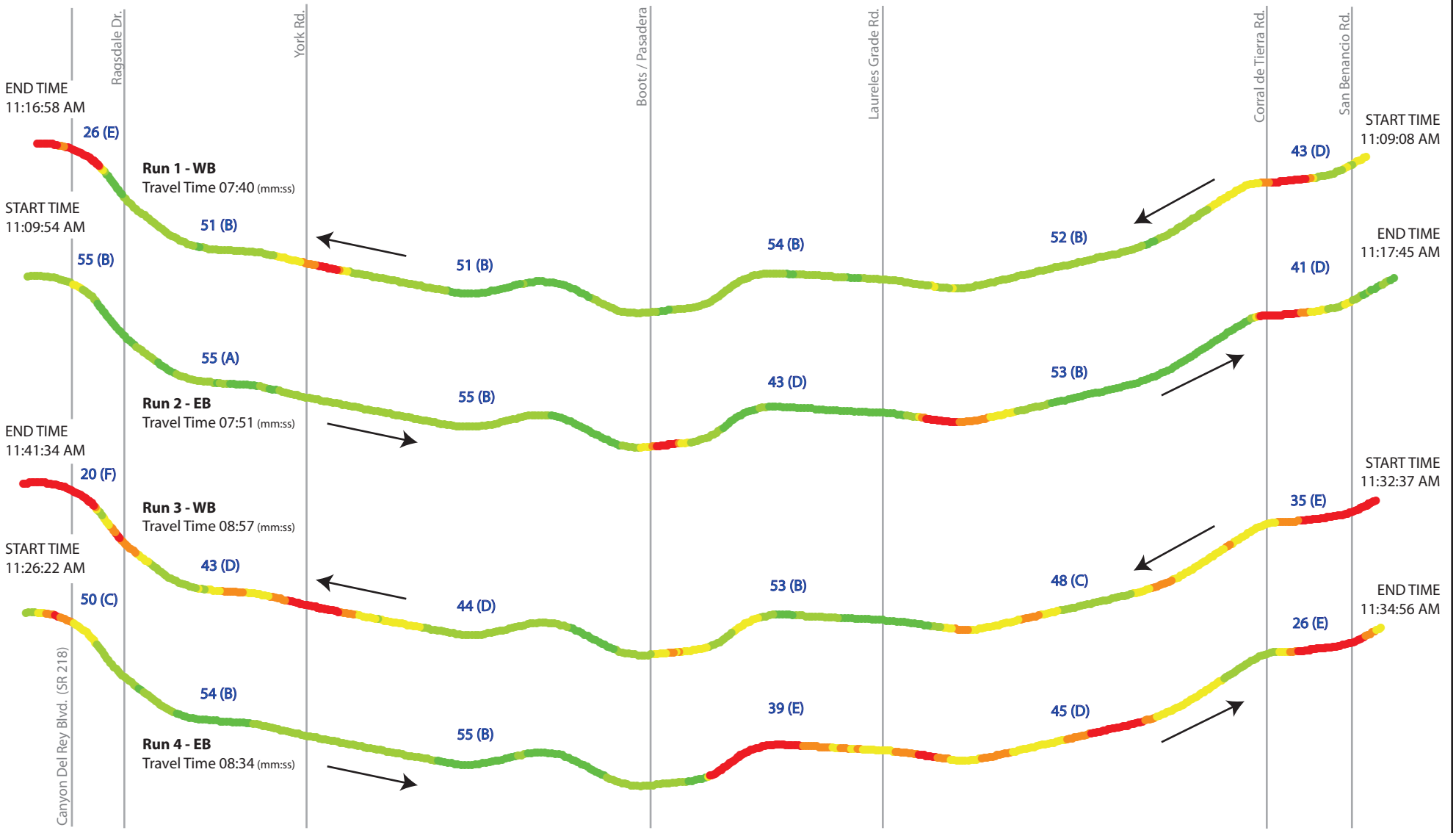
HIGGINS ASSOCIATES
CIVIL & TRAFFIC ENGINEERS

EXHIBIT 5B

PM Peak Hr. Average Travel Speeds
Along SR 68 Corridor

Highway 68 Between SR 218 and San Benancio Road

Total Distance Approximately 6.5 Miles



Legend

- LOS A > 55 mph
- LOS B 50.1 - 55 mph
- LOS C 45.1 - 50 mph
- LOS D 40.1 - 45 mph
- LOS E 25.1 - 40 mph
- LOS F ≤ 25 mph

XX (Y) = Avg. Speed (LOS)

N

HIGGINS ASSOCIATES
CIVIL & TRAFFIC ENGINEERS

EXHIBIT 5C

Off-Peak Average Travel Speeds
Along SR 68 Corridor

	Road Segment		Type	Direction	LOS Std.	Existing Conditions									Background Conditions						Background + Project Conditions						Cumulative + Project Conditions					
						AM Peak Hr					PM Peak Hr				AM Peak Hr			PM Peak Hr			AM Peak Hr			PM Peak Hr			AM Peak Hr			PM Peak Hr		
						Volume	GPS		Synchro		Volume	GPS		Synchro		Volume	Speed	LOS	Volume	Speed	LOS	Volume	Speed	LOS	Volume	Speed	LOS	Volume	Speed	LOS	Volume	Speed	LOS
							Speed	LOS	Speed	LOS		Speed	LOS	Speed	LOS																	
1	Highway 68	Between Highway 218 and York Rd.	2-Lane Arterial	EB	C/D	1,432	37.0	E	39.2	E	1,067	39.0	E	38.8	E	1,612	36.6	E	1,224	38.8	E	1,613	36.6	E	1,228	38.8	E	2,010	39.0	E	1,594	38.5	E
				WB		1,345	34.0	E	34.4	E	1,726	42.0	D	41.8	D	1,464	33.5	E	1,951	36.8	E	1,468	32.9	E	1,953	36.7	E	1,862	14.9	F	2,353	15.6	F
			Widened to 4 Lanes					*C*					*C*					*D*			*D*			*D*					*F*			*F*
2	Highway 68	Between York Rd. and Boots Rd.-Pasadera Dr.	2-Lane Arterial	EB	C/D	788	40.0	E	39.6	E	1,133	23.0	F	23.3	F	869	39.9	E	1,296	22.2	F	870	40.1	D	**1,300**	**22.2**	**F**	1,261	33.5	E	1,757	14.2	F
				WB		1,415	39.0	E	39.0	E	1,205	51.0	B	47.1	C	1,548	34.1	E	1,323	46.9	C	1,552	33.9	E	1,325	46.9	C	2,069	20.6	F	1,779	36.2	E
			Widened to 4 Lanes					*B*					*B*					*B*			*C*			*B*			*C*			*E*			*E*
3	Highway 68	Between Boots Rd.-Pasadera Dr. and Laureles Grade Rd.	2-Lane Arterial	EB	C/D	772	40.0	E	39.6	E	1,090	11.0	F	11.2	F	858	41.7	D	1,242	10.9	F	859	41.7	D	**1,245**	**10.8**	**F**	1,236	25.8	E	1,694	7.6	F
				WB		1,351	40.0	E	40.0	E	1,102	40.0	E	39.6	E	1,472	26.8	E	1,223	34.9	E	1,476	28.8	E	1,225	34.8	E	2,003	13.7	F	1,673	15.9	F
			Widened to 4 Lanes					*A*					*A*					*B*			*B*			*B*			*B*			*D*			*E*
4	Highway 68	Between Laureles Grade Rd. and Corral de Tierra Rd.	2-Lane Arterial	EB	C/D	876	44.0	D	44.0	D	1,309	21.0	F	21.2	F	967	38.7	E	1,483	15.7	F	977	38.0	E	**1,487**	**15.6**	**F**	1,366	19.3	F	1,976	10.8	F
				WB		1,373	35.0	E	35.4	E	1,074	52.0	B	51.9	B	1,508	28.8	E	1,218	51.6	B	1,512	28.6	E	1,220	51.5	B	2,034	15.6	F	1,640	33.8	E
			Widened to 4 Lanes			2,249		*B*					*B*					*B*			*C*			*B*			*C*			*E*			*F*
5	Highway 68	Between Corral de Tierra Rd. and San Benancio Rd.	2-Lane Arterial	EB	C/D	1,020	26.0	E	26.3	E	1,365	21.0	F	21.7	F	1,125	36.1	E	1,536	20.3	F	1,126	35.5	E	**1,540**	**19.9**	**F**	1,556	13.2	F	2,065	12.0	F
				WB		1,305	31.0	E	30.9	E	1,149	28.0	E	27.6	E	1,444	14.9	F	1,296	16.4	F	**1,448**	**14.5**	**F**	**1,298**	**15.4**	**F**	1,985	7.8	F	1,791	5.0	F
			Widened to 4 Lanes					*B*					*C*					*C*			*C*			*C*			*C*			*E*			*F*

