

Appendix I  
**Traffic Impact Analysis**





FEHR & PEERS  
TRANSPORTATION CONSULTANTS



Transportation Impact Analysis  
**UNION CITY MIXED USE PROJECT**

Prepared for:

Jones & Stokes  
City of Union City

Prepared by:

Fehr & Peers  
332 Pine Street, 4th Floor  
San Francisco, CA 94104

August 2010



## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>5</b>
Study Approach .....	5
Summary of Findings.....	6
Impacts and Mitigations.....	10
<b>1. INTRODUCTION .....</b>	<b>14</b>
Project Description.....	14
Traffic Operations Analysis Scenarios .....	17
Analysis Methodology and Level of Service Criteria .....	21
Standards of Significance .....	22
<b>2. EXISTING CONDITIONS .....</b>	<b>25</b>
Existing Intersection Conditions .....	25
Pedestrian and Bicyclist Circulation .....	29
Public Transit .....	30
<b>3. TRIP GENERATION FORECASTS .....</b>	<b>32</b>
Methodology .....	32
Project Trip Generation .....	41
Trip Generation – Project + Pending Intermodal Development.....	41
Trip Generation – Project + Pending & Long-Term Intermodal Development .....	41
<b>4. EXISTING PLUS PROJECT CONDITIONS .....</b>	<b>43</b>
Trip Distribution and Assignment.....	43
Planned Roadway Improvements.....	43
Existing Plus Project Traffic Impacts .....	43
Pedestrian Impacts.....	48
Bicycle Impacts.....	49
Transit Impacts .....	49
<b>5. EXISTING PLUS PROJECT &amp; PENDING INTERMODAL DEVELOPMENT .....</b>	<b>50</b>
Traffic Impacts Resulting from Project + Pending Intermodal Development.....	50
<b>6. CUMULATIVE (YEAR 2035) BASELINE CONDITIONS.....</b>	<b>55</b>
Cumulative Traffic Forecasts.....	55
Intersection Level of Service .....	55
<b>7. CUMULATIVE (YEAR 2035) WITH PROJECT CONDITIONS .....</b>	<b>58</b>
Cumulative Traffic Impacts .....	58
Cumulative Traffic Mitigation Measures .....	62
<b>8. REGIONAL ROADWAYS &amp; FREEWAY SEGMENTS .....</b>	<b>64</b>
Alameda County CMP Analysis Methodology .....	64
CMA Analysis Findings & Impacts on Regional Facilities .....	65
<b>9. SITE PLAN ANALYSIS.....</b>	<b>66</b>
Site-Access, On-Site Circulation and Parking Impacts .....	66

## **APPENDICES**

Appendix A: CMA Model and Volume

Appendix B: LOS Calculation Worksheets

## LIST OF FIGURES

Figure ES-1	Decoto Road Mitigation Measures .....	13
Figure 1	Project Location.....	15
Figure 2	Project Site Plan.....	16
Figure 3	Study Intersections and Roadway Network .....	20
Figure 4	Intersection Configurations and Control.....	27
Figure 5	Existing Peak Hour Traffic Volumes.....	28
Figure 6	Project Trip Distribution .....	44
Figure 7	Project Peak Hour Trip Assignment (with Existing Roadway Network) .....	45
Figure 8	Existing Plus Project Peak Hour Traffic Volumes .....	46
Figure 9	Trip Assignment – Project + Pending Intermodal Development .....	53
Figure 10	Existing Plus Project & Pending Intermodal Development Peak Hour Traffic Volumes .....	54
Figure 11	Year 2035 Cumulative Baseline Peak Hour Traffic Volumes .....	57
Figure 12	Year 2035 Cumulative With Project Peak Hour Traffic Volumes.....	59

## LIST OF TABLES

Table 1: Signalized Intersection Level of Service Definitions using Average Control Vehicular Delay .....	21
Table 2: Unsignalized Intersection Level of Service Definitions using Average Control Vehicular Delay .....	22
Table 3: Intersection Levels of Service – Existing Conditions .....	26
Table 4 – Trip Generation Forecast – Proposed Project .....	33
Table 5 – Trip Generation - Project + Pending Intermodal Development.....	34
Table 6 – Trip Generation – Cumulative Baseline .....	36
Table 7 – Trip Generation - Cumulative with Project Scenario.....	38
Table 8: Intersection Levels of Service – Existing Plus Project Conditions .....	47
Table 9: Intersection Levels of Service – Existing Plus Project & Pending Intermodal Development.....	52
Table 10: Intersection Levels of Service – Cumulative (Year 2035) Baseline Conditions.....	56
Table 11: Intersection Levels of Service – Cumulative with Project Conditions .....	60

## EXECUTIVE SUMMARY

This report presents the findings, conclusions, and recommendations of the transportation impact study conducted by Fehr & Peers for the mixed-use transit-oriented development proposed adjacent to the Union City BART station in Union City, California. The project site is located north of the BART station, between 11<sup>th</sup> Street and the Union Pacific / Southern Pacific (UPSP) railroad tracks, bordered on the west by Decoto Road, and on the east by a residential townhome development.

Figure 1 shows the project location, and Figures 2 through 4 show the proposed project site plans. The proposed project will consist of:

- 973 multi-family dwelling units
- 37,500 square feet (SF) of net new retail space
- 6,200 SF of business condominiums

## STUDY APPROACH

### *Traffic Operations*

This study analyzed traffic conditions at nine existing intersections and six future intersections, as shown on Figure 3. The intersection and roadway network was analyzed under five scenarios:

- Existing Conditions
- Existing Plus Project Conditions
- Existing Plus Project & Pending Intermodal Development Conditions
- Cumulative (Year 2035) Baseline Conditions
- Cumulative (Year 2035) With Project Conditions

In addition, traffic impacts to regional facilities and State highways in the project vicinity were evaluated as part of the Alameda County CMA analysis provided in Chapter 8 of this report.

### *Multi-Modal Analysis*

In addition to the traffic operations scenarios, this study evaluates potential transportation impacts related to:

- Bicycle & Pedestrian Circulation
- Public Transit
- Site Access & Design

### *Cumulative Development Assumptions*

#### Cumulative Baseline Scenario

The Year 2035 Baseline Conditions analysis is based on traffic that would be generated by previously planned land uses on the project site and adjacent Intermodal sites. The Year 2035 Baseline traffic volumes were derived

from the *Technical Memorandum for I-880 – SR 238 East-West Connector Traffic Operations Analysis*, prepared for the Alameda County Transportation Authority by Dowling Associates, Inc., May 19th, 2008.

Traffic volumes for the East-West Connector Study were derived from the Alameda County CMA (ACCMA) model, which includes traffic that would be generated by development of the Union City Intermodal sites, including the project site, consistent with the land uses previously approved for the station area. Table 6 shows the land uses previously assumed for the Union City Intermodal development sites, including the project site.

#### Cumulative With Project Scenario

For the Cumulative “With Project” scenario, an updated set of assumptions concerning the likely buildout of the Intermodal Station was derived, which includes the project. Based on the updated development assumptions, the “net change” was applied to Year 2035 Baseline volumes, in order to determine the Year 2035 “With Project” volumes for analysis purposes.

Since the Baseline volumes were based on previous assumptions concerning development of the Intermodal sites, the “net change” between Cumulative Baseline and “With Project” volumes was relatively small, and did not produce significant changes to Year 2035 operations. However, in evaluating potential impacts, development of the Intermodal Station would contribute to cumulative impacts based on the change from Existing conditions.

Table 7 shows the trip generation calculation for the Cumulative with Project scenario, and also shows the net change between the Cumulative Baseline and Cumulative “with Project” conditions. The development assumptions for the adjacent Intermodal Station development include the project.

### **SUMMARY OF FINDINGS**

Project findings are summarized below: the technical analysis supporting each finding is contained in the relevant chapter of this report. These findings are based on the criteria described in the *CEQA Guidelines*, Appendix G – Environmental Checklist Form. Significance thresholds are based on relevant standards and policies from the Union City General Plan and other applicable plans.

Development of the Project site as proposed would have a significant environmental impact if it were to result in:

- ***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 congestions at intersections)***
  - Project impacts to study intersections under Existing plus Project conditions would be **less-than-significant**. Study intersections would operate at LOS D or better under Existing plus Project conditions. This analysis assumes planned improvements are completed at the Decoto Road/Alvarado-Niles intersection.
  - Project impacts to study intersections under Existing plus Project & Pending Intermodal Development conditions would be **significant** at the intersection of Decoto Road/11<sup>th</sup> Street, because LOS will decline to LOS F during the AM and PM peak hours. This impact results from the addition of project traffic, and traffic resulting from pending development of the Intermodal Station sites, to Existing volumes. No other significant impacts would result under Existing plus Project & Pending Intermodal Development conditions.
  - The project would contribute to **cumulatively significant impacts** to study intersections under Cumulative (Year 2035) conditions at the following study intersections:
    - a. Decoto Road / 11<sup>th</sup> Street (LOS F during AM & PM peak hours); project contribution is **significant**.

- **Exceedence, either individually or cumulatively, of a level of service standard established by the county congestion management agency for designated roads or highways;**

The project would not cause exceedence of the Alameda County CMA (ACCMA) standard for designated roadways. Although the project would contribute traffic to facilities that would operate at LOS F (without the project), the project impact would be less than significant based on ACCMA standards. The ACCMA analysis included evaluation of freeway segments on I-880.

Based on the ACCMA analysis, project impacts to regional CMP facilities, including freeway segments on I-880, would be **less than significant**.

- **A change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;**

No impacts to air traffic patterns would occur as a result of the project.

- **A substantial increase in hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);**

The project would contribute to cumulative increases in motor vehicle and pedestrian volumes on Decoto Road, resulting in potential conflicts between motor vehicles and pedestrians. The existing marked crosswalks at 10<sup>th</sup> & Decoto are not controlled by traffic signals or stop signs. Additional traffic will pass through these crosswalk locations due to:

- Substantial increase in traffic volumes making a southbound left-turn from Decoto Road to 11<sup>th</sup> Street, inbound to the project site and adjacent Intermodal development sites;
- In addition, a large portion of projects trips are expected to enter the site from Decoto Road at Cheeves Way, thus increasing northbound volumes on Decoto Road that will cross the crosswalks at 10<sup>th</sup> Street.

As a result, delays to pedestrians crossing at this location would increase, resulting in a corresponding increase in potential conflicts between motorists and pedestrians. Furthermore, the traffic volumes and number of travel lanes would exceed the threshold at which marked crosswalks at uncontrolled pedestrian crossing would be recommended without the provision of enhanced crosswalk treatments.

In addition, the proposed project would include an extension of Cheeves Way that would intersect Decoto Road approximately 60 to 100 feet south (west) of the railroad tracks. Installation of this roadway raises the possibility that pedestrians could desire to cross Decoto Road at the new intersection with Cheeves Way, in order to continue north or south along the railroad track corridor.

City staff has indicated a preference for pedestrian and bicycle crossing to be accommodated at 11<sup>th</sup> Street, with elimination of the 10<sup>th</sup> Street crossing. The City has completed enhancements at the crosswalks located at 5th Street /Decoto and 7th Street to facilitate pedestrian connections between the Decoto Neighborhood and the Intermodal Station District as well as Guy Emanuele, Jr. Elementary School. City staff indicated that these improvements included the installation of high visibility cross walks and pedestrian-timed signals.

At locations with significant pedestrian volumes, or locations adjacent to “pedestrian generators” (such as the BART Station), it is generally advisable to provide pedestrian crossing opportunities at intervals of 600 feet or less, thus allowing pedestrians to reach a crosswalk within a walking distance of 300 feet. Pedestrians desiring to cross at 10<sup>th</sup> & Decoto will be able to utilize the signalized crosswalk at 11<sup>th</sup> Street (located 300 feet south of the northernmost crosswalk at 10<sup>th</sup> Street) in order

to cross Decoto. Therefore, the impact to pedestrian circulation at the 10<sup>th</sup> Street/Decoto Road intersection is **less than significant**.

Further north at Cheeves Way, it would be necessary for pedestrians desiring to cross Decoto Road to walk a distance of approximately 510 feet south to cross Decoto Road at 11<sup>th</sup> Street. However, this crossing location is very close to the railroad tracks, and would generate relatively few “pedestrian generators” given the distance from the BART Station and adjacent development sites. Therefore, the volume of pedestrians desiring to cross Decoto Road at Cheeves Way will be relatively low. Therefore, the impact to pedestrian circulation at the Cheeves Way/Decoto Road intersection is **less than significant**.

- **Inadequate emergency access;**

The Project site will be accessible by emergency vehicles on all sides due to a combination of new roads and a pedestrian promenade that will also provide emergency vehicle access. With respect to emergency access, the Fire Department has determined that the project site meets applicable requirements.

The PG&E site (see Figure 2) which the project site is a part of, is bordered on two sides by railroad tracks, and on a third side (east of the site) by a channelized waterway. Emergency vehicle access will be via the following locations:

- Emergency vehicles accessing the site from Decoto Road could enter via 11<sup>th</sup> Street or Cheeves Way (although access via Cheeves Way would be limited due to the raised median on Decoto).
- Emergency vehicles accessing the site from the east would be able to enter the site via 11<sup>th</sup> Street, with a planned extension of 11<sup>th</sup> Street to include a connection with the planned East-West Connector. Until such time as the East-West Connector is constructed, access from the east on 11<sup>th</sup> Street will utilize a temporary, route through an adjoining residential neighborhood accessed via Linda Street/Niles Boulevard.

The closest Fire station to the Project site is located on 7<sup>th</sup> Street, which is approximately ½ mile away. The Police Station is located on the corner of Alvarado-Niles Road and Royal Ann Drive, which is approximately 1 mile from the project site. Access to the site may be slowed due to the existing railroad tracks that cross Decoto Road. However, Fire Department staff has indicated that this has not been an issue for them in the past. In addition, if a problem does arise regarding delayed response times due to impaired site access, the Fire Department would radio to nearby fire stations in other cities to respond or take an alternate route. This impact is considered **less than significant** and no mitigation is required.

- ***Inadequate parking capacity;***

Environmental impacts under CEQA occur when a project does not supply an adequate amount of parking spaces to meet peak parking demand, either on its own or in combination with existing parking supplies, and results in physical impacts on the environment through the construction of off-site parking improvements. In this case, the provision of parking will be adequate to accommodate peak parking demand; thus no reasonably foreseeable environmental impacts related to inadequate parking capacity are expected to occur.

As a separate issue, the amount of parking spaces proposed for the project does not meet the residential parking requirements stipulated in the City's municipal code. However, this, on its own, does not constitute a physical impact on the environment and therefore is not considered a significant environmental impact under CEQA.

For the purposes of this analysis, peak parking demand for residents and retail/commercial customers is addressed separately in the following sections.

#### Residential Parking Demand

For the proposed residential structures, the project will include 1,430 parking spaces for residential uses and 133 guest spaces, which can also be used to satisfy the residential parking demand, for a total of 1,563 parking spaces. Based on parking demand data collected by the Institute of Transportation Engineers (ITE), the average peak parking demand for low- and mid-rise apartments/condominiums (2-10 stories) in a suburban setting is 1.2 vehicles parked per unit during the daily peak. Therefore, peak parking demand will be 1,168 parking spaces. Since it is generally advisable to provide an additional 5-10 percent "buffer" above peak demand to accommodate higher than anticipated guest or service (cleaning services, etc.) parking, a total of approximately 1,280 parking spaces would be recommended for the residential component of the project (based on typical ITE suburban rates). With the proposed mix of residential and guest spaces, the project will satisfy peak parking demand based on ITE rates. It should also be noted that these rates are based on suburban settings that are not as well-served by public transit as the project site. As such, the project could expect reduced demand due to proximity to transit, linked trips, and internal trips; thus, actual parking demand generated by residences at the project site will likely be less than the ITE rates predict.