Notes:
1. Levels of service in **BOLD** represent significant project impacts.
2. Segments were analyzed using the Synchro traffic analysis software. The segment speeds in the Synchro model were calibrated with the existing segment speeds, which were obtained in the field using GPS speed data. The projected speeds in subsequent scenarios were obtained by adding the projected traffic volumes in future scenarios to the existing calibrated speeds in Synchro. The levels of service are based speeds in Table A obtained from the 2000 Highway Capacity Manual for Two-Lane Highways.
3. Mitigated levels of service were analyzed using planning level threshold volumes for a 4-lane divided arterial, shown in Table B.

Table A.

LOS	Average Travel Speed (mph)
A	> 55
B	50.1 - 55
C	45.1 - 50
D	40.1 - 45
E	25.1 - 40
F	<= 25

Table B.

LOS	Volume
A	<=2200
B	2,500
C	2,900
D	3,250
E	3,600
F	>3,600

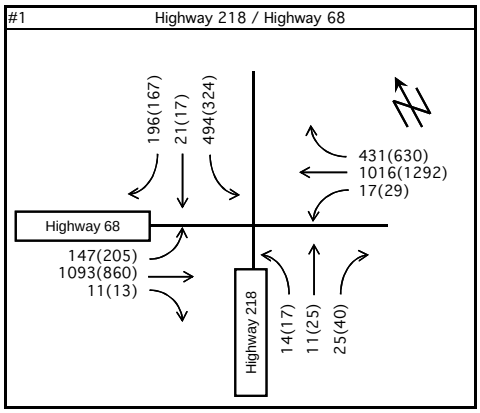
	Intersection					Existing Conditions	Background Conditions	Background + Project Conditions	Cumulative + Project Conditions
	N-S Street	E-W Street	Existing Lane Configuration	Existing Intersection Control	LOS Standard				
1	Highway 218	Highway 68	NB 1-L, 1-T/R SB 2-L, 1-T, 1-R EB 1-L, 1-T, 1-T/R WB 1-L, 2-T, 1-R	Signal	C/D (Caltrans)	None Recommended	None Recommended	None Recommended	RI #6 1. Widen and restripe NB Monterra to 1-L, 1-T, 1-R 2. Widen and restripe EB Hwy 68 to 2-L, 1-T, 1-T/R 3. Convert Hwy 218 SBR to RTO
2	York Road	Highway 68	SB 1-L, 1-R EB 1-L, 1-T WB 1-T, 1-R	Signal	C/D (Caltrans)	RI #1 1. Add 2nd Hwy 68 WBT	Same As Existing	Same As Existing	RI #7 1. Existing Improvements AND 2. Add 2nd Hwy 68 EBT 3. Add 2nd Hwy 68 EBL
3	Pasadera Drive-Boots Road	Highway 68	NB 1-L, 1-T/R SB 1-L/T, 1-R EB 1-L, 1-T, 1-R WB 1-L, 1-T, 1-R	Signal	C/D (Caltrans)	RI #2 1. Add 2nd Hwy 68 WBT	Same As Existing	Same As Existing	RI #8 1. Existing Improvements AND 2. Add 2nd Hwy 68 EBT
4	Laureles Grade Road	Highway 68	NB 1-L, 1-R EB 1-T, 1-R WB 1-L, 1-T	Signal	C/D (Caltrans)	RI #3 1. Add 2nd Hwy 68 EBT 2. Add 2nd Hwy 68 WBT	Same As Existing	Same As Existing	RI #9 1. Existing Improvements AND 2. Convert Laureles Grade NBR to RTO
5	Corral de Tierra Road	Highway 68	NB 1-L, 1-R EB 1-T, 1-R WB 1-L, 1-T	Signal	C/D (Caltrans)	RI #4 1. Add 2nd Hwy 68 EBT 2. Add 2nd Hwy 68 WBT	Same As Existing	Same As Existing	RI #10 1. Existing Improvements AND 2. Convert Corral de Tierra NBR to RTO
6	San Benancio Road	Highway 68	NB 1-L/T, 1-R SB 1-L/T, 1-R EB 1-L, 1-T, 1-R WB 1-L, 1-T/R	Signal	C/D (Caltrans)	RI #5 1. Add 2nd Hwy 68 EBT 2. Add 2nd Hwy 68 WBT	Same As Existing	Same As Existing	Same As Existing
	San Benancio Road	Meyer Road	NB 1-T/R SB 1-L/T WB 1-L/T/R	Stop Sign	C (Mon. Co.)	None Recommended	None Recommended	MM #1. Pay TAMC Fee[See note 6] MM #2. Trim Vegetation MM #3. Widen & Resurface Meyer Road MM #4. Provide Right-Turn Tapers MM #5. Add Southbound Left-Turn Lane MM #6. Pay TAMC Fee[See note 7]	Same As Background + Project