Although the project will meet the conservative ITE rates described above, the project will not meet the City's parking standards for the Station Mixed Use Commercial (CSMU) Zoning District. These standards are found in Chapter 18.38 of the Union City Municipal Code and are defined as follows:

#### Residential Use (Ownership Units)

- a. One and one-half (1-1/2) covered and enclosed parking stalls per each one (1) bedroom or studio unit.*
- b. Two (2) covered and enclosed parking stalls per each unit with two (2) or more bedrooms.*
- c. A minimum of one (1) motorized cycle parking stall that is enclosed and weather-protected shall be provided for every twenty-five (25) units*

The Zoning Ordinance also contains parking standards for rental units that requires 1.5 parking stalls for each unit irrespective of bedroom count. For purposes of this analysis, the residential parking standards for ownership units were used since they generate a higher parking demand.

Assuming approximately half of the dwelling units will be one bedroom or less and half will be two-or-more bedrooms, the project will be required under the municipal code to provide 1,703 spaces for residential use, 140 more spaces than the project is proposing. As stated above, environmental impacts under CEQA occur when a project does not supply an adequate amount of parking spaces to meet peak parking demand, and results in physical impacts on the environment through the construction of off-site parking improvements. Since it has been demonstrated that the project will meet conservative ITE parking demand rates for residential parking, it can be

assumed that off-site parking improvements will not be necessary; thus, the related environmental effects will not occur. Additionally, in keeping with the project's intended purpose as a transit-oriented development and with the goals of the City's Transit First Policy as outlined in General Plan Goal TR-A.1.1, the project's provision of residential parking below City standards will encourage residents to use alternate forms of transportation, which will reduce traffic-related environmental effects. As such, the project's inability to meet the City's minimum parking standards is not considered a significant environmental impact under CEQA.

#### Retail/Commercial Parking Demand

To satisfy parking demand generated by the proposed retail and commercial units, the City has committed to supplying public parking within the proposed development and has developed a comprehensive parking program for the area. The City has installed two parking lots along 11th Street that accommodate up to 689 spaces. The parking lot located adjacent to the rear of the BART station, on the southerly side of 11th Street, includes 333 parking spaces. A portion of these parking spaces (approximately 179 spaces) were developed as BART replacement parking associated with the Union City BART Station renovation and will need to be maintained for an additional 14 years. The second parking lot is located on Block 2 and includes approximately 356 parking spaces that will be developed during Phase 2 of the project. These parking lots are currently being utilized by BART patrons but there is currently observed excess capacity on the weekdays and week-ends. In addition, the City has purchased 117 public stalls within a garage associated with an approved 157-unit multi-family project, located on Block 4, that will begin construction in Spring 2010. It is anticipated that the garage will be operational prior to occupancy of the retail and commercial space within the project. Approximately 111 on-street parking spaces will also be provided along 11th Street, Cheeves Way, Berger Way and Galliano Way, that will also be installed prior to the occupancy of the retail and commercial space. The City owns several additional blocks within the project area that can be utilized for surface parking, if necessary.

Based on ITE parking demand rates, the retail and commercial components are likely to generate peak demand of approximately four to five spaces per thousand square feet, based on typical suburban parking demand for retail uses. Therefore, assuming the more conservative rate of five spaces per thousand square feet, the peak parking demand generated by 37,500 square feet of the commercial uses would be 188 spaces. Per Chapter 18.38, Station Mixed Use Commercial, and Chapter 18.36, Commercial Districts, of the Union City Zoning Ordinance, the City's parking requirement for the retail and commercial (i.e. office) components are five parking spaces per one thousand square feet of gross floor area, which is consistent with the ITE parking demand rates.

As noted above, adequate public parking in the project vicinity is available to satisfy the required parking demand for retail and commercial uses within the project. As such, there will be sufficient parking to satisfy peak retail/commercial parking demand.

Overall, the project will be capable of meeting peak parking demands for residents as well as retail and commercial customers, as demonstrated through a comparison with ITA demand rates. Impacts related to parking will therefore be less than significant, and no mitigation is required.

## **IMPACTS AND MITIGATIONS**

Based on the significance criteria and findings identified in this report (and summarized above), the following impacts were identified, along with corresponding mitigation measures intended to reduce impacts to less than significant levels (where feasible):

### **Impact TRANS-1: The project would contribute to a near-term and long-term cumulative traffic impact at the intersection of Decoto Road/11<sup>th</sup> Street. (Significant Impact)**

The significant impact to the Decoto Road/11<sup>th</sup> Street intersection would result under Existing plus Project & Pending Intermodal Development and Cumulative conditions. This intersection provides the primary access point for motor vehicles accessing the project site and adjacent intermodal station development sites (existing and

planned) to the north of the BART Station. This impact was previously identified as significant and unavoidable during adoption of the *Avalon at Union Station EIR* by the City of Union City in 2006, because mitigating the impact to less than significant levels would require road mitigations that would conflict with the plan to facilitate transit and pedestrian-oriented development at the Union City Intermodal Station. Mitigating this impact would require additional travel lanes on Decoto Road and additional turn lanes on the northbound, southbound and westbound approaches. The addition of travel lanes on three of the four intersection approaches would increase the vehicular orientation of the area and result in lengthier crossing distances for pedestrians. In adopting a statement of overriding considerations, Union City determined that road widening at this location would be inconsistent with the goals outlined in the Union City *General Plan* and *Intermodal Station Redevelopment Plan*, both of which emphasize the need to facilitate pedestrian and transit circulation (rather than motor vehicle circulation) adjacent to the BART Station and Intermodal development sites.

The *Avalon at Union Station EIR* included the following findings in support of the Statement of Overriding Considerations:

“The conclusion that these intersections will be impacted... is the result of a traffic forecasting process that overlays many layers of conservative assumptions. While the use of conservative assumptions (assumptions that would tend to overstate impacts) is appropriate for an environmental document, they result in higher forecasts of traffic than contained in any other forecast process performed for the area. The net result of these assumptions is a conclusion that two critical intersections should be widened. Such widening would increase the vehicular orientation of the area and is counter to many General Plan policies, which envision the Project area as a pedestrian-oriented district.”

“An alternative approach to providing additional vehicular capacity expansion would be to adopt Statements of Overriding Consideration for the subject vehicular impacts. The City could also monitor traffic growth in the area, through the conduct of transportation impact studies for other developments in the area (new counts should be required for each), to determine whether growth from area development is actually resulting in forecasts that are as high as those presented in this EIR. In the event that traffic growth is less intense, the need for vehicular capacity expansion may be negated. In the event that traffic growth is as high as projected in this EIR, the City could: (a) consider modifying level of service standards within the pedestrian district to permit higher levels of vehicular congestion, in the interest of enhancing pedestrian use; (b) consider other policy changes that would seek to offset pedestrian degradation through pedestrian enhancements (such as median refuge islands in wider street crossings); (c) modify the land use program of area development to scale back traffic forecasts; or (d) some combination of the above.”

In considering approval of the project, a Statement of Overriding Considerations could be adopted in conjunction with mitigation measures intended to reduce the severity of the cumulative traffic impact. The following mitigation measures are recommended to partially mitigate this impact:

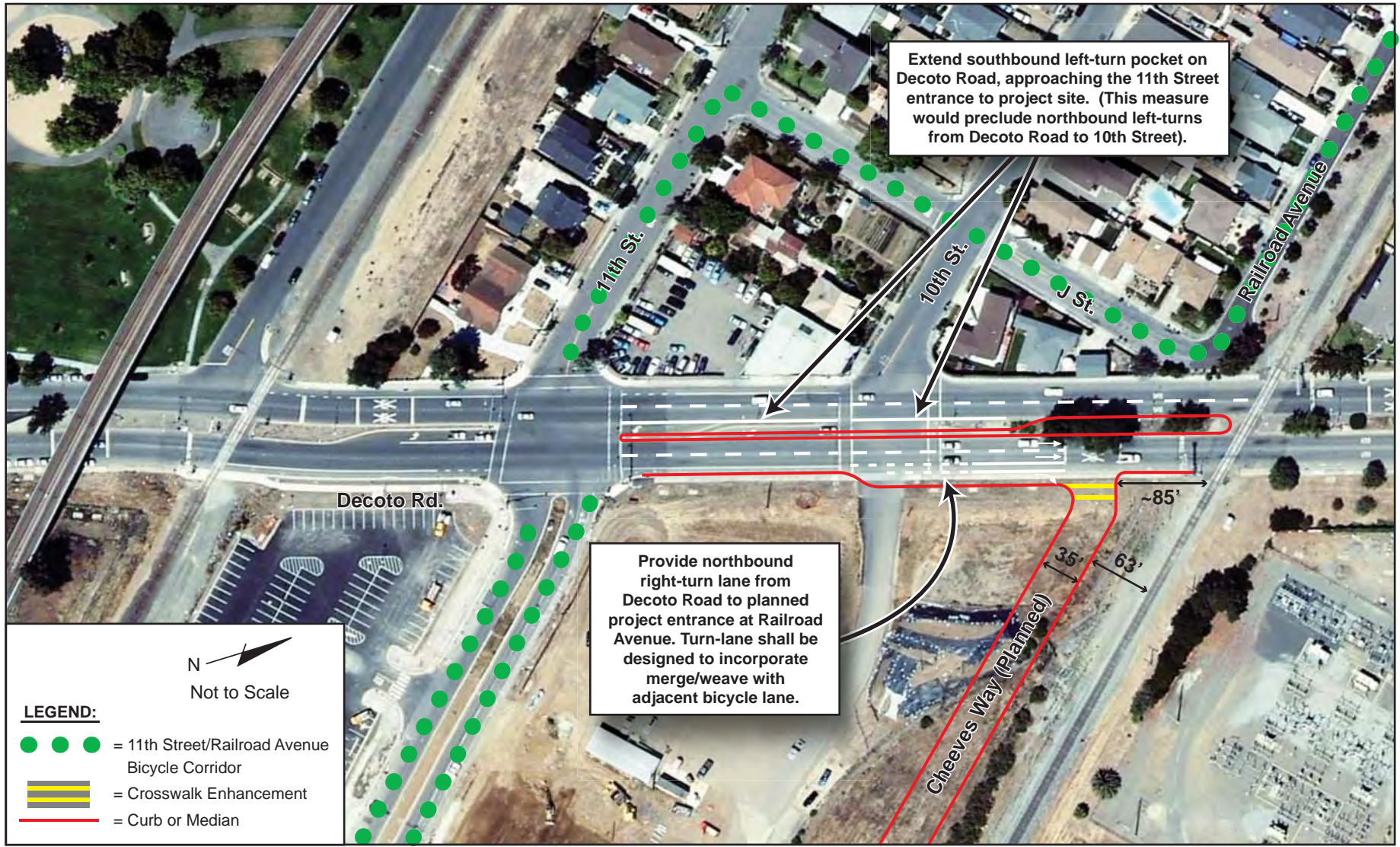
- Extend the length of the southbound left-turn pocket on Decoto Road, approaching 11<sup>th</sup> Street. This measure would provide additional storage for vehicles entering the project site with a left-turn movement from Decoto to 11<sup>th</sup>, and reduce delays to through traffic on Decoto that would occur due to left-turning vehicles spilling back out of the left-turn lane and into one of the through lanes. A conceptual design for this measure is shown on Figure ES-1. This measure would include relocation of a portion of the existing center median and elimination of the northbound left-turn pocket for vehicles traveling northbound on Decoto Road (approaching 11<sup>th</sup> Street); volumes making the northbound left-turn are very low in comparison to the southbound left-turn and northbound right-turn volumes for vehicles accessing the BART Station.
- Install a northbound right-turn lane on Decoto Road, approaching the intersection with Cheeves Way, in order to facilitate access to the project site at an alternative location. The intent would be to encourage northbound motorist to enter the site via Cheeves Way, rather than via 11<sup>th</sup> Street.

However, even with these mitigation measures, this impact is **significant and unavoidable** following mitigation. Therefore, a statement of overriding Considerations would be necessary, as discussed above.

*Mitigation TRANS-1:*


Reduce the severity of impacts at Decoto Road/11<sup>th</sup> Street by extending the length of the southbound left-turn pocket on Decoto Road (approaching 11<sup>th</sup> Street), relocating the Decoto Road median and eliminating the northbound left-turn pocket from Decoto Road to westbound 10<sup>th</sup>; and installing a northbound right-turn lane on Decoto Road, approaching Cheeves Way. Figure ES-1 shows a conceptual plan for the proposed mitigation (in combination with adjacent mitigations to improve bicycle and pedestrian circulation at Decoto/10<sup>th</sup> and Decoto/Cheeves Way).

This impact would remain **significant and unavoidable** at Decoto Road/11<sup>th</sup> Avenue (see further discussion above with findings supporting a statement of overriding considerations).






Extend southbound left-turn pocket on Decoto Road, approaching the 11th Street entrance to project site. (This measure would preclude northbound left-turns from Decoto Road to 10th Street).

Provide northbound right-turn lane from Decoto Road to planned project entrance at Railroad Avenue. Turn-lane shall be designed to incorporate merge/weave with adjacent bicycle lane.

N   
Not to Scale

**LEGEND:**

-  = 11th Street/Railroad Avenue Bicycle Corridor
-  = Crosswalk Enhancement
-  = Curb or Median

# 1. INTRODUCTION

This report presents the findings, conclusions, and recommendations of a transportation impact study conducted for a mixed-use transit-oriented development in Union City, California. The project site is located east of the intersection of Decoto Road/11<sup>th</sup> Street, and north of the Union City BART station.

## PROJECT DESCRIPTION

The proposed project is a mixed-use development that would consist of 973 multi-family residential dwelling units, 37,500 net square feet (SF) of retail, and 6,200 SF of business condominium space in three separate 10 to 24-story residential towers and 275 three to four story flats. Each building would have retail space and business condominiums on its lower floors, with residential units above. The residential units range in size from one to three-bedroom units.

The proposed project would be located on a six acre site near 11<sup>th</sup> Street and Decoto Road in Union City, adjacent to the Union City BART/Intermodal Station. The project site is part of a larger 30-acre site, that was formerly occupied by PG&E. Figure 1 shows the project location, while Figure 2 shows the proposed project site plan. The project would be constructed on Blocks 2 & 3 as shown in Figure 2. The project would be built in two phases. The following descriptions for Phase 1 & 2 provide estimated residential unit counts and commercial square footage amounts based on the most recent conceptual development plans submitted by the applicant. These amounts may be revised slightly between phases but the overall level of development would not exceed the total number of dwelling units proposed, which is 973.

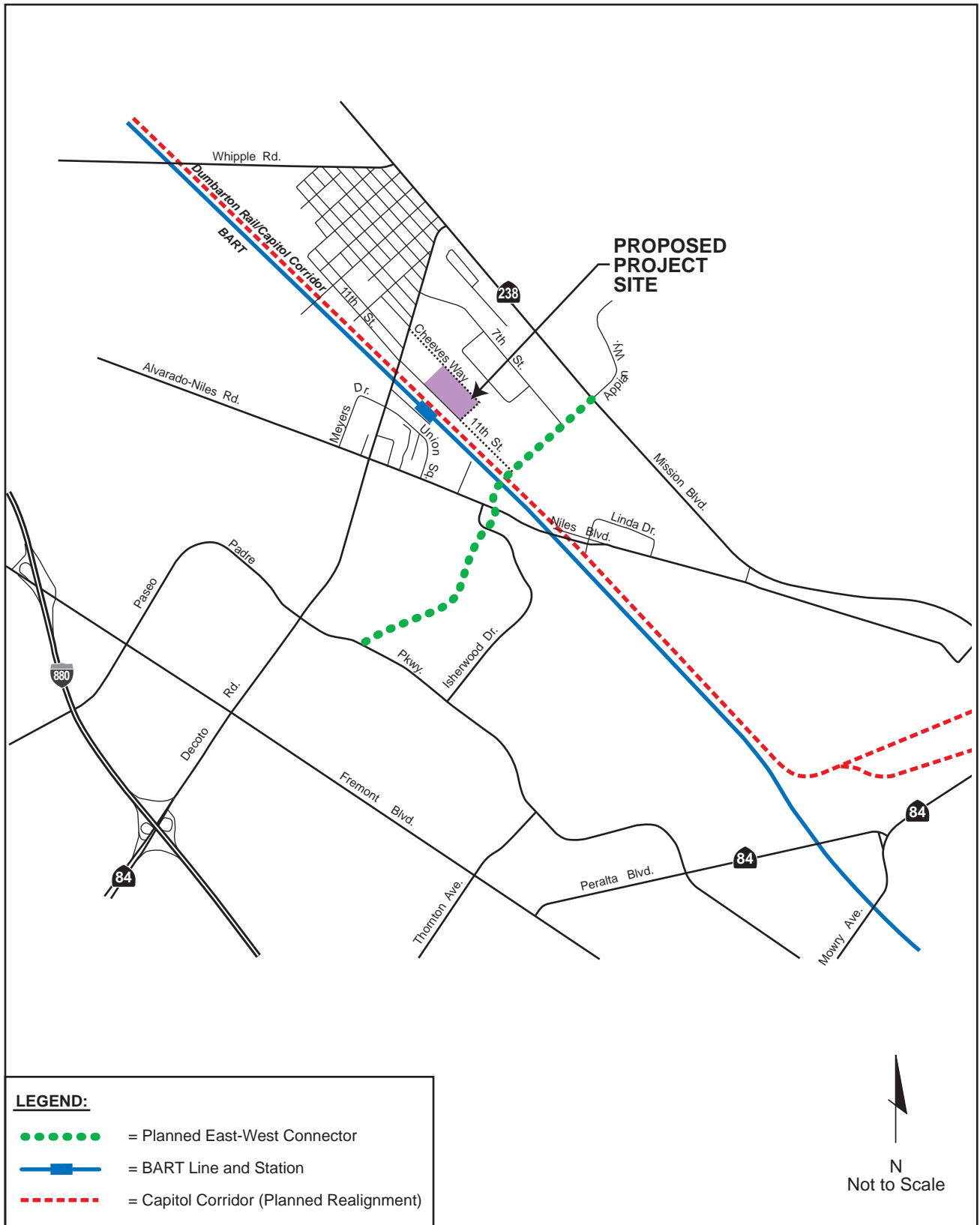
### **Phase 1 (Block 3):**

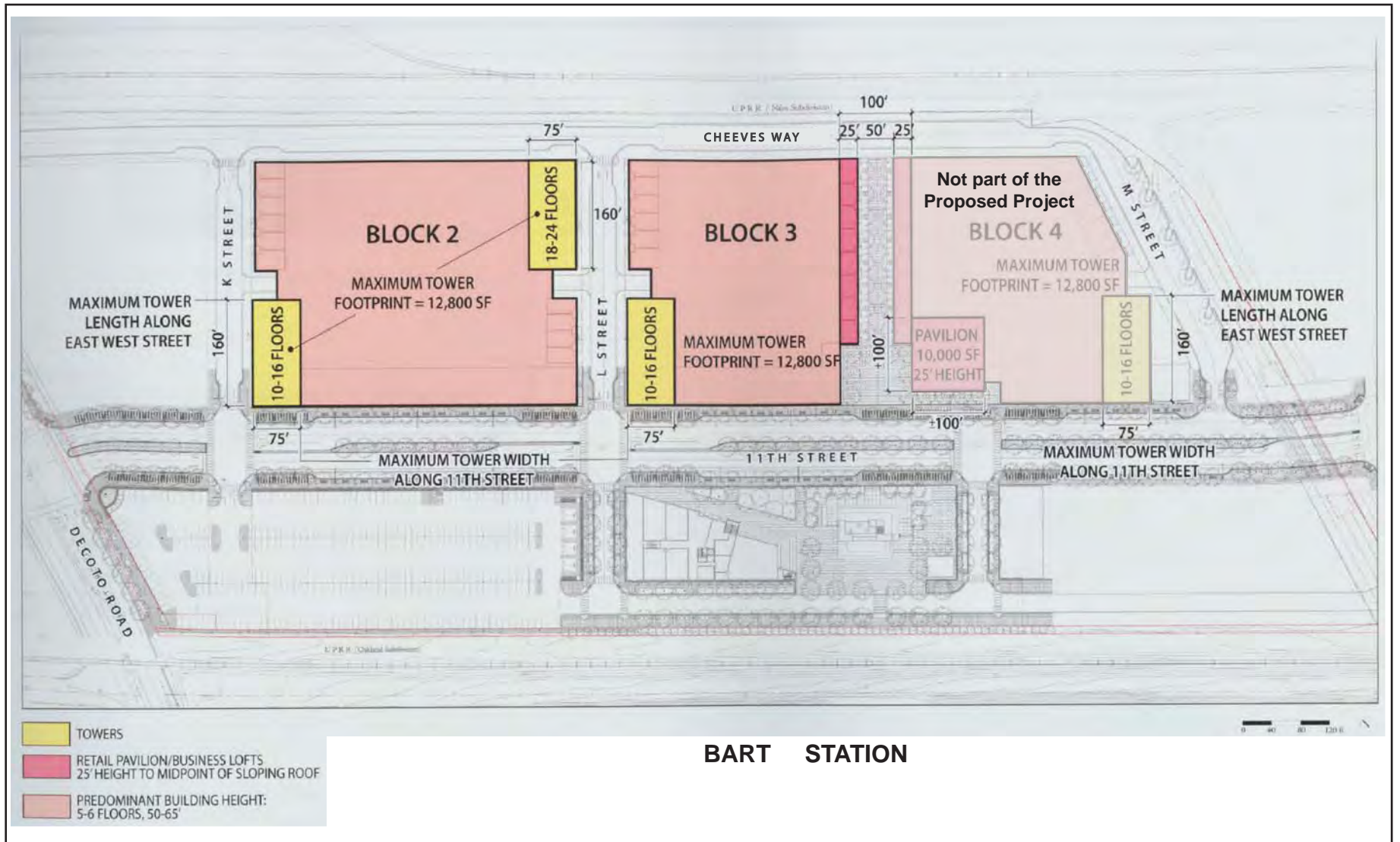
- 331 total residential units
  - One 10 to 16-story tower consisting of 188 residential units constructed on top of a parking podium
  - 143 podium-level, 3 to 4-story residential flats
- 15,400 net SF of retail ready space fronting 11<sup>th</sup> Street
- 6,200 SF of business condominiums fronting the Central Promenade

### **Phase 2 (Block 2):**

- 642 total residential units
  - Two 10 to 24-story towers constructed on top of a parking podium consisting of 510 residential units
  - 132 podium-level, 3 to 4-story residential flats
- 22,100 SF of retail ready space fronting 11<sup>th</sup> Street

Each of the “with project” analysis scenarios described in this report are based on buildout of Phase 2 of the project which includes up to 973 units, up to 37,500 net square feet of retail space and up to 6,200 square feet of business condominiums on Blocks 2 & 3.





## TRAFFIC OPERATIONS ANALYSIS SCENARIOS

As directed by the City of Union City, this study evaluated transportation conditions for the following scenarios:

**Existing Conditions** –represents current conditions based upon traffic counts conducted in December 2007.

**Existing Plus Project Conditions** – represents conditions resulting from the addition of project trips to existing traffic volumes.

**Existing Plus Project & Pending Intermodal Development** – represents conditions resulting from the addition of project trips, and trips generated by pending development of adjacent transit-oriented development (TOD) projects surrounding the BART station. As directed by the City of Union City, the Existing plus Project & Pending Intermodal Development scenario includes the following pending developments (in addition to the project):

- Avalon Bay (438 dwelling units)
- Pacific State Steel Corporation (PSSC) remaining townhouses (46 dwelling units remaining to be completed and occupied as of December 2007)
- PG&E site apartments on Block 4 (157 dwelling units)
- PG&E site retail on Block 4 (8,800 square feet)
- PG&E site office development (463,000 square feet)
- BART parking expansion (179 spaces)
- PG&E Business Condominiums located adjacent to Block 4 (6,200 square feet)
- Retail Pavilion Building – (10,000 square feet)

This section identifies projects that the City anticipates would be developed in the project vicinity. At the time the traffic counts were completed for this study, a few of the projects were not occupied or constructed and were included in this list. These include the Avalon Bay project, a portion of the PSSC townhomes, and the BART parking lot located along 11<sup>th</sup> Street. Traffic Impacts from these projects were estimated using *Trip Generation* (ITE, 2008) rates and using route assignments consistent with other proposed or approved projects in the area.

**Cumulative (Year 2035) Baseline Conditions** – represents long-term forecasted traffic conditions for Year 2035. The Year 2035 Baseline scenario includes traffic that would be generated by previously planned land uses on the project site and adjacent Intermodal sites. The Year 2035 Baseline traffic volumes were derived from the *Technical Memorandum for I-880 – SR 238 East-West Connector Traffic Operations Analysis*, prepared for the Alameda County Transportation Authority by Dowling Associates, Inc., May 19th, 2008. Cumulative traffic volumes for that study were derived from the Alameda County CMA model, which includes trips generated by development of the Union City Intermodal sites, including the project site, consistent with the uses previously approved for the area.

The Cumulative Baseline analysis is presented for comparative purposes, to present the anticipated levels of traffic based on previously approved and planned projects consistent with the assumed development outlined in the *Avalon at Union City EIR* (2006). Adjustments to these assumptions were made to address projects approved by the City since publishing the *Avalon at Union City EIR* based on input from city staff. The Cumulative Baseline and “With Project” comparison is not used to determine impacts. Cumulative impact analysis is based on the difference between *Existing* and *Cumulative with Project* conditions.

**Cumulative (Year 2035) With Project Conditions** – represents long-term forecasted traffic conditions following the net change in trips resulting from the project, pending Intermodal Station development, and updated assumptions concerning the full, long-term buildout of the Union City Intermodal Station.

In addition to the project, and pending intermodal development projects, additional TOD components evaluated in the Cumulative with Project scenario are:

- Site office development on BART owned property (500,000 square feet)
- Removal of the 179 BART parking spaces included in the Existing plus Project & Pending Intermodal Development scenario. This site is not co-located with the BART office development, but where the “PG&E site office development” is proposed.
- PSSC site office development (250,000 square feet)
- Dumbarton Rail Station parking lot (459 spaces)
- Capitol Corridor Rail Station parking lot (75 spaces)

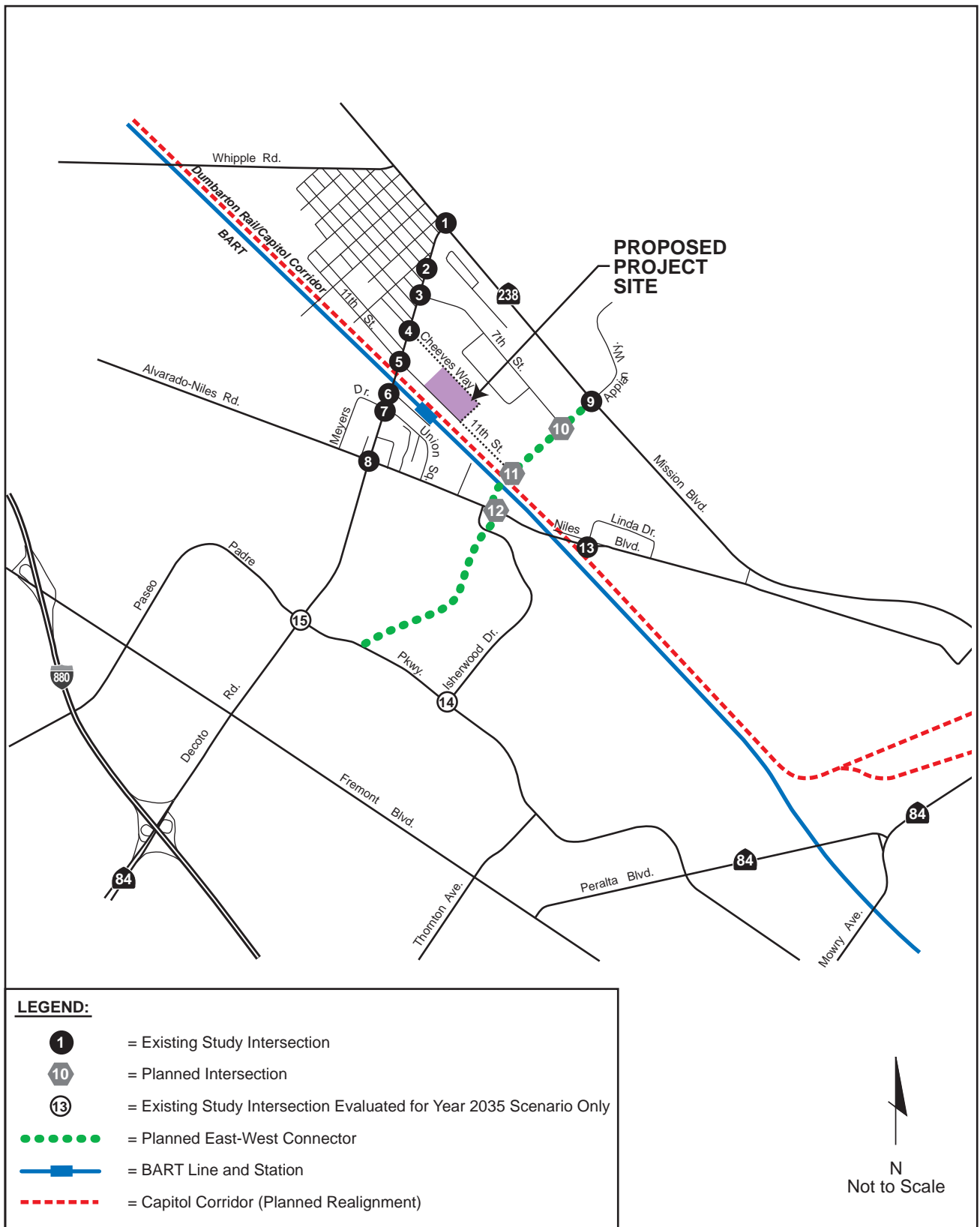
Figure 3 shows the study intersections and roadway network. Intersections 1 – 9 and 13 were evaluated for all scenarios, while intersections 10 – 12 and 14 - 15 were evaluated for the cumulative year 2035 scenarios only (noted in *italics* below). The study intersections are:

1. Decoto Road/Mission Boulevard
2. Decoto Road/5<sup>th</sup> Street
3. Decoto Road/7<sup>th</sup> Street
4. Decoto Road/Cheeves Way
5. Decoto Road/11<sup>th</sup> Street
6. Decoto Road/Station Way
7. Decoto Road/Meyers Drive/Union Square
8. Decoto Road/Alvarado-Niles Road
9. Mission Boulevard/Appian Way
10. *7<sup>th</sup> Street/East-West Connector*
11. *11<sup>th</sup> Street/East-West Connector*
12. *Alvarado-Niles Road/East-West Connector*
13. Alvarado-Niles Boulevard/Linda Drive
14. *Paseo Padre Parkway/Isherwood Drive*
15. *Decoto Road/Paseo Padre Parkway*

The proposed East-West Connector was assumed to be in place under Cumulative (Year 2035) traffic conditions. Figure 1 shows this would involve construction of a major arterial linking Mission Boulevard and Paseo Padre Parkway.