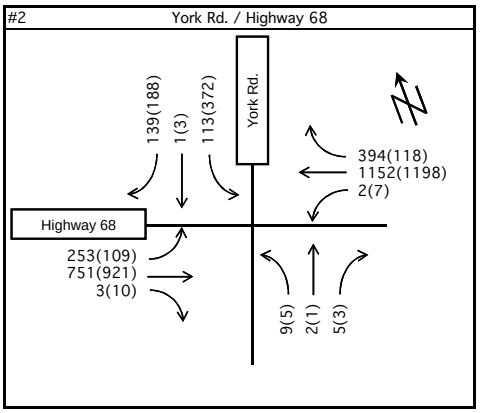
	Road Segment		Type	LOS Standard	Existing Conditions	Background Conditions	Background + Project Conditions	Cumulative + Project Conditions
1	Highway 68	Between Highway 218 and York Rd.	2-Lane Arterial	C/D	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*
2	Highway 68	Between York Rd. and Boots Rd.-Pasadera Dr.	2-Lane Arterial	C/D	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*
3	Highway 68	Between Boots Rd.-Pasadera Dr. and Laureles Grade Rd.	2-Lane Arterial	C/D	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*
4	Highway 68	Between Laureles Grade Rd. and Corral de Tierra Rd.	2-Lane Arterial	C/D	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*
5	Highway 68	Between Corral de Tierra Rd. and San Benancio Rd.	2-Lane Arterial	C/D	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*	Widen Highway 68 to 4 Lanes*

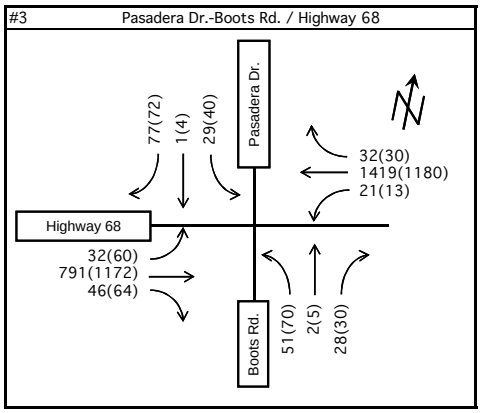
Notes:

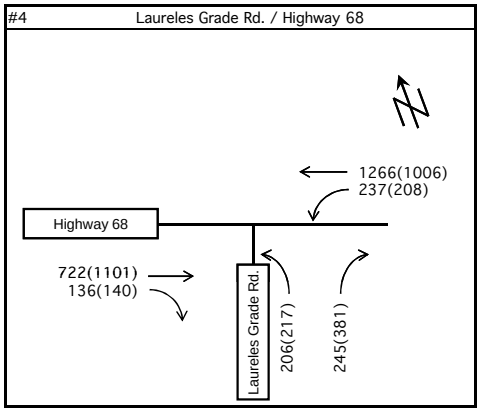
1. L, T, R = Left, Through, Right
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound
3. RTO = Right-turn overlap phasing
4. RI = Recommended Improvement
5. MM = Project Mitigation Measure
6. Payment of the TAMC fee mitigates direct project impacts at intersection #'s 5 and 6 through the TAMC "SR 68 Commuter Improvements" project.
7. Payment of the TAMC fee mitigates cumulative project impacts on the regional road network.

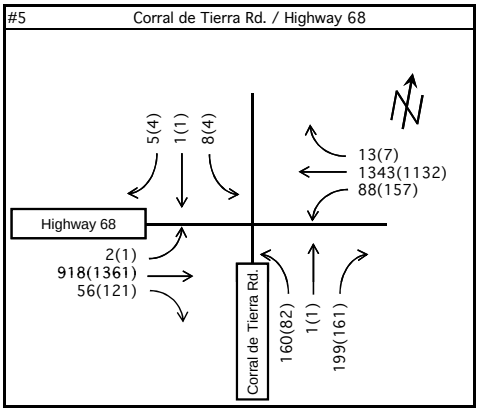
* Or Construct Highway 68 Bypass

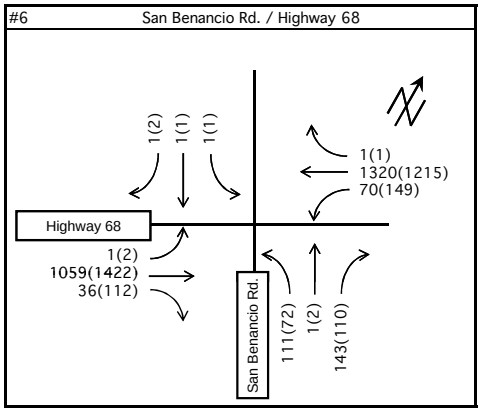


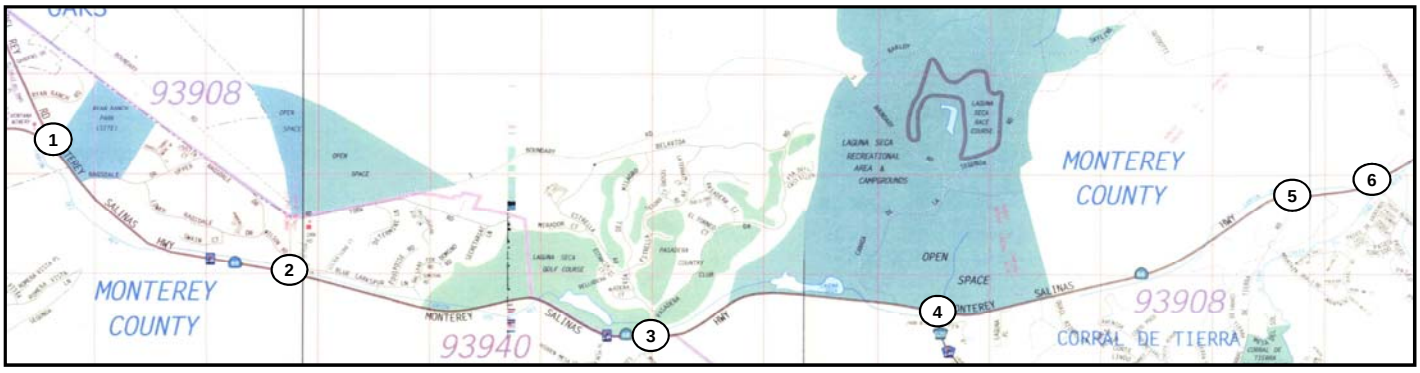












Notes:

1. XX (YY) = AM (PM)

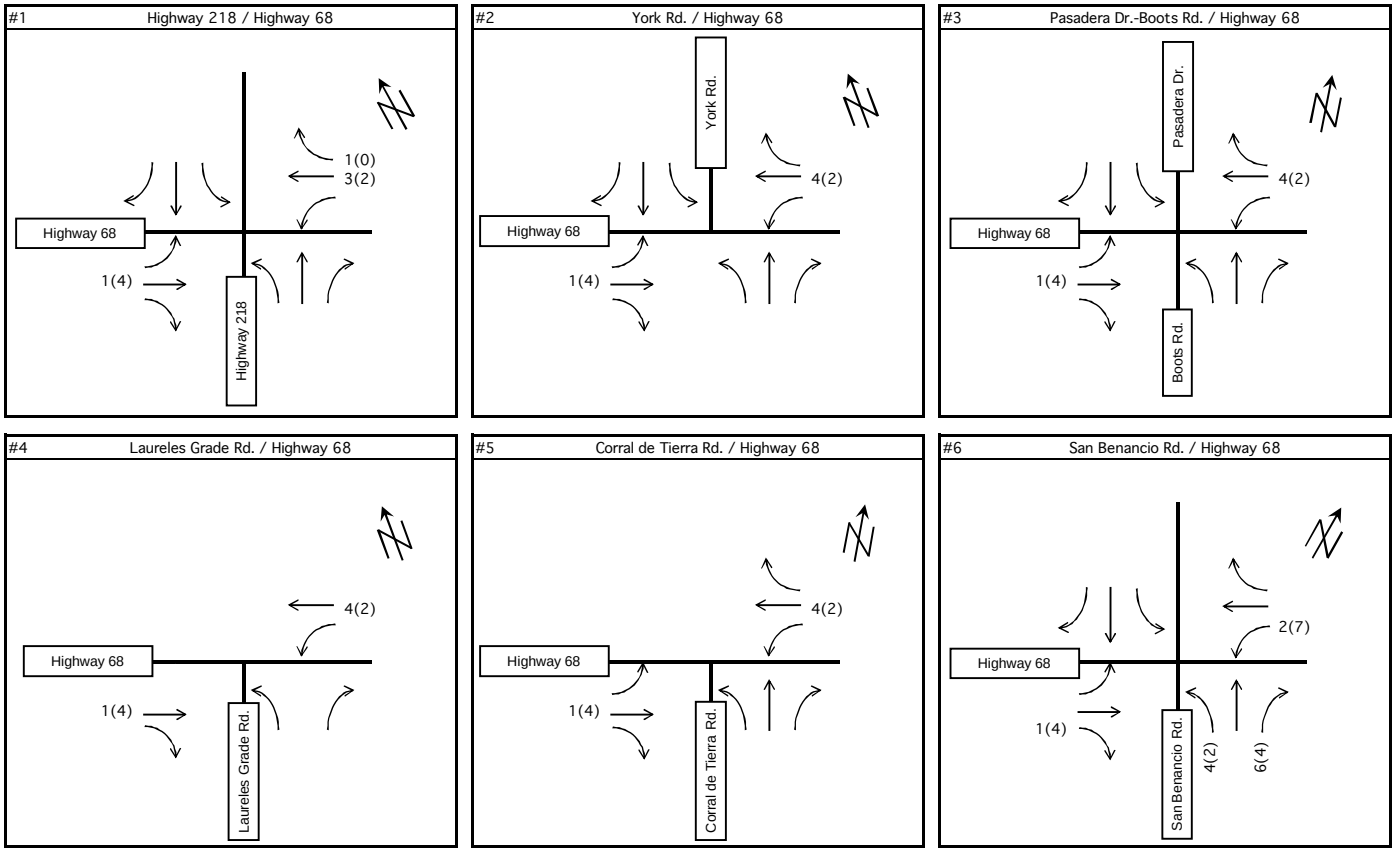
Harper Canyon / Encina Hills Subdivision - Project Trip Generation

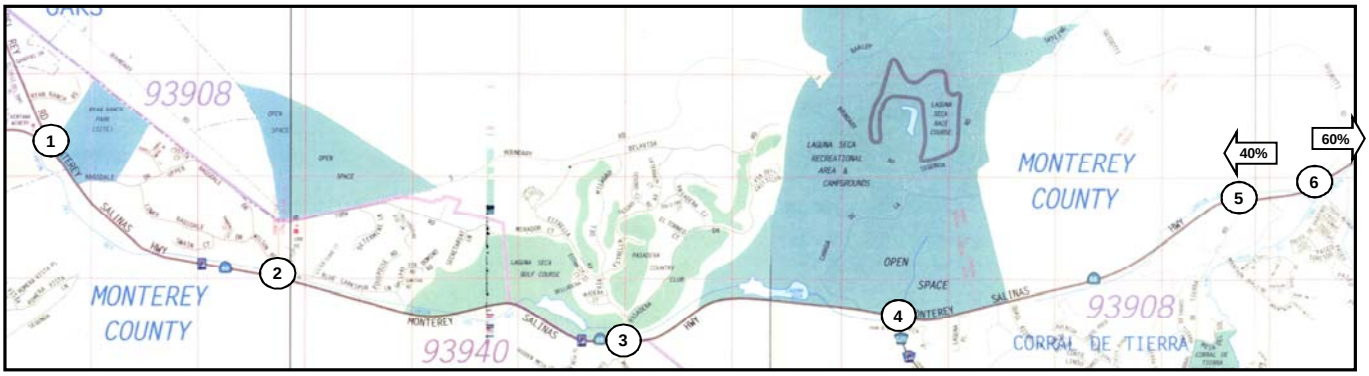
TRIP GENERATION RATES (per Dwelling Unit)[1]	ITE LAND USE CODE	DAILY TRIP RATE	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR RATE	% OF ADT	% IN	% OUT	PEAK HOUR RATE	% OF ADT	% IN	% OUT
Harper Canyon / Encina Hills Subdivision	210	9.57	0.75	8%	25%	75%	1.01	11%	63%	37%

GENERATED TRIPS	PROJECT SIZE	DAILY TRIPS	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT	PEAK HOUR TRIPS	% OF ADT	TRIPS IN	TRIPS OUT
Harper Canyon / Encina Hills Subdivision	17 Units	163	13	8%	3	10	17	10%	11	6
TOTAL GENERATED TRIPS	**17 Units**	**163**	**13**	**8%**	**3**	**10**	**17**	**10%**	**11**	**6**

Notes:

1. Trip generation rates published by Institute of Transportation Engineers, "Trip Generation," 7th Edition, 2003.

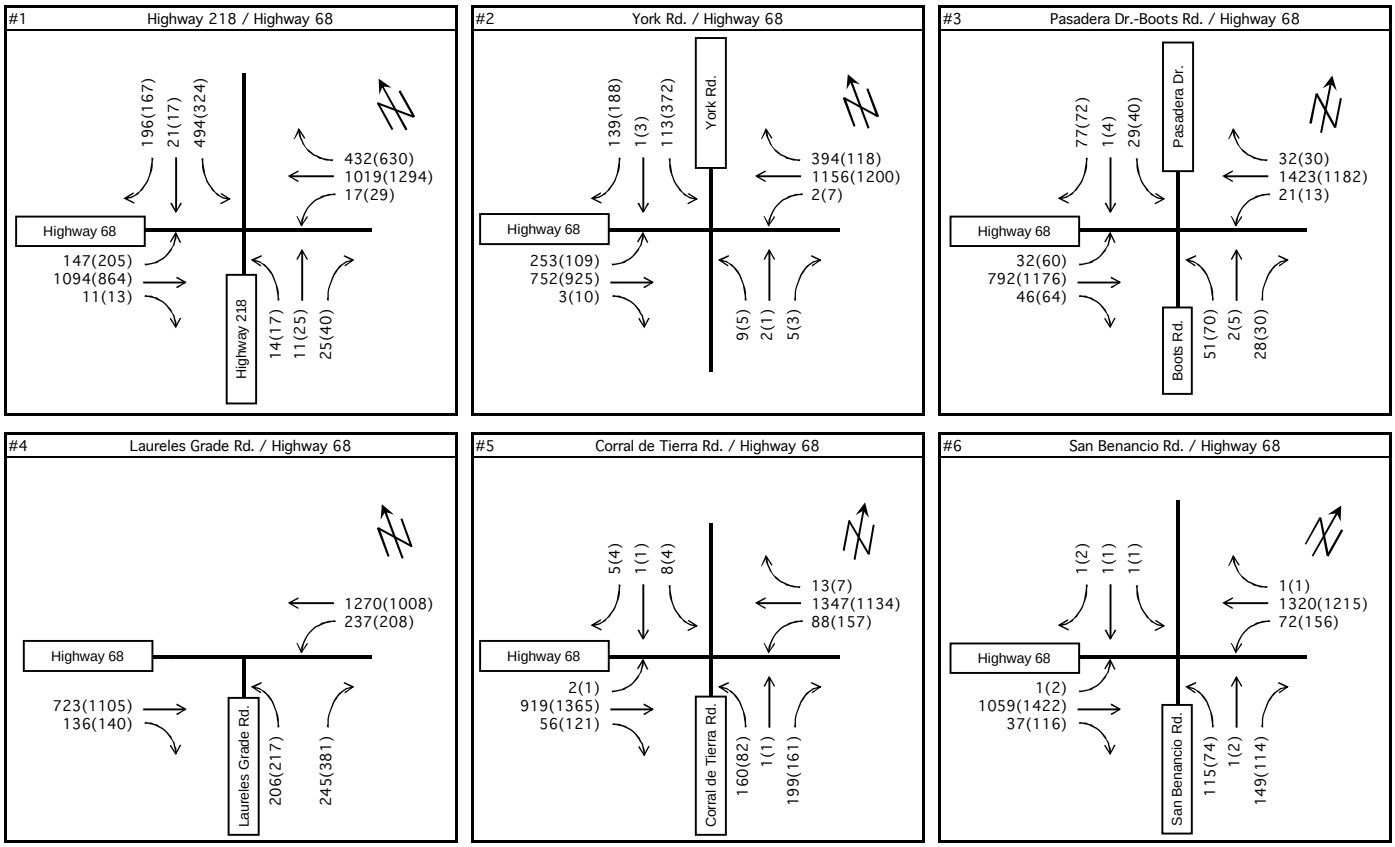


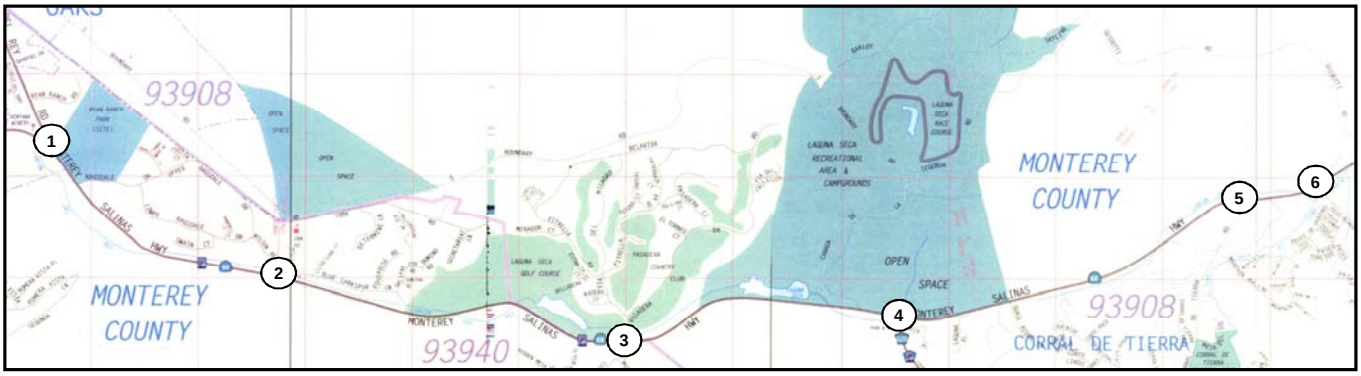


Notes:

1. XX (YY) = AM (PM)

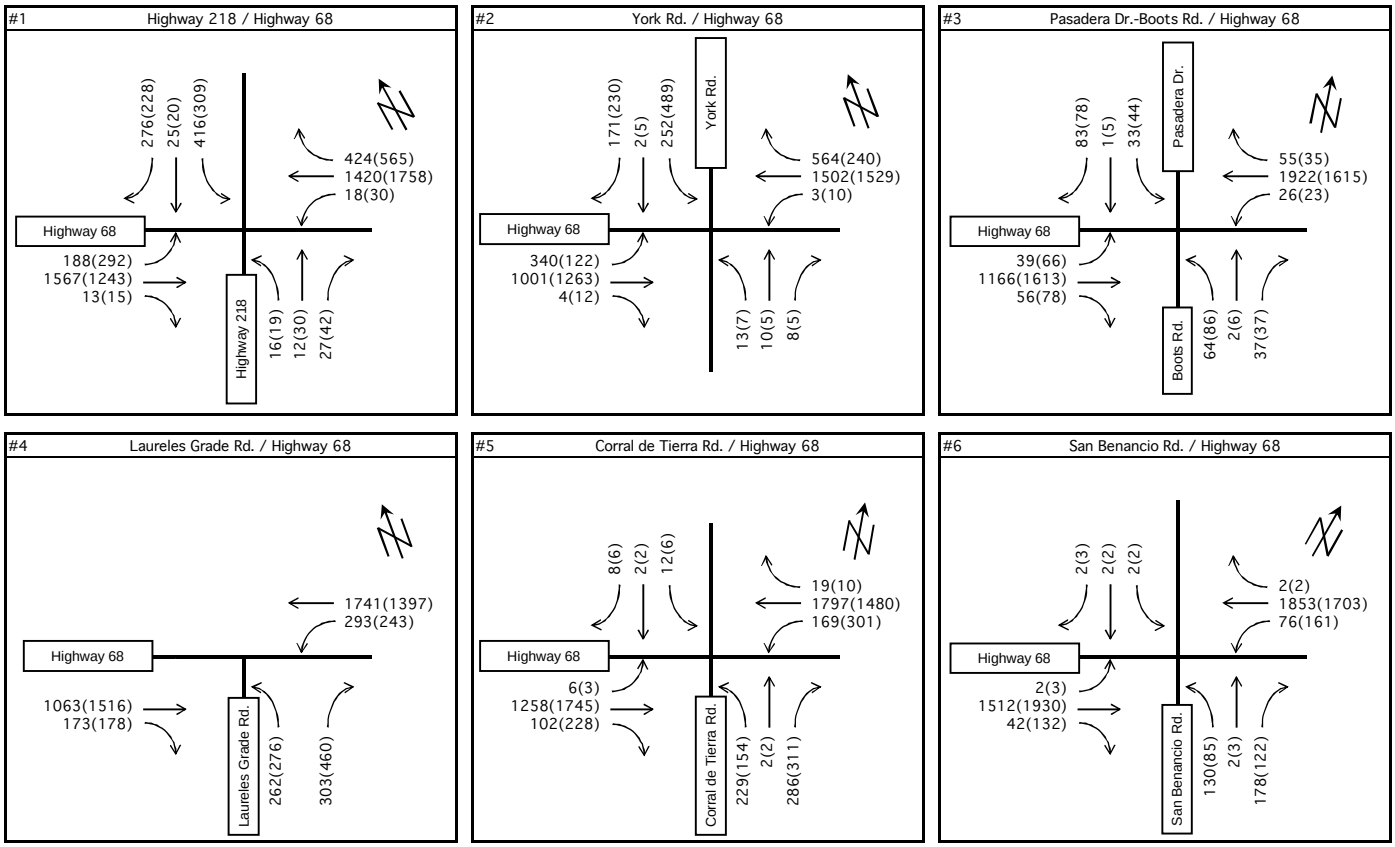
Exhibit 10
Project Trip Assignment
AM & PM Peak Hour Volumes

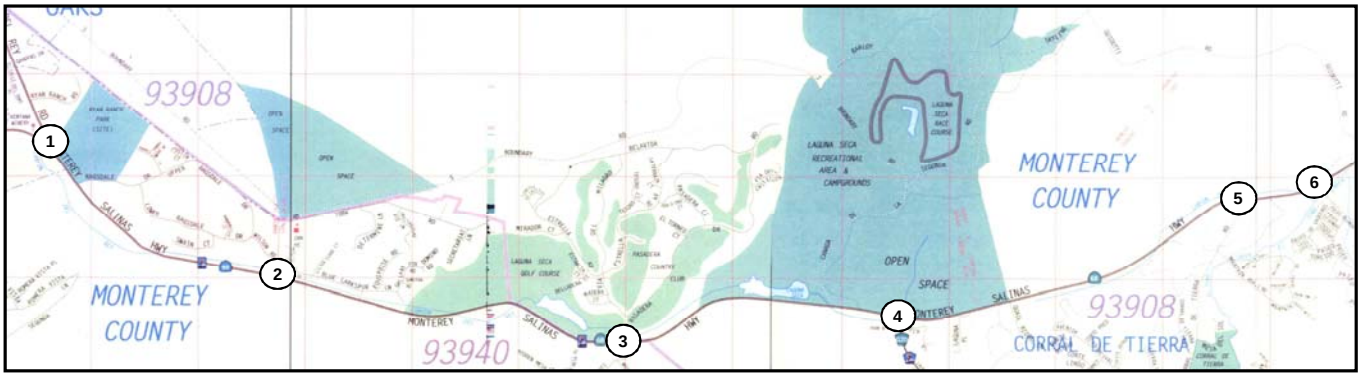




Notes:

1. XX (YY) = AM (PM)





Notes:

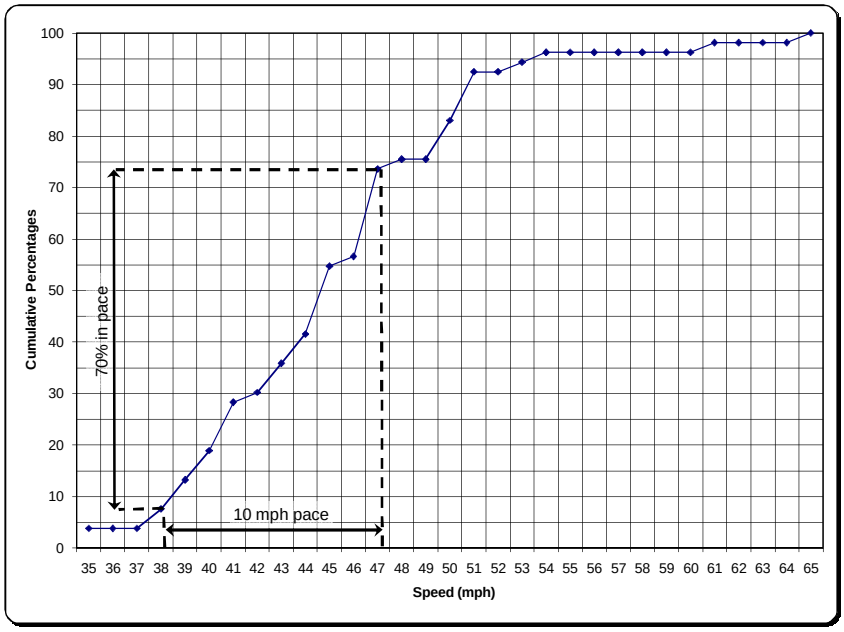
1. XX (YY) = AM (PM)