As requested by the City of Fremont, three study intersections (13-15) were evaluated in the City of Fremont. Cumulative conditions volumes for these intersections were obtained from the *Technical Memorandum for I-880 – SR 238 East-West Connector Traffic Operations Analysis*. Existing year intersection volumes of Alvarado-Niles Road and Linda Drive were obtained from traffic counts conducted in May 2010.

The City of Fremont also requested analysis of a fourth location, the intersection of Mission Boulevard/King Avenue. King Avenue functions as a local street that provides access to approximately 40 residences to the east of Mission Boulevard, and is one of two access points to approximately 300 residences located west of Mission Boulevard. Given the relatively limited number of residences served by King Avenue, side-street volumes are unlikely to result in significant delays to through traffic on Mission Boulevard, or to peak hour intersection LOS at the Mission Boulevard/King Avenue intersection. Project trips would be primarily limited to through trips on Mission Boulevard and few, if any, project trips would likely use King Avenue. Given the low probability of project impacts at this location, the Mission Boulevard/King Avenue intersection was not selected for evaluation.



## ANALYSIS METHODOLOGY AND LEVEL OF SERVICE CRITERIA

Transportation engineers and planners use the intersection Level of Service (LOS) methodology from the 2000 *Highway Capacity Manual (HCM 2000)* to describe the operations of the local roadway network. LOS varies from LOS A (indicating free flow traffic conditions with little or no delay at intersections) to LOS F (representing over-saturated conditions where traffic flows exceed design capacity, resulting in long queues and delays).

### Signalized Intersections

The 2000 *Highway Capacity Manual (HCM2000)* operations methodology was used for this analysis. At signalized intersections, LOS is based on the weighted average control delay of all movements measured in seconds per vehicle. Peak hour traffic volumes, lane configurations, and signal timing plans are used as inputs in the LOS calculations. Table 1 summarizes the relationship between the average control delay per vehicle and LOS for signalized intersections.

### Unsignalized Intersections

The *HCM2000* methodology was used to analyze intersections controlled by STOP signs on all the approaches and intersections controlled by STOP signs on the side-street approaches. At all-way STOP sign controlled intersections; LOS is based on the weighted average control delay of all movements. At side-street STOP sign controlled intersections, LOS is based on the control delay for each minor movement, and is generally reported for the worst-case movement. Table 2 summarizes the relationship between delay and LOS for unsignalized intersections.

TABLE 1: SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS USING AVERAGE CONTROL VEHICULAR DELAY		
Level of Service	Description	Control Delay per Vehicle (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0
D	Operations with longer delay due to a combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55.0 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0

Source: Transportation Research Board *Highway Capacity Manual (HCM, 2000)*.

**TABLE 2: UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS  
 USING AVERAGE CONTROL VEHICULAR DELAY**

Level of Service	Description	Control Delay per Vehicle (Seconds)
A	Little or no delays.	0 to 10.0
B	Short traffic delays.	> 10.0 to 15.0
C	Average traffic delays.	> 15.0 to 25.0
D	Long traffic delays.	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded.	> 50.0

Source:Transportation Research Board *Highway Capacity Manual (HCM, 2000)*.

## STANDARDS OF SIGNIFICANCE

Under California Environmental Quality Act (CEQA) Guidelines, Appendix G – Environmental Checklist Form, development of the Project site as proposed would have a significant environmental impact if it were to result in:

- 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 congestions at intersections);
- Exceedence, either individually or cumulatively, of a level of service standard established by the county congestion management agency for designated roads or highways;
- A change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- A substantial increase in hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);Inadequate emergency access;
- Inadequate parking capacity; or
- A conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

### **General Plan Policies**

The City of Union City *General Plan* includes a “vision” for transportation and circulation that would:

- Make Union City a pedestrian-friendly city by encouraging the use of trails for walking and bicycles as an alternative to the use of private automobiles;
- Develop Union City as a major regional transportation hub by redeveloping the BART station as an Intermodal facility linking multiple modes of transportation in a single location; And
- Support public transit within the City and reduce single-occupant automobile trips.

In addition, the following policies related to roadway and parking issues are included in the General Plan:

- TR-A.1.1 – *The City shall prepare and adopt a Transit First policy to encourage and promote the use of public transit and provide alternatives to single-occupancy vehicles;*
- TR-A.1.2 – *The City shall monitor traffic flow problems and shall, to the extent feasible, improve capacity through the use of short-range, low-cost improvements such as traffic signals, intersection widening, lane configurations and basic traffic controls; And*
- TR-A.1.3 *The City shall continue to implement its policy that traffic Levels of Service (LOS) will not exceed mid-range LOS D at all signalized intersections on arterial and collector streets, with the exception of intersections on major regional routes, including I-880, Mission Boulevard, (SR 238), and the Route 84/Decoto Road corridor.*

### **Level of Service Standards**

For the proposed project, impacts on the local and regional roadway system are described in terms of change in LOS. The City’s General Plan specifies that peak hour LOS of mid-range LOS D (45 seconds delay per vehicle) or better are acceptable at all signalized intersections on arterial and collector streets. For unsignalized intersections with conditions of mid-range LOS D or worse, the intersection conditions can be acceptable if the intersection does not meet a peak hour traffic volume signal warrant as defined in the *Manual on Uniform Traffic Control Devices* (FHWA, 2003). A peak hour intersection LOS of E is acceptable in Union City at intersections on major regional routes, including I-880, Mission Boulevard, (SR 238), and the Route 84/Decoto Road corridor. Since the majority of the study intersections evaluated in this study are located on major regional routes, LOS E is acceptable at study intersections located on Mission Boulevard, Decoto Road and the planned East-West Connector.

The allowance of LOS E operations for the planned East-West Connector (realigned SR 84) is consistent with the methodology described in the *Technical Memorandum for I-880 – SR 238 East-West Connector Traffic Operations Analysis* prepared for the Alameda County Transportation Authority by Dowling Associates, Inc., (May 2008) The East-West Connector study assesses operations based on the Alameda County Congestion Management Agency (ACCMA) standard of LOS E. Similarly, the analysis of ACCMA Metropolitan Transportation System (MTS) roadways and regional freeways described in the CMA analysis (Chapter 8 of this report) is also based on the ACCMA standard of LOS E.

### **Policies Supporting Alternative Transportation**

This report addresses multi-modal transportation impacts (bicycle, pedestrian and transit circulation), and site access and internal circulation, within the context of Union City’s planning goals for the Intermodal Station area.

The Alameda Countywide Bicycle Plan includes information on existing bicycle and walking commute trips. For Union City, the Plan indicates that less than one percent of commute trips are by bicycle and about one percent of commute trips are by walking. Field observations by Fehr & Peers (as reported in *Union City Intermodal Station Traffic Assessment*, May 2001) indicate that pedestrian activity is moderate along Decoto Road (40 to 50 pedestrians per hour), and few bicyclists travel near the Alvarado-Niles Road/Decoto Road intersection.

The Transportation Element of the City of Union City General Plan includes the following goals:

- *TR-C.1 To create an institutional framework that supports bicycle and pedestrian travel through policy development, City staff and committee actions, and capital project implementation.*
- *TR-C.2 To develop a comprehensive signed bicycle route network composed of Class I (paved off-street paths and multi-use trails), Class II (bicycle lanes), and Class III (shared-use roadways) facilities connecting all of Union City's neighborhoods and adjacent communities.*
- *TR-C.3 To develop Union City's local trail system and integrate local trails with regional trail systems whenever possible.*
- *TR-C.4 To create a continuous pedestrian network that meets ADA standards and allows pedestrians to safely and conveniently access parks and open space areas, transit centers, schools, shopping areas, public facilities, major employment centers, and other significant destinations.*
- *TR-C.5 To develop educational and outreach materials and programs that promote safe bicycling and walking, particularly for children.*
- *TR-C.6 To ensure bicycle and pedestrian improvement projects are considered for funding.*

## 2. EXISTING CONDITIONS

The analysis of the existing transportation system includes a description of the study roadway network and an evaluation of peak hour existing conditions at study intersections. Existing pedestrian, bicycle, and transit facilities are also discussed in this section. Figure 1 shows the project location, while the study intersections and roadway network are shown on Figure 3.

Regional access for Union City is provided primarily via I-880 and Mission Boulevard (SR 238). The major roadways in the project vicinity are described below:

**Decoto Road** is a four-lane arterial adjacent to the project site, in a northeast-southwest orientation through Union City. It extends between Mission Boulevard and I-880, with intermittent bicycle lanes in each direction. West of I-880, Decoto Road is SR 84. For purposes of this study, Decoto Road is described as a north-south roadway.

**Alvarado-Niles Road** is an east-west four-lane arterial that features bicycle lanes and sidewalks in both directions. Alvarado-Niles Road extends from the south side of I-880 through Union City. Within Fremont, the street name is shortened to Niles Road. This road terminates at the intersection of Niles Canyon Road/Mission Boulevard.

**I-880** is an eight-lane, north-south freeway located west of the project site. According to *2004 Traffic Volumes* by the California Department of Transportation (Caltrans), I-880 has an average daily, two-way traffic volume (ADT) of 204,000 vehicles near the project site. Access between the project site and I-880 is provided primarily via the Alvarado-Niles Road interchange.

**Mission Boulevard (SR 238)** is a state highway located near the project site. Along its length, the number of travel lanes vary from four to six lanes. According to *2004 Traffic Volumes* by Caltrans, SR 238 has an ADT of 30,500 vehicles in the vicinity of the project. To the north, Mission Boulevard serves as an interchange providing access between I-880 and I-580, and to the south Mission Boulevard is a conventional highway through Fremont, terminating at an interchange with I-680.

**SR 84** provides regional access and follows a number of roadways near the site including Mission Boulevard, Alvarado-Niles Road and Paseo Padre Parkway. According to *2004 Traffic Volumes* by Caltrans, the ADT is 29,500 vehicles. There was a proposal by the Alameda County Transportation Authority to realign SR 84 between Mission Boulevard and Paseo Padre Parkway, near the project site. This realignment is now known as the planned *East-West Connector*.

**Union Square** is a two-lane roadway that provides a connection between Alvarado-Niles Road and Decoto Road. This roadway provides vehicular access for the BART station and adjacent sites south of the station, including the Avalon Bay site.

**11<sup>th</sup> Street** is a four-lane east-west roadway that will serve as the primary access route for the project site. It features bicycle lanes and twelve-foot wide sidewalks in both directions, with street and pedestrian lighting as well as a raised median. This street, which currently dead-ends just east of the proposed project site, will connect to the planned *East-West Connector* once that roadway is extended south to Paseo Padre Parkway.

### EXISTING INTERSECTION CONDITIONS

Fehr & Peers collected intersection turning movement counts at the nine existing study intersections in December 2007. These counts were collected during weekday AM (7:00 AM to 9:00 AM) and PM peak periods (4:00 PM to 6:00 PM). The AM peak hour generally occurs between 7:30 to 8:30 AM and the PM peak hour generally occurs between 5:00 and 6:00 PM near the study area, although individual intersections varied slightly.

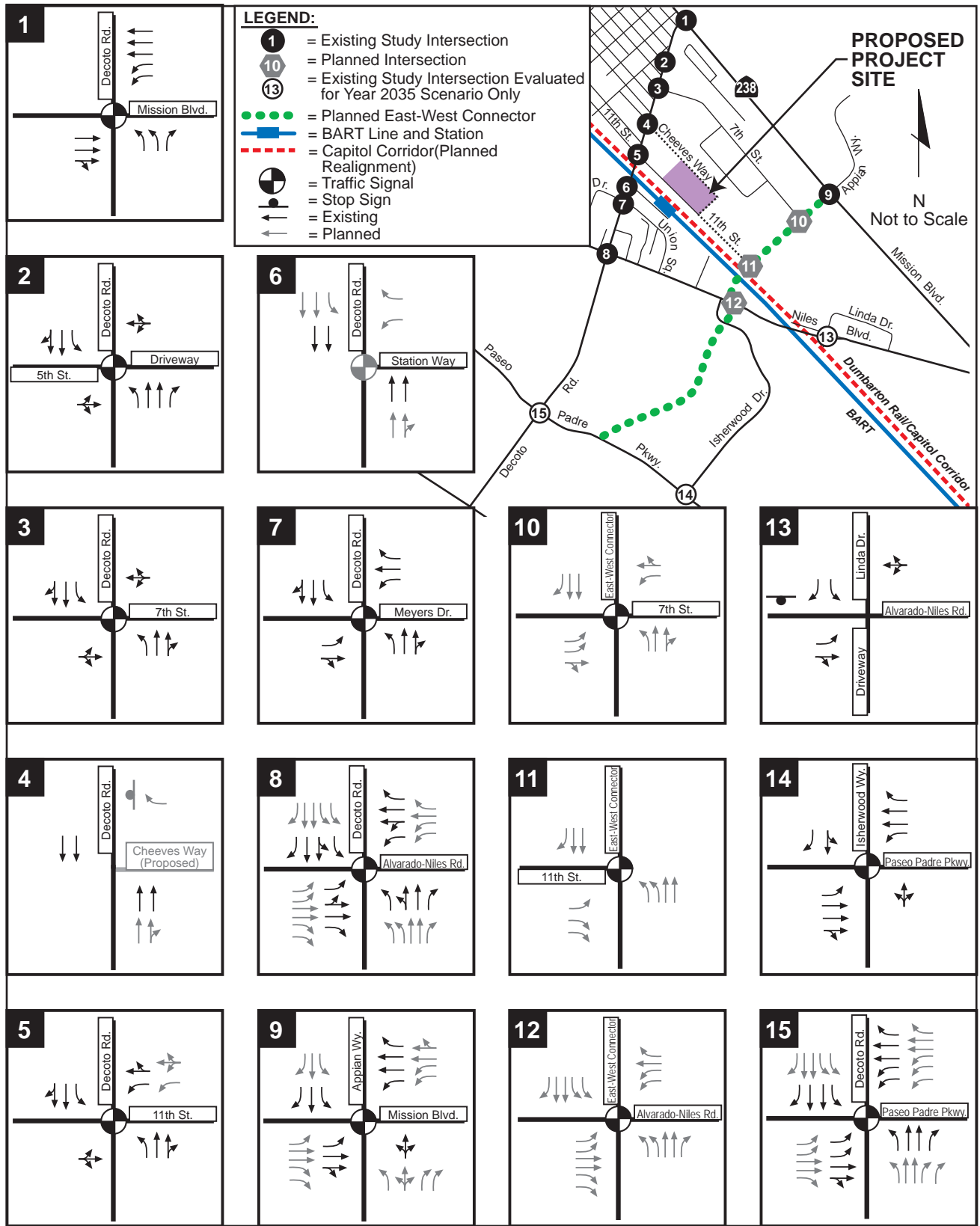
Figure 4 presents the intersection configuration and control type, while existing peak hour traffic volumes are presented on Figure 5.

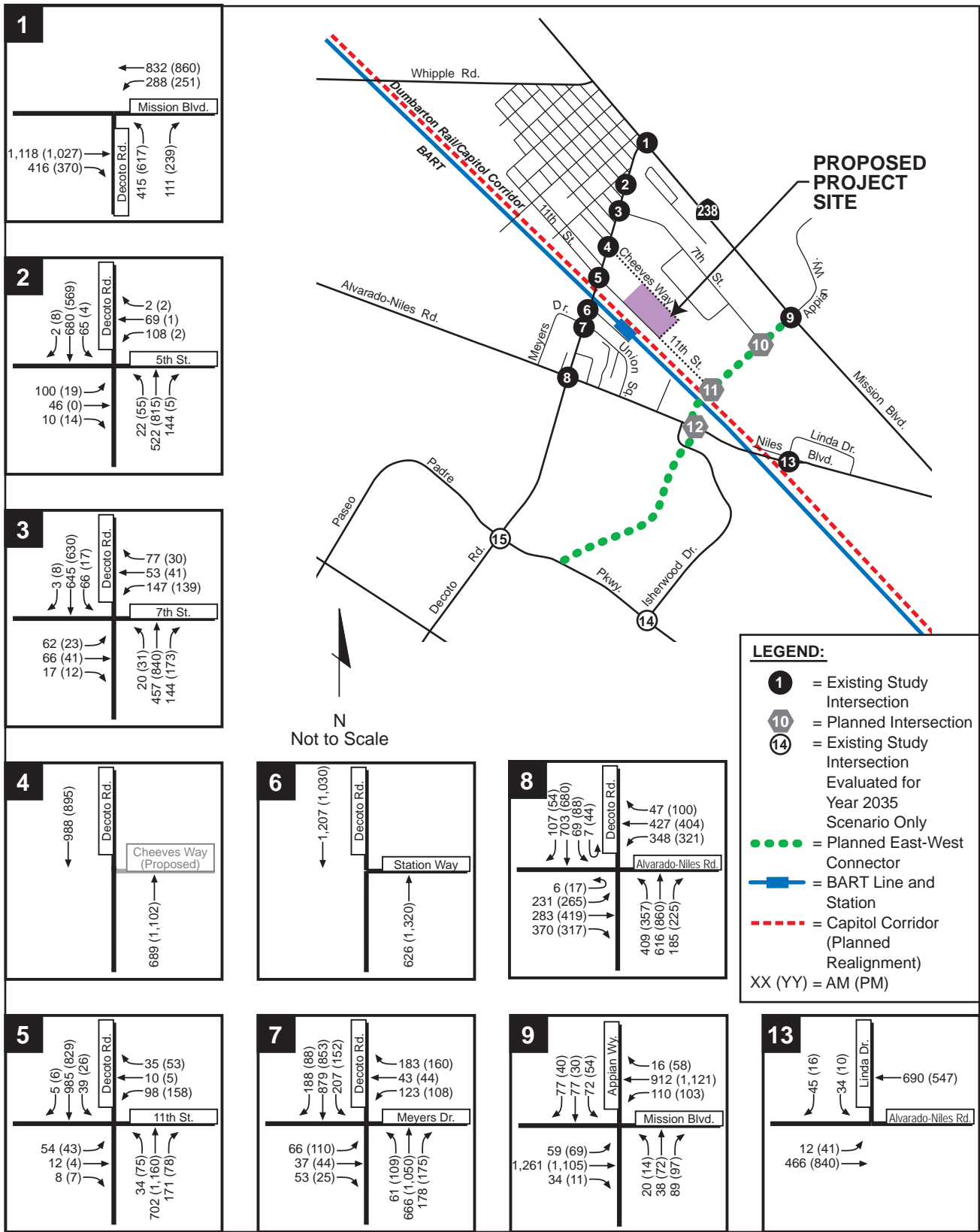
Existing peak hour intersection LOS results are presented in Table 3 (see Appendix A for detailed calculation sheets). Under existing conditions, all study intersections operate at mid-range LOS D or better during both peak hours with the exception of the intersection of Decoto Road/Alvarado-Niles, that operates at LOS D (below mid-range) during both peak hours. Since LOS E is acceptable on Decoto Road, operations are acceptable at all locations under Existing Conditions.

<b>TABLE 3: INTERSECTION LEVELS OF SERVICE – EXISTING CONDITIONS</b>					
Intersection	Control <sup>1</sup>	AM Peak Hour		PM Peak Hour	
		Delay <sup>2</sup>	LOS <sup>3</sup>	Delay	LOS
1. Decoto Road/Mission Boulevard	Signal	18.5	B	16.9	B
2. Decoto Road/5 <sup>th</sup> Street	Signal	13.4	B	8.0	A
3. Decoto Road/7 <sup>th</sup> Street	Signal	13.4	B	9.8	A
4. Decoto Road/Cheeves Way	N/A <sup>4</sup>				
5. Decoto Road/11 <sup>th</sup> Street	Signal	17.2	B	16.1	B
6. Decoto Road/Station Way	N/A <sup>4</sup>				
7. Decoto Road/Meyers Drive/Union Square	Signal	23.0	C	23.4	C
8. Decoto Road/Alvarado-Niles Road	Signal	47.9	D	54.2	D
9. Mission Boulevard/Appian Way	Signal	19.7	B	20.4	C
13. Alvarado-Niles Road/Linda Drive	SSS	19.0 (SB Left)	C	20.3 (SB Left)	C

Note: **Bold** indicates unacceptable operations (LOS of mid-range D or better is acceptable at all locations, and LOS E is acceptable at study intersections located on Mission Boulevard, Decoto Road and the planned East-West Connector).

1. Signal = Signalized intersection; SSS = Side-street stop-controlled intersection  
 2. Delay in seconds per vehicle. Delay calculated consistent with methodology presented in the 2000 *Highway Capacity Manual*  
 3. LOS = Level of Service  
 4. Planned intersection, not yet in operation.  
 Source: Fehr & Peers, 2008





## PEDESTRIAN AND BICYCLIST CIRCULATION

The *Alameda Countywide Bicycle Plan* includes information on existing bicycle and walking commute trips. For Union City, the *Plan* indicates that less than one percent of commute trips are by bicycle and about one percent of commute trips are by walking. Field observations by Fehr & Peers (as reported in *Union City Intermodal Station Traffic Assessment*, May 2001) indicate that pedestrian activity is moderate along Decoto Road (40 to 50 pedestrians per hour), and few bicyclists travel near the Alvarado-Niles Road/Decoto Road intersection.

Consistent with General Plan Policy TR-C.4, sidewalks are generally provided on both sides of the street in the vicinity of the Project site. Sidewalks and the crosswalks at signalized intersections generally provide adequate access between the local neighborhood and pedestrian activity areas such as the Union City BART station and shopping plazas. As noted in the General Plan EIR, *"No residential areas in the city are built without sidewalks. Sidewalks are included as part of the City's street standards for all street classes. This type of standard provides for safe movement of pedestrians in a continuous facility through neighborhoods and along major streets. In addition, all new traffic signals are required to include pedestrian signals. The City's Park and Recreation Master Plan identifies existing and proposed walking trails that connect with the regional master plan."*

The existing bicycle facilities within Union City are primarily off-street bicycle and pedestrian trails following the Alameda and Dry Creek corridors. Most of these routes are not continuous throughout the City. The City's General Plan includes a figure depicting the City's existing and proposed bicycle network. Consistent with that figure and the City's General Plan, there are dedicated bicycle lanes (Class II) on Alvarado-Niles Road, 11<sup>th</sup> Street and Decoto Road. The figure also calls for construction of continuous Class II bicycle lanes on Union Square, between Decoto Road and Alvarado-Niles Road, which have been completed to the extent feasible. Additionally, bicycle lanes (Class II) are provided on Decoto Road, a major north-south corridor in Union City for vehicles and bicyclists. For further detail, see the City's Pedestrian & Bicycle Master Plan, as it provides a more comprehensive overview and in-depth discussion of the City's existing and planned pedestrian and bicycle routes.

In the immediate project vicinity, pedestrian and bicycle circulation will be accommodated via the bicycle lanes and sidewalks on 11<sup>th</sup> Street. Bicycle lanes have already been constructed on 11<sup>th</sup> Street from Decoto Road to the dead end east of the project site. Once the proposed East-West Connector is completed, 11<sup>th</sup> Street will be extended to reach it, providing further bicycle access to and from the project site, and to the proposed East-West Connector. Currently, sidewalks are provided on both sides of 11<sup>th</sup> Street and generally provide adequate access between the local neighborhood and pedestrian activity areas south of the project site.

## **PUBLIC TRANSIT**

The following section summarizes public transit in the study area.

### **Dumbarton Express**

- DB/DB1/DB3 (Contracted to VTA) routes operate Monday through Friday between 5:20 AM and 7:31 PM with 15-minute to 90-minute headways. Service is provided between Union City BART and Palo Alto, including connecting with Caltrain at the Palo Alto Transit Center.

### **Union City Transit**

- Routes 1A (Alvarado-Niles) operate weekdays from 4:35 AM to 9:55 PM with 30-minute to 1-hour headways. Route 1A operates on Saturday from 7:05 AM to 6:55 PM and on Sunday from 8:05 AM to 5:55 PM with 1-hour headways.
- Route 1B (Alvarado-Niles) operate weekdays from 4:50 AM to 9:35 PM with 10-65 minute headways. Route 1B operates on Saturday from 7:35 AM to 7:30 PM and on Sunday from 8:35 AM to 6:30 PM with 60 – 65 minute headways.
- Route 2 (Whipple) operates weekdays from 5:00 AM to 10:25 PM with 15-35-minute headways and Saturday from 7:00 AM to 7:25 PM with 25-35 minute headways..
- Route 3 (Almaden) operates weekdays from 5:00 AM to 10:05 PM with 1-hour headways, Saturday from 7:00 AM to 7:05 PM with 1-hour headways.
- Route 4 (Seven Hills) operates weekdays from 4:15 AM to 9:50 PM with 1-hour headways, Saturday from 7:15 AM to 6:50 PM with 1-hour headways.

### **AC Transit**

- Route 97 (Union City BART – Hesperian Boulevard – Bay Fair BART) operates weekdays from 5:00 AM to 12:00 AM with 15-minute headways, Saturday and Sundays 7:00 AM to 11:00 PM with 30 minute headways.
- Route 99 (Hayward BART – Mission Boulevard – Union City BART) operates weekdays and weekends from 5:30 AM to 11:00 PM with 30-minute headways.
- Route 216 (Mowry Avenue – Niles Boulevard) operates weekdays from 5:30 AM to 9:30 PM with 1-hour headways.
- Route 232 (Union City BART – Cedar Boulevard – New Park Mall) operates weekdays from 5:30 AM to 8:00 PM with 30-minute headways.
- Route 264 (Union City BART – NewPark Mall via Decoto Road) operates weekdays from 6:30 AM to 9:20 PM with 30 minute headways.
- Route 275 (Two-way loop: Union City BART) operates weekdays from 6:45 AM to 8:45 PM at 1 hour headways and weekends between 7:15 AM and 8:15 PM at 1 hour headways.
- Route 332 (New Park Mall – Union City BART – Fremont BART) operates weekends from 7:00 AM to 7:00 PM with 1-hour headways.

- Route 333 (Newark Flexible Service) operates weekdays from 7:00 PM to 1:00 AM with 1 hour headways.
- Route 345 (NewPark Mall to Fremont BART via Mowry Avenue) operates weekdays from 6:00 AM to 8:00 PM at 1 hour headways and weekends between 7:00 AM and 9:00 PM at 1 hour headways.
- Route 801 (All Nighter) operates weekdays and weekends between 11:30 PM and 6:00 AM at 1 hour headways.

### **Union City BART**

- The Union City BART station (Fremont/Richmond and Fremont/Daly City Lines) is adjacent to the project site. The BART system operates from 4:00 AM to 1:30 AM on weekdays, 6:00 AM to 1:30 AM on Saturdays, and 8:00 AM to 1:30 AM on Sundays. Headways vary from 10 to 20 minutes depending on the time of day and day of the week. Service to and from Daly City and San Francisco is offered weekdays from approximately 5:00 AM to 7:00 PM with 20-minute headways.

### 3. TRIP GENERATION FORECASTS

#### METHODOLOGY

Trip generation rates used to forecast vehicle traffic associated with development of the proposed project were obtained from the following sources:

- The 8<sup>th</sup> Edition of *Trip Generation* published by the Institute of Transportation Engineers (ITE) was used to develop trip generation rates for the residential land uses within the project site. The average trip generation rates published for mid-rise apartments are used for the project since the project size and layout best resembles this description.
- The trip generation rate for the business condominiums was obtained from observed trip rates for the San Francisco Workshops facility (ActivSpace), as reported in *Trip Generation Analysis of Proposed San Francisco Workshops Project* (Fehr & Peers, 2004).
- The trip generation rate for the retail land uses within the project site was obtained from the Final Transportation Impact Study for *Avalon at Union Station* (Fehr & Peers, 2005).

Trip generation varied for each of three project scenarios:

- Table 4 shows project trip generation as applied to the Existing Plus Project scenario.
- Table 5 shows project trip generation in combination with approved development of adjacent sites, as applied to the Existing plus Project & Pending Intermodal Development scenario.
- Table 6 shows the no project trip generation assumed for the site and adjacent uses to the BART station under the Cumulative Baseline scenario.
- Table 7 shows project trip generation for the project in combination with full development of the Intermodal Development sites adjacent to the BART station.

Under each scenario, the trip generation rates used were adjusted based on the proximity of the project site to the Union City Intermodal Station, as the proposed project's proximity to a major regional transit connection increases the likelihood of generating a higher proportion of pedestrian and bicycle traffic than if it were located in a more automobile-oriented environment. In addition, trip reductions were taken from each land use based on the forecasted number of internal trips (within the project site) and pass-by trips using the *Trip Generation Handbook* (ITE, 2008) methodology.

Consistent with previous analyses for the Union City Intermodal Station, including the *Avalon at Union Station EIR* (2006), a 10% trip reduction was applied to each land use for peak hour trips to assume higher transit usage for residents and visitors adjacent to the BART station. An additional 21% reduction was also applied to the retail land use to account for retail "pass-by" trips, which are trips that are already on the roadway network and subsequently enter the project site as an intermediate stop before the final destination. Pass-by trips are not specifically generated by the project but were estimated using retail pass by trip rates from the *Trip Generation Handbook* (ITE, 2004).