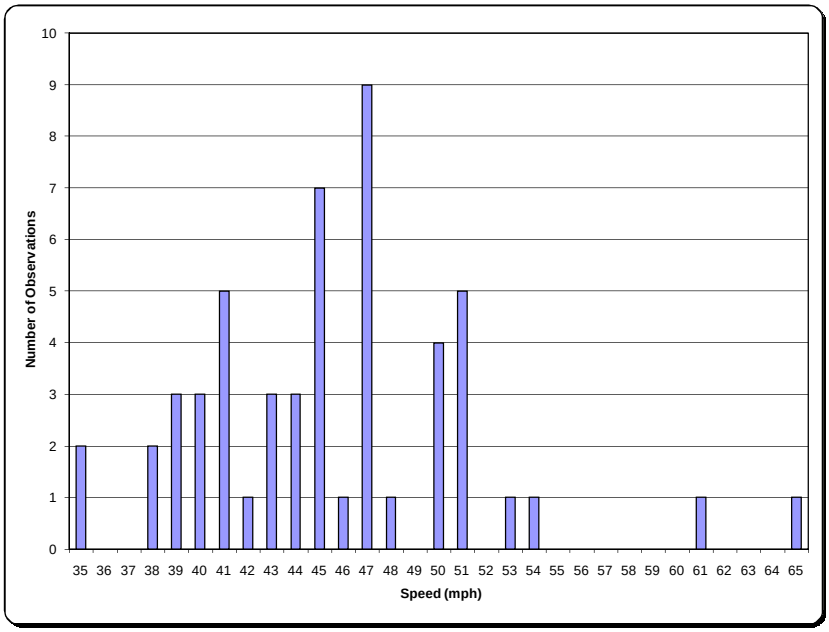
San Benancio Road Speed Study

Location:	**San Benancio Road at Meyer Road**				
Direction:	**NB**	50th percentile speed (median):	45 mph	Average Speed:	45 mph
Day of the Week:	Friday	85th percentile speed (critical):	51 mph	Standard Deviation:	6 mph
Date:	May 5, 2006	10 mph pace speed[2]:	38 to 47	Mode[1]:	47 mph
Time of Day:	3:00 PM - 4:30 PM	Percent in pace speed:	70 %	% Exceeding Speed Limit	17 %
Posted Speed Limit[3]:	50 mph	Range of speeds:	35 to 65		
Vehicles Observed:	53				

Survey Data

Speed (mph)	Number of Obs.	Percent. of Total	Cumul. Percent.
35	2	4	4
36	0	0	4
37	0	0	4
38	2	4	8
39	3	6	13
40	3	6	19
41	5	9	28
42	1	2	30
43	3	6	36
44	3	6	42
45	7	13	55
46	1	2	57
47	9	17	74
48	1	2	75
49	0	0	75
50	4	8	83
51	5	9	92
52	0	0	92
53	1	2	94
54	1	2	96
55	0	0	96
56	0	0	96
57	0	0	96
58	0	0	96
59	0	0	96
60	0	0	96
61	1	2	98
62	0	0	98
63	0	0	98
64	0	0	98
65	1	2	100





Notes:

[1] If there is more than one mode, the highest speed is presented in the summary.

[2] If there is more than one 10 mph pace speed, the average is presented in the summary.

[3] Refers to speed limit as posted on day and at the location of the speed survey.

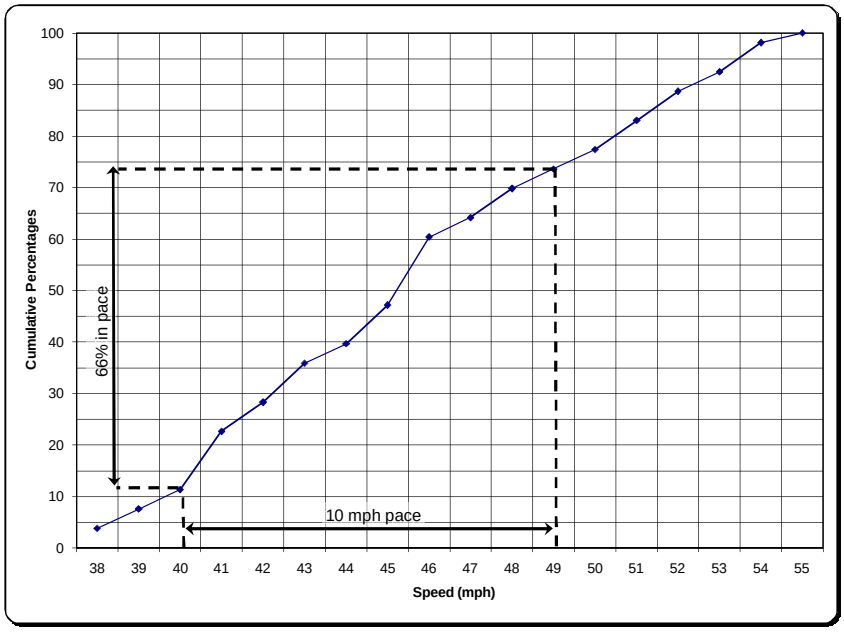
Exhibit 13
San Benancio Road Speed Study
Northbound Travel Direction

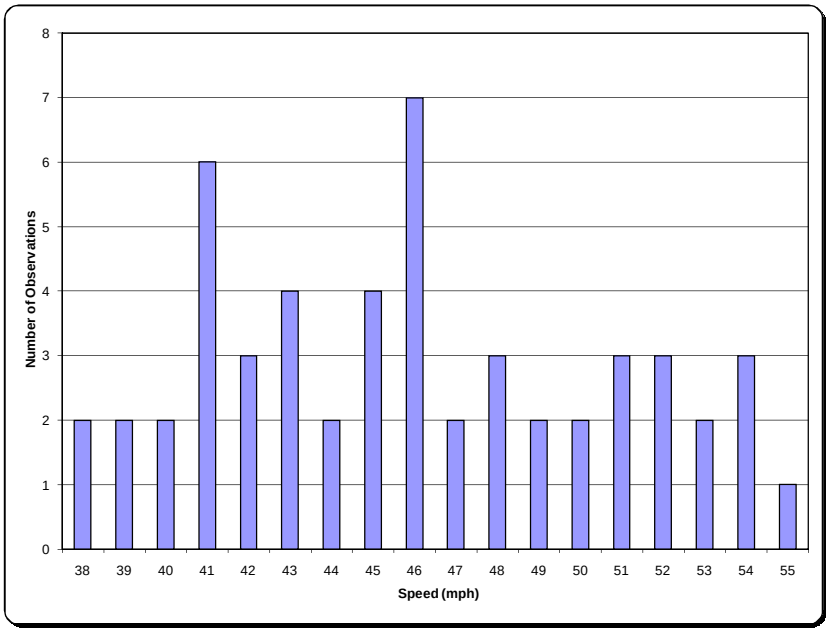
San Benancio Road Speed Study

Location:	**San Benancio Road at Meyer Road**				
Direction:	**SB**	50th percentile speed (median):	46 mph	Average Speed:	46 mph
Day of the Week:	Friday	85th percentile speed (critical):	52 mph	Standard Deviation:	5 mph
Date:	May 5, 2006	10 mph pace speed[2]:	40 to 49	Mode[1]:	46 mph
Time of Day:	3:00 PM - 4:30 PM	Percent in pace speed:	66 %	% Exceeding Speed Limit	23 %
Posted Speed Limit[3]:	50 mph	Range of speeds:	38 to 55		
Vehicles Observed:	53				

Survey Data

Speed (mph)	Number of Obs.	Percent. of Total	Cumul. Percent.
38	2	4	4
39	2	4	8
40	2	4	11
41	6	11	23
42	3	6	28
43	4	8	36
44	2	4	40
45	4	8	47
46	7	13	60
47	2	4	64
48	3	6	70
49	2	4	74
50	2	4	77
51	3	6	83
52	3	6	89
53	2	4	92
54	3	6	98
55	1	2	100





Notes:

[1] If there is more than one mode, the highest speed is presented in the summary.