TABLE 4 – TRIP GENERATION FORECAST – PROPOSED PROJECT

PROJECT												
Land Use	ITE Land Use	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour			
					Rate	Total	In	Out	Rate	Total	In	Out
Condos, Flats, Townhomes	Condo/Townhouse	230	973	dwelling units	0.318 <sup>1</sup>	309	53	256	0.415 <sup>1</sup>	403	270	133
<i>Residential Proximity to Transit</i>					-10.0%	-31	-5	-26	-10.0%	-40	-27	-13
<i>Internal Trip Reduction</i>									-3.0%	-12	-8	-4
<b>Subtotal (Residential)</b>			<b>973</b>	<b>dwelling units</b>		<b>278</b>	<b>48</b>	<b>230</b>		<b>351</b>	<b>235</b>	<b>116</b>
Retail & Commercial	Specialty Retail	820	37.5	ksf	2.469 <sup>1</sup>	87	53	34	9.219 <sup>1</sup>	328	157	171
<i>Retail Proximity to Transit</i>					-10.0%	-9	-5	-4	-10.0%	-33	-16	-17
<i>Internal Trip Reduction</i>									-3.7%	-12	-6	-6
<i>Retail Pass-by Trip Reduction</i>					-21.0%	-18	-11	-7	-21.0%	-69	-33	-36
<b>Subtotal (Retail)</b>			<b>38</b>	<b>ksf</b>		<b>60</b>	<b>37</b>	<b>23</b>		<b>214</b>	<b>102</b>	<b>112</b>
Business condominiums	Active Space	N/A <sup>2</sup>	6.2	ksf	0.733	5	3	2	0.733	5	5	0
<i>Commercial Loft Proximity to Transit</i>					-10.0%	-1	-1	0	-10.0%	0	0	0
<i>Internal Trip Reduction</i>									-3.0%	0	0	0
<b>Subtotal (Commercial Lofts)</b>			<b>6</b>	<b>ksf</b>		<b>4</b>	<b>2</b>	<b>2</b>		<b>5</b>	<b>5</b>	<b>0</b>
<b>VEHICLE TRIPS (PROJECT SITE)</b>						<b>342</b>	<b>87</b>	<b>255</b>		<b>570</b>	<b>342</b>	<b>228</b>
Source: Fehr & Peers, 2009												
Notes:												
1. Denotes effective rate. Actual trip generation was calculated by equation from <i>ITE Trip Generation Manual</i> , 2008.												
2. Active Space rates derived from studies of similar facilities in San Francisco, CA												

**TABLE 5 – TRIP GENERATION - PROJECT + PENDING INTERMODAL DEVELOPMENT**

Land Use	ITE Land Use	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour				
					Rate	Total	In	Out	Rate	Total	In	Out	
<b>PROJECT SITE</b>													
Condos, Flats, Townhomes	Condo/Townhouse	230	973	dwelling units	0.318 <sup>1</sup>	309	53	256	0.415 <sup>1</sup>	403	270	133	
<i>Residential Proximity to Transit</i>					-10.0%	-31	-5	-26	-10.0%	-40	-27	-13	
<i>Internal Trip Reduction</i>									-3.0%	-12	-8	-4	
<b>Subtotal (Residential)</b>			<b>973</b>	<b>dwelling units</b>		<b>278</b>	<b>48</b>	<b>230</b>		<b>351</b>	<b>235</b>	<b>116</b>	
Retail and Commercial	Specialty Retail	820	37.5	ksf	2.469 <sup>1</sup>	87	53	34	9.219 <sup>1</sup>	328	157	171	
<i>Retail Proximity to Transit</i>					-10.0%	-9	-5	-4	-10.0%	-33	-16	-17	
<i>Internal Trip Reduction</i>									-8.5%	-28	-16	-12	
<i>Retail Pass-by Trip Reduction</i>									-21.0%	-69	-33	-36	
<b>Subtotal (Retail)</b>			<b>38</b>	<b>ksf</b>		<b>60</b>	<b>37</b>	<b>23</b>		<b>198</b>	<b>92</b>	<b>106</b>	
Business Condominiums	ActivSpace	N/a <sup>2</sup>	6.2	ksf	0.73	5	3	2	0.73	5	5	0	
<i>Commercial Loft Proximity to Transit</i>					-10.0%	-1	-1	0	-10.0%	-1	-1	0	
<i>Internal Trip Reduction</i>									-3.0%	0	0	0	
<b>Subtotal (Commercial Lofts)</b>			<b>6</b>	<b>ksf</b>		<b>4</b>	<b>2</b>	<b>2</b>		<b>4</b>	<b>4</b>	<b>0</b>	
<b>Subtotal (Mid-Term trip generation from Project site)</b>						<b>342</b>	<b>87</b>	<b>255</b>		<b>553</b>	<b>331</b>	<b>222</b>	
<b>MID-TERM SITES (INTERMODAL DEVELOPMENT)</b>													
Land Use	ITE Land Use	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour				
					Rate	Total	In	Out	Rate	Total	In	Out	
Avalon Bay <sup>3</sup>	Apartment	N/a <sup>4</sup>	438	apartments	0.30	131	39	92	0.39	171	101	70	
<i>Residential Proximity to Transit</i>					-10.0%	-13	-4	-9	-10.0%	-17	-10	-7	
<i>Internal Trip Reduction</i>									-3.0%	-5	-3	-2	
<b>Subtotal (Avalon Bay)</b>			<b>438</b>	<b>apartments</b>		<b>118</b>	<b>35</b>	<b>83</b>		<b>149</b>	<b>88</b>	<b>61</b>	
PSSC townhouses <sup>5</sup>	Condo/Townhouse	230	46	townhouses	Equn.	28	5	23	Equn.	32	21	11	
<i>Residential Proximity to Transit</i>					-10.0%	-3	-1	-2	-10.0%	-3	-2	-1	
<i>Internal Trip Reduction</i>									-3.0%	-1	-1	0	
<b>Subtotal (PSSC Townhouses)</b>			<b>46</b>	<b>townhouses</b>		<b>25</b>	<b>4</b>	<b>21</b>		<b>28</b>	<b>18</b>	<b>10</b>	
Residential Block 4	Apartment/Townhouse	230	157	dwelling units	0.468 <sup>1</sup>	73	12	61	0.570 <sup>1</sup>	89	60	29	
<i>Residential Proximity to Transit</i>					-10.0%	-7	-1	-6	-10.0%	-9	-6	-3	
<i>Internal Trip Reduction</i>									-3.0%	-3	-2	-1	
<b>Subtotal (Residential)</b>			<b>157</b>	<b>dwelling units</b>		<b>66</b>	<b>11</b>	<b>55</b>		<b>77</b>	<b>52</b>	<b>25</b>	
Retail Block 4	Specialty Retail	820	8.8	ksf	4.167 <sup>1</sup>	36	22	14	14.524 <sup>1</sup>	126	60	66	
<i>Retail Proximity to Transit</i>					-10.0%	-4	-2	-2	-10.0%	-13	-6	-7	
<i>Internal Trip Reduction</i>						0	0	0	-4.8%	-6	-4	-2	

**TABLE 5 – TRIP GENERATION - PROJECT + PENDING INTERMODAL DEVELOPMENT**

Land Use	ITE Land Use	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour			
					Rate	Total	In	Out	Rate	Total	In	Out
<i>Retail Pass-by Trip Reduction</i>					-21.0%	-8	-5	-3	-21.0%	-26	-12	-14
<b>Subtotal (Retail)</b>			<b>9</b>	<b>ksf</b>		<b>24</b>	<b>15</b>	<b>9</b>		<b>81</b>	<b>38</b>	<b>43</b>
Business Condominiums Block 4	ActivSpace	N/a <sup>2</sup>	6.2	ksf	0.73	5	3	2	0.73	5	5	0
<i>Commercial Loft Proximity to Transit</i>					-10.0%	-1	-1	0	-10.0%	-1	-1	0
<i>Internal Trip Reduction</i>									-3.0%	0	0	0
<b>Subtotal (Commercial Lofts)</b>			<b>6</b>	<b>ksf</b>		<b>4</b>	<b>2</b>	<b>2</b>		<b>4</b>	<b>4</b>	<b>0</b>
Retail Pavilion Building Block 4	Specialty Retail	820	10.0	ksf	4.167 <sup>1</sup>	39	24	15	14.524 <sup>1</sup>	137	66	71
<i>Retail Proximity to Transit</i>					-10.0%	-4	-2	-2	-10.0%	-14	-7	-7
<i>Internal Trip Reduction</i>						0	0	0	-5.1%	-7	-4	-3
<i>Retail Pass-by Trip Reduction</i>					-21.0%	-8	-5	-3	-21.0%	-29	-14	-15
<b>Subtotal (Retail)</b>			<b>10</b>	<b>ksf</b>		<b>27</b>	<b>17</b>	<b>10</b>		<b>87</b>	<b>41</b>	<b>46</b>
PG&E Office	General Office	710	463	ksf	Equn.	789	694	95	Equn.	668	114	554
<i>Office Proximity to Transit</i>					-10.0%	-79	-70	-9	-10.0%	-67	-11	-56
<i>Internal Trip Reduction</i>									-3.0%	-20	-3	-17
<b>Office Vehicle Trips</b>			<b>463</b>	<b>ksf</b>		<b>710</b>	<b>624</b>	<b>86</b>		<b>581</b>	<b>100</b>	<b>481</b>
<b>BART parking</b>	Parking		179	pkg stalls	0.90	161	118	43	0.86	154	39	115
<b>Subtotal (Mid-term trip generation from adjacent Intermodal TOD sites)</b>						<b>1,135</b>	<b>826</b>	<b>309</b>		<b>1,161</b>	<b>380</b>	<b>781</b>
<b>TOTAL MID-TERM TRIP GENERATION</b>						<b>1,477</b>	<b>913</b>	<b>564</b>		<b>1,714</b>	<b>711</b>	<b>1,003</b>

Source: Fehr & Peers, 2009

Notes:

1. Denotes effective rate. Actual trip generation was calculated by equation from ITE Trip Generation Manual.
2. Active Space rates derived from studies of similar facilities in San Francisco, CA
3. Trips generated by units that were not occupied when traffic counts were conducted in December 2007.
4. Trip rate obtained from the *Avalon Bay TIA*, 2005
5. Represents balance of PSSC units not occupied when traffic counts were conducted in December 2007.

**TABLE 6 – TRIP GENERATION – CUMULATIVE BASELINE**

Land Use	Lane Use Type	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour				
					Rate	Total	In	Out	Rate	Total	In	Out	
PGE Office	General Office	710	435.7	ksf	Equn.	750	660	90	Equn.	635	108	527	
<i>Residential Proximity to Transit</i>						-10.0%	-75	-66	-9	-10.0%	-64	-11	-53
<i>Internal Trip Reduction</i>										-3.0%	-19	-13	-6
<b>Subtotal (Office)</b>						<b>675</b>	<b>594</b>	<b>81</b>		<b>552</b>	<b>84</b>	<b>468</b>	
PGE Condos <sup>2</sup>	Condo/Townhouse	230	412	dwelling units	Equn.	157	27	130	Equn.	198	133	65	
<i>Residential Proximity to Transit</i>						-10.0%	-16	-3	-13	-10.0%	-20	-13	-7
<i>Internal Trip Reduction</i>										-3.0%	-6	-4	-2
<b>Subtotal (Residential)</b>						<b>141</b>	<b>24</b>	<b>117</b>		<b>172</b>	<b>116</b>	<b>56</b>	
PSSC townhouses	Condo/Townhouse	230	46	townhouses	Equn.	28	5	23	Equn.	32	21	11	
<i>Residential Proximity to Transit</i>						-10.0%	-3	-1	-2	-10.0%	-3	-2	-1
<i>Internal Trip Reduction</i>										-3.0%	-1	-1	0
<b>Subtotal (PSSC Townhouses/KB Homes)</b>						<b>25</b>	<b>4</b>	<b>21</b>		<b>28</b>	<b>18</b>	<b>10</b>	
Avalon Bay	Apartment		438	apartments	0.30	131	39	92	0.39	171	101	70	
<i>Residential Proximity to Transit</i>						-10.0%	-13	-4	-9	-10.0%	-17	-10	-7
<i>Internal Trip Reduction</i>										-3.0%	-5	-3	-2
<b>Subtotal (Avalon Bay)</b>						<b>118</b>	<b>35</b>	<b>83</b>		<b>149</b>	<b>88</b>	<b>61</b>	
BART Office	General Office	710	500.0	ksf	Equn.	842	741	101	Equn.	713	121	592	
<i>Office Proximity to Transit</i>						-10.0%	-84	-74	-10	-10.0%	-71	-12	-59
<i>Internal Trip Reduction</i>										-3.0%	-21	-4	-17
<b>Subtotal (BART Office)</b>						<b>758</b>	<b>667</b>	<b>91</b>		<b>621</b>	<b>105</b>	<b>516</b>	
PGE Park-and-Ride	Parking		455	pkg stalls	0.90	<b>410</b>	<b>299</b>	<b>111</b>	0.86	<b>391</b>	<b>98</b>	<b>293</b>	
BART parking	Parking		400	pkg stalls	0.90	<b>360</b>	<b>263</b>	<b>97</b>	0.86	<b>344</b>	<b>86</b>	<b>258</b>	
Residential Block 4	Apartment/Townhouse	230	157	dwelling units	0.468 <sup>1</sup>	73	12	61	0.570 <sup>1</sup>	89	60	29	
<i>Residential Proximity to Transit</i>						-10.0%	-7	-1	-6	-10.0%	-9	-6	-3
<i>Internal Trip Reduction</i>										-3.0%	-3	-2	-1
<b>Subtotal (Residential)</b>						<b>66</b>	<b>11</b>	<b>55</b>		<b>77</b>	<b>52</b>	<b>25</b>	
Retail Block 4	Specialty Retail	820	8.8	ksf	4.167 <sup>1</sup>	36	22	14	14.524 <sup>1</sup>	126	60	66	
<i>Retail Proximity to Transit</i>						-10.0%	-4	-2	-2	-10.0%	-13	-6	-7
<i>Internal Trip Reduction</i>							0	0	0	-7.1%	-9	-5	-4

**TABLE 6 – TRIP GENERATION – CUMULATIVE BASELINE**

Land Use	Lane Use Type	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour			
					Rate	Total	In	Out	Rate	Total	In	Out
<i>Retail Pass-by Trip Reduction</i>					-21.0%	-8	-5	-3	-21.0%	-26	-12	-14
<b>Subtotal (Retail)</b>						<b>24</b>	<b>15</b>	<b>9</b>		<b>78</b>	<b>37</b>	<b>41</b>
Business Condominiums Block 4	ActivSpace	N/a <sup>2</sup>	6.2	ksf	0.73	5	3	2	0.73	5	5	0
<i>Commercial Loft Proximity to Transit</i>					-10.0%	-1	-1	0	-10.0%	-1	-1	0
<i>Internal Trip Reduction</i>									-3.0%	0	0	0
<b>Subtotal (Commercial Lofts)</b>						<b>4</b>	<b>2</b>	<b>2</b>		<b>4</b>	<b>4</b>	<b>0</b>
Retail Pavilion Building Block 4	Specialty Retail	820	10.0	ksf	4.167 <sup>1</sup>	39	24	15	14.524 <sup>1</sup>	137	66	71
<i>Retail Proximity to Transit</i>					-10.0%	-2	-1	-1	-10.0%	-14	-7	-7
<i>Internal Trip Reduction</i>						0	0	0	-7.3%	-10	-6	-4
<i>Retail Pass-by Trip Reduction</i>					-21.0%	-8	-5	-3	-21.0%	-29	-14	-15
<b>Subtotal (Retail)</b>						<b>29</b>	<b>18</b>	<b>11</b>		<b>84</b>	<b>39</b>	<b>45</b>
PGE Retail <sup>2</sup>	Specialty Retail	820	47.6	ksf	Equ.	100	61	39	Equ.	384	184	200
<i>Retail Proximity to Transit</i>					-10.0%	-10	-6	-4	-10.0%	-38	-18	-20
<i>Internal Trip Reduction</i>						0	0	0	-12.5%	-48	-27	-21
<i>Retail Pass-by Trip Reduction</i>					-21.0%	-21	-13	-8	-21.0%	-81	-39	-42
<b>Subtotal (Retail)</b>						<b>69</b>	<b>42</b>	<b>27</b>		<b>217</b>	<b>100</b>	<b>117</b>
PSSC Office	General Office	710	250.0	ksf	Equ.	472	415	57	Equ.	409	70	339
<i>Office Proximity to Transit</i>					-10.0%	-47	-41	-6	-10.0%	-41	-7	-34
<i>Internal Trip Reduction</i>									-3.0%	-12	-2	-10
<b>Subtotal (PSSC Office)</b>						<b>425</b>	<b>374</b>	<b>51</b>		<b>356</b>	<b>61</b>	<b>295</b>
<b>VEHICLE TRIPS (BUILDOUT OF "NO PROJECT" LAND USES)</b>						<b>3,104</b>	<b>2,348</b>	<b>756</b>		<b>3,073</b>	<b>888</b>	<b>2,185</b>

Notes:

1. The cumulative "no project" scenario is based on buildout of the previously approved land uses for the Union City Intermodal sites, as described in the 2005 Avalon at Union Square EIR traffic analysis.
2. Development quantities were estimated by subtracting development previously assumed for Block 4 (Phase II) of the previous *Union City Mixed Use TIA*(October 2008) from development assumed in the 2005 Avalon at Union Square EIR traffic analysis: 10ksf retail subtracted from 57.6ksf retail , 254 residential units subtracted from 666 residential units.

**TABLE 7 – TRIP GENERATION - CUMULATIVE WITH PROJECT SCENARIO**

Land Use	ITE Land Use	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour				
					Rate	Total	In	Out	Rate	Total	In	Out	
<b>PROJECT SITE</b>													
Condos, Flats, Townhomes	Condo/ Townhouse	230	973	dwelling units	0.318 <sup>1</sup>	309	53	256	0.415 <sup>1</sup>	403	270	133	
<i>Residential Proximity to Transit</i>					-10.0%	-31	-5	-26	-10.0%	-40	-27	-13	
<i>Internal Trip Reduction</i>									-3.0%	-12	-8	-4	
<b>Subtotal (Residential)</b>			<b>973</b>	<b>dwelling units</b>		<b>278</b>	<b>48</b>	<b>230</b>		<b>351</b>	<b>235</b>	<b>116</b>	
Retail and Commercial	Specialty Retail	820	37.5	ksf	2.469 <sup>1</sup>	87	53	34	9.219 <sup>1</sup>	328	157	171	
<i>Retail Proximity to Transit</i>					-10.0%	-9	-5	-4	-10.0%	-33	-16	-17	
<i>Internal Trip Reduction</i>						0	0	0	-14.9%	-49	-34	-15	
<i>Retail Pass-by Trip Reduction</i>						-18	-11	-7	-21.0%	-69	-33	-36	
<b>Subtotal (Retail)</b>			<b>38</b>	<b>ksf</b>		<b>60</b>	<b>37</b>	<b>23</b>		<b>177</b>	<b>74</b>	<b>103</b>	
Business Condominiums	ActivSpace	N/a <sup>2</sup>	6.2	ksf	0.73	5	3	2	0.73	5	5	0	
<i>Commercial Loft Proximity to Transit</i>					-10.0%	-1	-1	0	-10.0%	-1	-1	0	
<i>Internal Trip Reduction</i>									-3.0%	0	0	0	
<b>Subtotal (Commercial Lofts)</b>			<b>6</b>	<b>ksf</b>		<b>4</b>	<b>2</b>	<b>2</b>		<b>4</b>	<b>4</b>	<b>0</b>	
<b>VEHICLE TRIPS (PROJECT SITE)</b>						<b>342</b>	<b>87</b>	<b>255</b>		<b>532</b>	<b>313</b>	<b>219</b>	
<b>MID-TERM SITES</b>													
Land Use	ITE Land Use	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour				
					Rate	Total	In	Out	Rate	Total	In	Out	
Avalon Bay <sup>3</sup>	Apartment	N/a <sup>4</sup>	438	apartments	0.30	131	39	92	0.39	171	101	70	
<i>Residential Proximity to Transit</i>					-10.0%	-13	-4	-9	-10.0%	-17	-10	-7	
<i>Internal Trip Reduction</i>									-3.0%	-5	-3	-2	
<b>Subtotal (Avalon Bay)</b>			<b>438</b>	<b>apartments</b>		<b>118</b>	<b>35</b>	<b>83</b>		<b>149</b>	<b>88</b>	<b>61</b>	
Residential Block 4	Apartment/Townhouse	230	157	dwelling units	0.468 <sup>1</sup>	73	12	61	0.570 <sup>1</sup>	89	60	29	
<i>Residential Proximity to Transit</i>					-10.0%	-7	-1	-6	-10.0%	-9	-6	-3	
<i>Internal Trip Reduction</i>									-3.0%	-3	-2	-1	
<b>Subtotal (Residential)</b>			<b>157</b>	<b>dwelling units</b>		<b>66</b>	<b>11</b>	<b>55</b>		<b>77</b>	<b>52</b>	<b>25</b>	
Retail Block 4	Specialty Retail	820	8.8	ksf	4.167 <sup>1</sup>	36	22	14	14.524 <sup>1</sup>	126	60	66	

**TABLE 7 – TRIP GENERATION - CUMULATIVE WITH PROJECT SCENARIO**

Land Use	ITE Land Use	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour							
					Rate	Total	In	Out	Rate	Total	In	Out				
<i>Retail Proximity to Transit</i>					-10.0%	-4	-2	-2	-10.0%	-13	-6	-7				
<i>Internal Trip Reduction</i>						0	0	0	-9.5%	-12	-8	-4				
<i>Retail Pass-by Trip Reduction</i>					-21.0%	-8	-5	-3	-21.0%	-26	-12	-14				
<b>Subtotal (Retail)</b>						<b>9</b>	<b>ksf</b>			<b>24</b>	<b>15</b>	<b>9</b>		<b>75</b>	<b>34</b>	<b>41</b>
Business Condominiums Block 4	ActivSpace	N/a <sup>2</sup>	6.2	ksf	0.73	5	3	2	0.73	5	5	0				
<i>Commercial Loft Proximity to Transit</i>					-10.0%	-1	-1	0	-10.0%	-1	-1	0				
<i>Internal Trip Reduction</i>									-3.0%	0	0	0				
<b>Subtotal (Commercial Lofts)</b>						<b>6</b>	<b>ksf</b>			<b>4</b>	<b>2</b>	<b>2</b>		<b>4</b>	<b>4</b>	<b>0</b>
Retail Pavilion Building Block 4	Specialty Retail	820	10.0	ksf	4.167 <sup>1</sup>	39	24	15	14.524 <sup>1</sup>	137	66	71				
<i>Retail Proximity to Transit</i>					-10.0%	-4	-2	-2	-10.0%	-14	-7	-7				
<i>Internal Trip Reduction</i>						0	0	0	-9.5%	-13	-9	-4				
<i>Retail Pass-by Trip Reduction</i>					-21.0%	-8	-5	-3	-21.0%	-29	-14	-15				
<b>Subtotal (Retail)</b>						<b>10</b>	<b>ksf</b>			<b>27</b>	<b>17</b>	<b>10</b>		<b>81</b>	<b>36</b>	<b>45</b>
PSSC townhouses <sup>6</sup>	Condo/ Townhouse	230	46	townhouses	0.609 <sup>1</sup>	28	5	23	0.696 <sup>1</sup>	32	21	11				
<i>Residential Proximity to Transit</i>					-10.0%	-3	-1	-2	-10.0%	-3	-2	-1				
<i>Internal Trip Reduction</i>									-3.0%	-1	-1	0				
<b>Subtotal (PSSC Townhouses/KB Homes)</b>						<b>46</b>	<b>townhouses</b>			<b>25</b>	<b>4</b>	<b>21</b>		<b>28</b>	<b>18</b>	<b>10</b>
PG&E Office	General Office	710	463.0	ksf	1.704 <sup>1</sup>	789	694	95	1.443 <sup>1</sup>	668	114	554				
<i>Office Proximity to Transit</i>					-10.0%	-79	-70	-9	-10.0%	-67	-11	-56				
<i>Internal Trip Reduction</i>									-3.0%	-20	-3	-17				
<b>Subtotal (PG&amp;E Office)</b>						<b>463</b>	<b>ksf</b>			<b>710</b>	<b>624</b>	<b>86</b>		<b>581</b>	<b>100</b>	<b>481</b>
<b>BART parking</b>	Parking		0	pkg stalls	0.90	0	0	0	0.86	0	0	0				
<b>VEHICLE TRIPS (MID-TERM INTERMODAL DEVELOPMENT)</b>										<b>974</b>	<b>708</b>	<b>266</b>		<b>995</b>	<b>332</b>	<b>663</b>
<b>LONG-TERM SITES</b>																
Land Use	ITE Land Use	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour							
					Rate	Total	In	Out	Rate	Total	In	Out				
BART Office	General Office	710	500.0	ksf	1.684 <sup>1</sup>	842	741	101	1.426 <sup>1</sup>	713	121	592				
<i>Office Proximity to Transit</i>					-10.0%	-84	-74	-10	-10.0%	-71	-12	-59				

**TABLE 7 – TRIP GENERATION - CUMULATIVE WITH PROJECT SCENARIO**

Land Use	ITE Land Use	ITE Code	Size	Unit	AM Peak Hour				PM Peak Hour				
					Rate	Total	In	Out	Rate	Total	In	Out	
<i>Internal Trip Reduction</i>									-3.0%	-21	-4	-17	
<b>Subtotal (BART Office)</b>			<b>500</b>	<b>ksf</b>		<b>758</b>	<b>667</b>	<b>91</b>		<b>621</b>	<b>105</b>	<b>516</b>	
PSSC Office	General Office	710	250.0	ksf	1.888 <sup>1</sup>	472	415	57	1.636 <sup>1</sup>	409	70	339	
<i>Office Proximity to Transit</i>						-10.0%	-47	-41	-6	-10.0%	-41	-7	-34
<i>Internal Trip Reduction</i>									-3.0%	-12	-2	-10	
<b>Subtotal (PSSC Office)</b>			<b>250</b>	<b>ksf</b>		<b>425</b>	<b>374</b>	<b>51</b>		<b>356</b>	<b>61</b>	<b>295</b>	
Dumbarton Rail pkg	Parking		459	pkg stalls	0.90	413	301	112	0.86	395	99	296	
Capitol Corridor pkg	Parking		75	pkg stalls	0.90	68	50	18	0.86	65	16	49	
<b>Parking Long-Term (Vehicle Trips)</b>			<b>534</b>	<b>pkg stalls</b>		<b>481</b>	<b>351</b>	<b>130</b>		<b>460</b>	<b>115</b>	<b>345</b>	
<b>VEHICLE TRIPS (LONG-TERM INTERMODAL DEVELOPMENT)</b>						<b>1,664</b>	<b>1,392</b>	<b>272</b>		<b>1,437</b>	<b>281</b>	<b>1,156</b>	
<b>YEAR 2035 CUMULATIVE TRIP GENERATION</b>						<b>2,980</b>	<b>2,187</b>	<b>793</b>		<b>2,964</b>	<b>926</b>	<b>2,038</b>	
YEAR 2035 BASELINE TRIP GENERATION (NO PROJECT) <sup>5</sup>						3,104	2,348	756		3,073	888	2,185	
<b>NET TRIP CHANGE WITH PROJECT &amp; REVISIONS TO BUILDOUT</b>						<b>-124</b>	<b>-161</b>	<b>37</b>		<b>-109</b>	<b>38</b>	<b>-147</b>	

Source: Fehr & Peers, 2009

Notes:

1. Denotes effective rate. Actual trip generation was calculated by equation from ITE Trip Generation Manual.
2. Active Space rates derived from studies of similar facilities in San Francisco, CA
3. Trips generated by townhouses that were not occupied when traffic counts were conducted in December 2007.
4. Trip rate obtained from the Avalon Bay TIA, 2005
5. The Year 2035 Cumulative "no project" scenario is based on buildout of the previously approved land uses for the Union City Intermodal sites, as described in the 2005 Avalon project traffic study. The trip generation forecasts for the Baseline and Midterm scenarios used for the Cumulative analysis therefore have slightly different internalization percentages to account for the changes in the land use mix.
6. Represents balance of PSSC townhomes not occupied when traffic counts were conducted in December 2007.

## PROJECT TRIP GENERATION

Existing plus Project conditions represent vehicle trips generated by the proposed project. This scenario assumes the project is built as a stand-alone development; as a result, trip reductions due to the mix of uses are less for this scenario, but increase for the Existing plus Project & Pending Intermodal Development and Long-Term development scenarios.

- As shown in Table 4, the project would generate 342 vehicle trips during the AM peak hour and 570 vehicle trips during the PM peak hour.
- Trips generated by the project land uses would be reduced slightly following the addition of pending and long-term development at the Intermodal Station, due to increased internalization of trips within the station site as adjacent Intermodal Station sites develop. Since data in the *Trip Generation Handbook* is limited to internalization rates during the PM peak hour, there is no reduction during the AM peak hour. As shown in Table 5, under Existing plus Project & Pending Intermodal Development conditions that project would generate 553 PM peak hour vehicle trips, with a further reduction to 532 PM peak hour trips under the long-term scenario (as shown on Table 7).

## TRIP GENERATION – PROJECT + PENDING INTERMODAL DEVELOPMENT

Existing plus Project & Pending Intermodal Development conditions represent existing traffic, project-generated traffic, and increases in traffic expected as a result of the currently-approved Intermodal projects surrounding the Union City BART station that are anticipated to be complete within the next few years. Table 5 shows trip generation for this scenario. Including trips generated by the project, the Existing plus Project & Pending Intermodal Development scenario generates 1,477 AM and 1,714 PM peak hour vehicle trips (including project trips). Subtracting the project contribution, the adjoining pending development sites would generate 1,135 AM and 1,161 PM peak hour trips.

## TRIP GENERATION – PROJECT + PENDING & LONG-TERM INTERMODAL DEVELOPMENT

Long-term trip generation is based on full build-out of the Union City Intermodal Station land uses. Two long-term scenarios were used for this analysis:

1. The *Previously Approved* land use assumptions for the Intermodal Station are based on prior studies that evaluated impacts resulting from potential buildout of the Intermodal Station (including the project site), based on the pending projects identified in the *Avalon at Union Station EIR* (2005). In addition to the developments outlined in the EIR, recently approved condominiums and retail space on Block 4 as described in the *Intermodal Station District TIA* (2008) were added to the *Previously Approved* land uses. As shown in Table 6, full build-out of the land uses under this scenario would generate 3,104 vehicle trips during the AM peak hour and 3,073 vehicle trips during the PM peak hour.
2. The *2008 Land Use Assumptions* described in Chapter 1 of this report provide updated assumptions concerning full build-out of the Intermodal station, taking into account recent development plans including the proposed project. The 2008 Land Use Assumptions reflect a reduced provision of parking facilities for BART patrons (compared to previous studies) and increased provision of residential development. (Earlier studies had assumed a greater reliance on office development, rather than residential development). As shown in Table 7, full build-out of the Intermodal Station based on these land use assumptions would generate 2,980 AM and 2,964 PM peak hour vehicle trips.

Since the ACCMA traffic model includes traffic that would be generated by the previously approved land use plans for the Intermodal Station sites, traffic forecasts for Cumulative (Year 2035) Baseline conditions were

derived from the ACCMA model from intersection volume outputs presented in the *East-West Connector Study*<sup>1</sup>. However, since these volumes did not account for recently approved condominiums and retail space on Block 4, intersection volumes from the *East-West Connector Study* were adjusted to account for traffic contribution resulting from Block 4 development.

The net change in trips between buildout of the *Previously Approved Land Uses* and *2008 Land Use Assumptions* was used to derive the Cumulative (Year 2035) Plus Project traffic volumes, by applying the “net change” to the Cumulative Baseline. As shown in Table 7, the net change between the two scenarios would constitute a decrease in 124 trips in the AM peak hour and a decrease in 109 trips in the PM peak hour. However, the approach direction of trips (inbound versus outbound) would have different intersection impacts (since the 2010 land use assumptions include a larger amount of residential development, which generates more outbound trips in the AM, and inbound trips in the PM, compared to office use which tend to be inbound in the AM and outbound in the PM).

Although the net change between Cumulative Baseline and Cumulative with Project volumes is negative, cumulative impacts are determined based on the difference between Existing and Cumulative traffic operations. Therefore, the cumulative project impact is based on with the project’s contribution to overall cumulative growth in traffic. The project contribution to cumulative impacts is based on the project’s trip generation under the Cumulative with Project scenario. Under the Cumulative with Project scenario, the project would generate 342 AM and 532 PM peak hour trips (or approximately 12 to 18 percent of the total trip generation resulting from the planned intermodal projects).