[2] If there is more than one 10 mph pace speed, the average is presented in the summary.

[3] Refers to speed limit as posted on day and at the location of the speed survey.

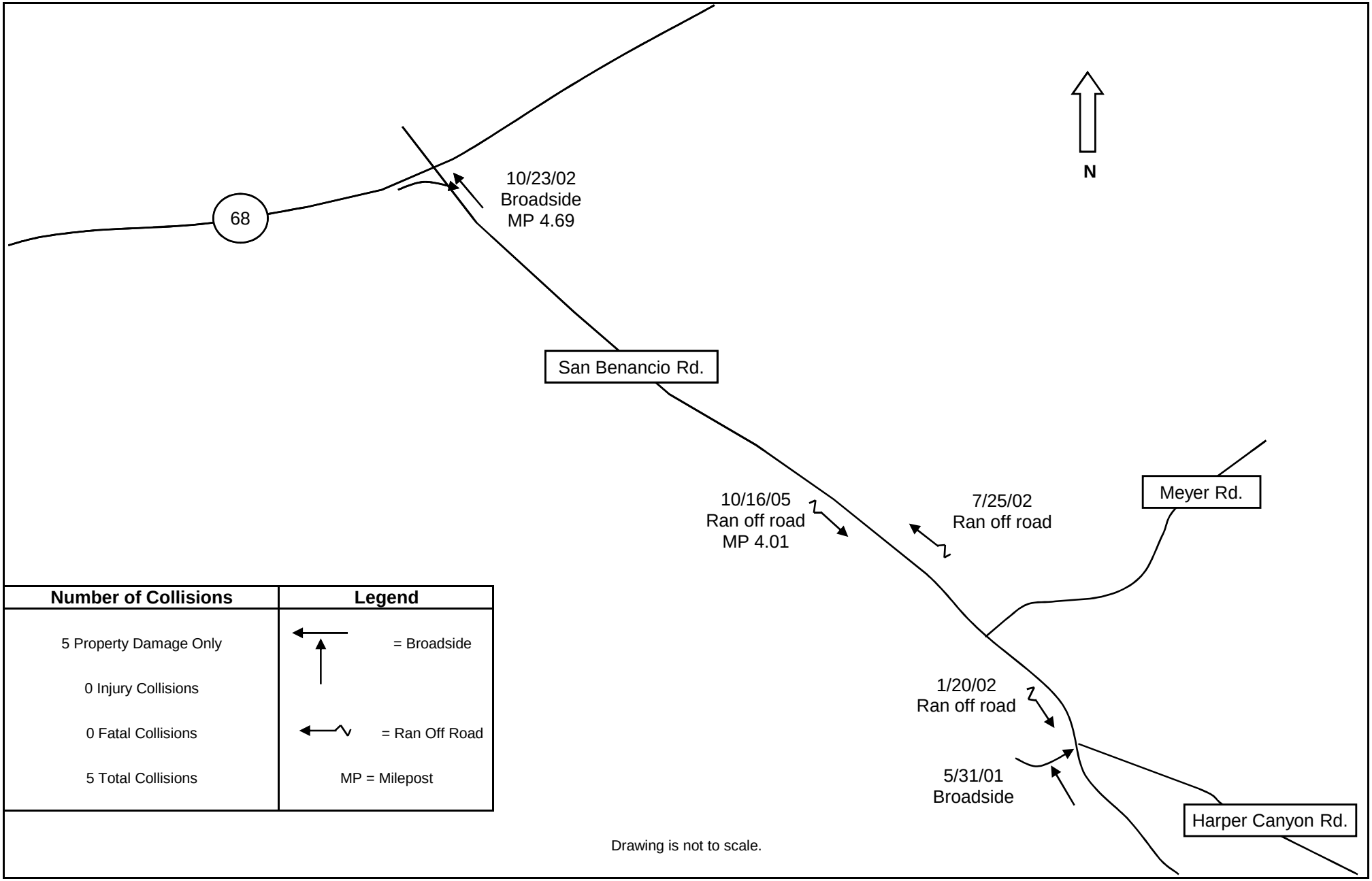
Exhibit 14
San Benancio Road Speed Study
Southbound Travel Direction

Sight Distance From Meyer Road (At San Benancio Road) With Measured 85th Percentile Speeds										
				Braking Distance (feet)		Total Distance (feet)		Measured	Available	Cause(s) of
	Design	Brake Reaction		2%	2%	2%	2%	Sight	Sight Distance	Sight Distance
Direction	Speed	Time	Distance	upgrade	upgrade	upgrade	upgrade	Distance (feet)	Acceptable?	Constraint
Looking North	52 mph	2.5	190.7	245.0		435.7		240	No	Vegetation, embankment, and crest vertical curve.
Looking South	51 mph	2.5	187.0		235.7		422.7	250	No	Vegetation, embankment, and crest vertical curve.

Notes:
1. Source: *A Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials, 2001
2. Design speeds of 51 and 52 mph are based upon a field speed survey performed on May 5, 2006. A speed limit of 35 mph is posted on San Benancio Road just south of SR 68. There is no posted speed limit on San Benancio Road in the vicinity of Meyer Road.

Sight Distance From Meyer Road (At San Benancio Road) With 40 MPH Speeds										
				Braking Distance (feet)		Total Distance (feet)		Measured	Available	Cause(s) of
	Design	Brake Reaction		2%	2%	2%	2%	Sight	Sight Distance	Sight Distance
Direction	Speed	Time	Distance	upgrade	upgrade	upgrade	upgrade	Distance (feet)	Acceptable?	Constraint
Looking North	40 mph	2.5	146.7	145.0		291.7		240	No	Vegetation, embankment, and crest vertical curve.
Looking South	40 mph	2.5	146.7		145.0		291.7	250	No	Vegetation, embankment, and crest vertical curve.

Sight Distance From Meyer Road (At San Benancio Road) With 35 MPH Speeds										
				Braking Distance (feet)		Total Distance (feet)		Measured	Available	Cause(s) of
	Design	Brake Reaction		2%	2%	2%	2%	Sight	Sight Distance	Sight Distance
Direction	Speed	Time	Distance	upgrade	upgrade	upgrade	upgrade	Distance (feet)	Acceptable?	Constraint
Looking North	35 mph	2.5	128.3	111.0		239.3		240	Yes	Vegetation, embankment, and crest vertical curve.
Looking South	35 mph	2.5	128.3		111.0		239.3	250	Yes	Vegetation, embankment, and crest vertical curve.



Number of Collisions	Legend
5 Property Damage Only	= Broadside
0 Injury Collisions	
0 Fatal Collisions	= Ran Off Road
5 Total Collisions	MP = Milepost

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