---

6. *DRAFT Technical Memorandum for I-880 – SR 238 East-West Connector Traffic Operations Analysis*, prepared for the Alameda County Transportation Authority by Dowling Associates, Inc. on May 19<sup>th</sup>, 2008.

## 4. EXISTING PLUS PROJECT CONDITIONS

This section describes the proposed project's trip generation (described in more detail in Chapter 3), trip distribution, and assignment characteristics, and summarizes the evaluation of project impacts on the existing transportation system.

### TRIP DISTRIBUTION AND ASSIGNMENT

As detailed in Table 4, under Existing plus Project conditions, the project would generate 342 AM peak hour trips and 570 PM peak hour trips. The directional distribution of the project-generated traffic is based on the distribution of trips identified in prior studies conducted for the development of the Union City Intermodal sites. These took into account knowledge of commute patterns, characteristics of the surrounding roadway network, existing traffic patterns, and surrounding land uses. Trip distribution for this analysis varies for commercial and residential uses.

Figure 6 shows the trip distribution utilized for each analysis scenario. The assignment of project trips to study intersections under Existing plus Project scenario is shown in Figure 7. The resulting peak hour traffic volumes at each study intersection are shown on Figure 8.

### PLANNED ROADWAY IMPROVEMENTS

Union City has completed a reconfiguration of the intersection of Alvarado Niles Road/Decoto Road to provide two separate left-turn lanes on each leg of the intersection. This reconfiguration was not in place when intersection volumes were counted in 2007, nor assumed as part of the Existing Conditions analysis. It has been included under Existing Plus Project conditions.

### EXISTING PLUS PROJECT TRAFFIC IMPACTS

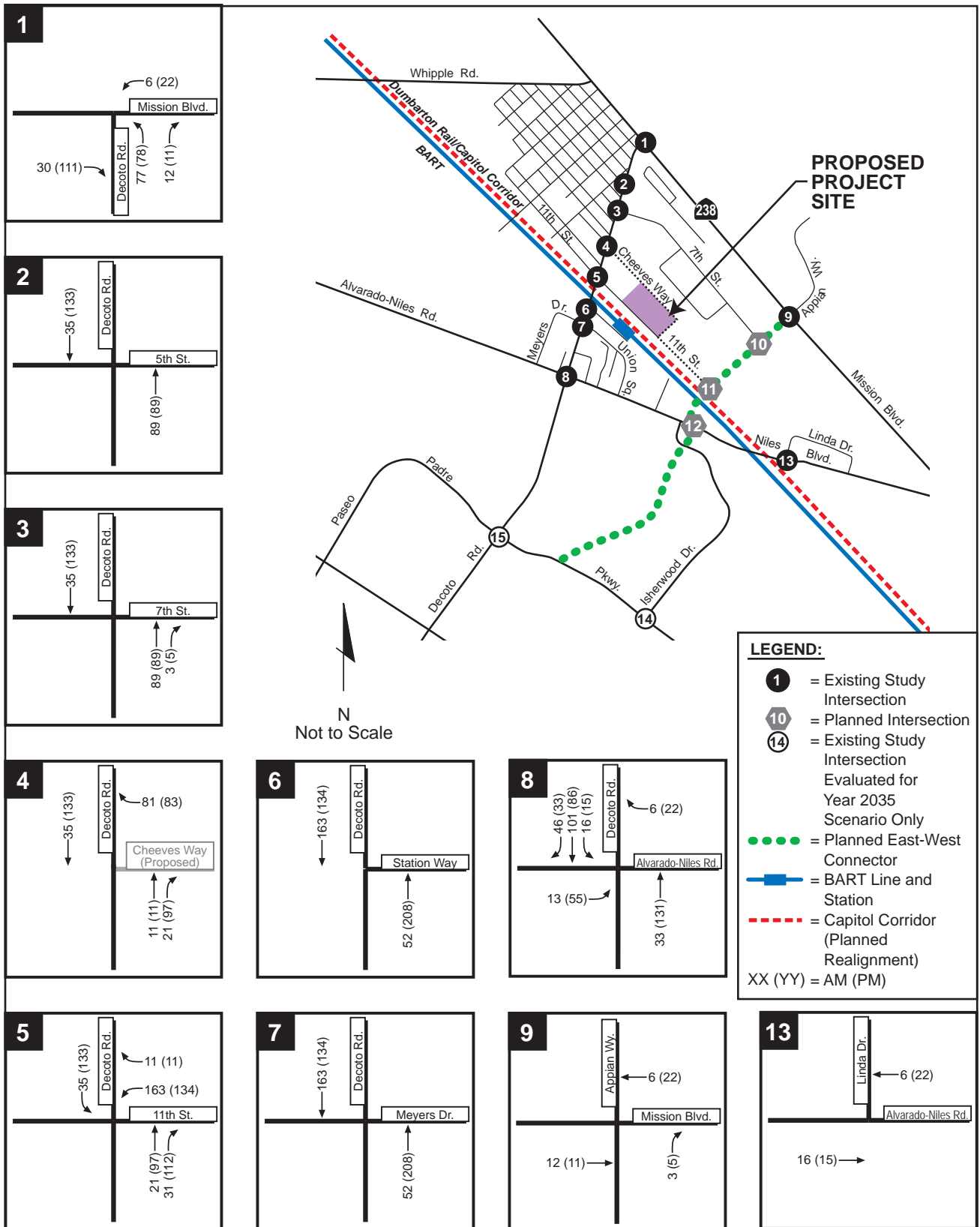
Existing Plus Project intersection operating conditions were evaluated at each study intersection for the AM and PM peak hours. Peak hour intersection LOS with the trips generated by the proposed project added to the existing traffic volumes are shown in Table 8 (see Appendix B for detailed LOS calculation sheets).

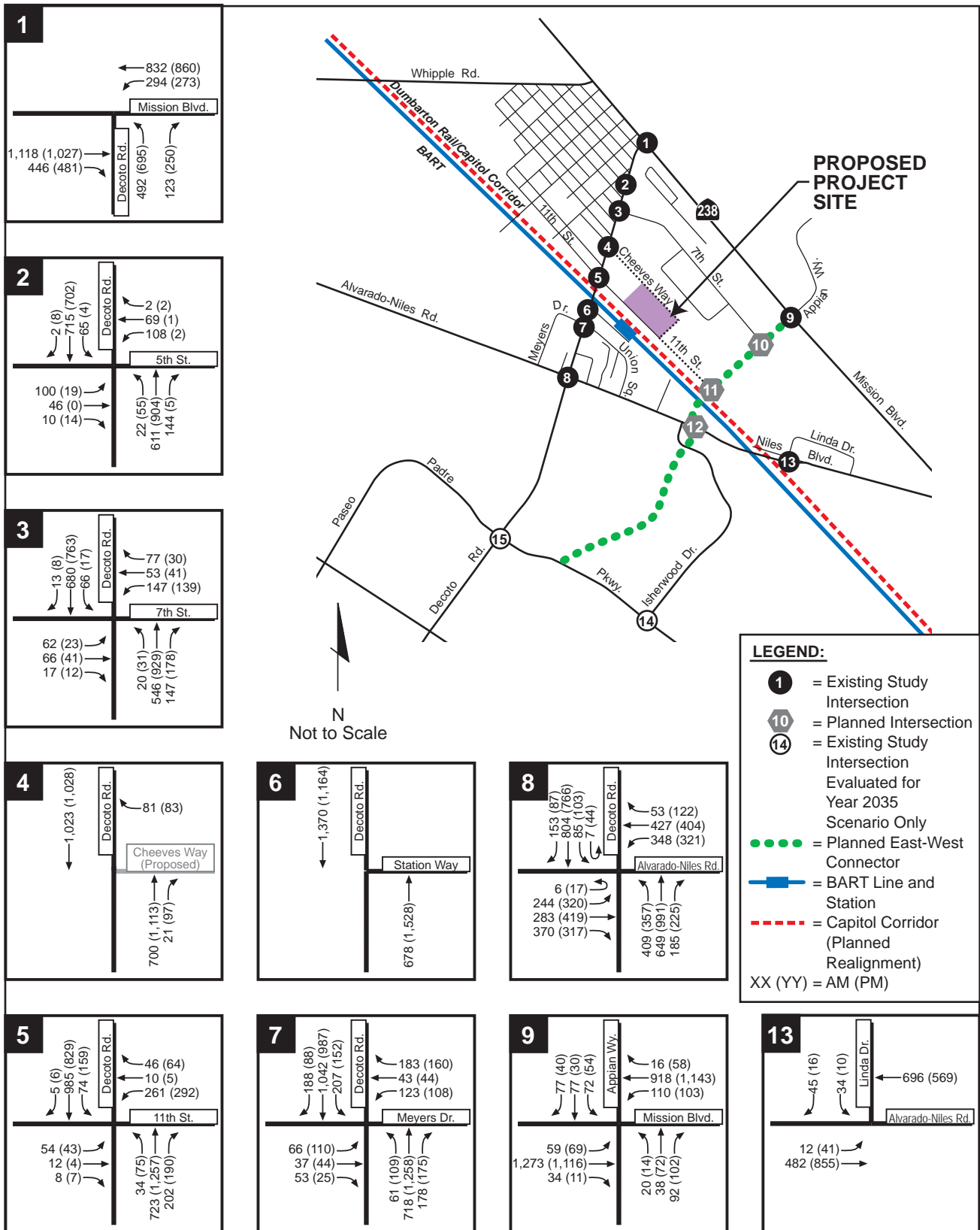
As proposed by the project, the 11<sup>th</sup> Street/Decoto Road will be reconfigured as follows: the two-lane westbound approach (on 11<sup>th</sup> Street approaching Decoto Road) will be restriped to include one left turn lane and one shared left-through-right turn lane. Following this reconfiguration and with the addition of project trips, the intersection would operate at LOS D during the PM peak hour, indicating acceptable operations for intersections on Decoto Road, under Existing plus Project conditions.

#### *Findings of Significance*

As shown in Table 8, peak hour intersection operations would be acceptable at each location. Based on the analysis described above, impacts to study intersections under Existing Plus Project conditions would be **less-than-significant**.







**TABLE 8: INTERSECTION LEVELS OF SERVICE – EXISTING PLUS PROJECT CONDITIONS**

Intersection	Control <sup>1</sup>	Existing Conditions				Existing Plus Project Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Decoto Road/Mission Boulevard	Signal	18.5	B	16.9	B	19.3	B	19.8	B
2. Decoto Road/5 <sup>th</sup> Street	Signal	13.4	B	8.0	A	13.7	B	5.2	A
3. Decoto Road/7 <sup>th</sup> Street	Signal	13.4	B	9.8	A	13.8	B	9.8	A
4. Decoto Road/Cheeves Way	SSS (planned)					10.2	B	10.8	B
5. Decoto Road/11 <sup>th</sup> Street (current configuration)	Signal	17.2	B	16.1	B				
5. Decoto Road/11 <sup>th</sup> Street <sup>4</sup> (reconfigured as planned)	Signal					22.5	C	44.9	D
6. Decoto Road/Station Way	Signal (planned)								
7. Decoto Road/Meyers Drive/Union Square	Signal	23.0	C	23.4	C	23.6	C	24.5	C
8. Decoto Road/Alvarado-Niles Road (current configuration)	Signal	47.9	D	53.8	D				
8. Decoto Road/Alvarado-Niles <sup>5</sup> Road (reconfigured as planned)	Signal					32.1	C	32.4	C
9. Mission Boulevard/Appian Way	Signal	19.7	B	20.1	C	19.9	B	20.8	C
13. Alvarado-Niles Road/Linda Road	SSS	19.0	C	20.3	C	19.4	C	21.1	C

Note: **Bold** indicates unacceptable operations (LOS of mid-range D or better is acceptable at all locations, and LOS E is acceptable at study intersections located on Mission Boulevard, Decoto Road and the planned East-West Connector).

1. Signal = Signalized intersection

SSS = Side-street stop-controlled intersection

2. Delay in seconds. Delay calculated consistent with methodology presented in the 2000 Highway Capacity Manual.

3. LOS = Level of Service

4. Assumes westbound shared right/through/left-turn lane as planned & optimized signal phasing. 5. Assumes intersection reconfiguration as currently planned (second left turn lane added for each approach).

Source: Fehr & Peers, 2010

Source: Fehr & Peers, 2010

## PEDESTRIAN IMPACTS

Due to its proximity to a major regional transit connection (BART), the proposed project is likely to generate a higher portion of bicycle and pedestrian traffic than if it were located in a more automobile-oriented environment. Therefore, bicycle and pedestrian connectivity to and from the adjacent study area is important.

Planned pedestrian facilities include sidewalks on the project's perimeter with pedestrian bulb-outs, marked crosswalks at each intersection along 11<sup>th</sup> Street, a pedestrian promenade between Blocks 3 and 4, and a pedestrian connection from the existing BART Station to the Intermodal Station District that leads to a public plaza. The connection from the existing BART station to the public plaza is planned to extend across 11<sup>th</sup> Street to the pedestrian promenade, which extends to Cheeves Way. These connections will ultimately provide a direct pedestrian route between the BART Station, adjacent land uses south of the BART Station, and the proposed project. With construction of the pedestrian connection between the project site and the BART station, pedestrians will no longer have to travel on Decoto Road to access the existing station from the station entrance located on the south side of the station. The City has commissioned a study to evaluate how this connection can be extended north to an adjacent site (i.e. Shelton site), which is located between the railroad tracks and the 7<sup>th</sup> Street Industrial Area. This site is zoned as RDC (Research and Development Campus) and is anticipated to accommodate high-density employment centers.

The project would contribute to cumulative increases in vehicle and pedestrian volumes on Decoto Road, resulting in potential conflicts between motor vehicles and pedestrians. The existing marked crosswalks at 10<sup>th</sup> Street & Decoto Road are not controlled by traffic signals or stop signs. Additional traffic will pass through these crosswalk locations due to:

- Substantial increase in traffic volumes making a southbound left-turn from Decoto Road to 11<sup>th</sup> Street, inbound to the project site and adjacent Intermodal development sites; And
- A large portion of projects trips are expected to enter the site from Decoto Road at Cheeves Way, thus increasing northbound volumes on Decoto Road that will cross the crosswalks at 10<sup>th</sup> Street.

As a result, delays to pedestrians crossing at this location would increase, resulting in a corresponding increase in potential conflicts between motorists and pedestrians. Furthermore, the traffic volumes and number of travel lanes would exceed the threshold at which marked crosswalks at uncontrolled pedestrian crossing would be recommended without the provision of enhanced crosswalk treatments.

In addition, the proposed project would include an extension of Cheeves Way that would intersect Decoto Road approximately 60 to 100 feet south (west) of the railroad tracks. Installation of this roadway raises the possibility that pedestrians could desire to cross Decoto Road at the new intersection with Cheeves Way, in order to continue north or south along the railroad track corridor.

City staff has indicated a preference for pedestrian and bicycle crossing to be accommodated at 11<sup>th</sup> Street, with elimination of the 10<sup>th</sup> Street crossing. The City has also identified enhancements to the crosswalks at Fifth Street/Decoto Road, Seventh Street/Decoto Road and Ninth Street/Decoto Road, to facilitate pedestrian connections between the Decoto Neighborhood and the Intermodal Station District as well as Guy Emanuele Jr. Elementary School. City staff indicated that these improvements include the installation of high visibility crosswalks and pedestrian-timed signals.

At locations with significant pedestrian volumes, or locations adjacent to "pedestrian generators" (such as the BART Station), it is generally advisable to provide pedestrian crossing opportunities at intervals of 600 feet or less, thus allowing pedestrians to reach a crosswalk within a walking distance of 300 feet. Pedestrians desiring to cross at 10<sup>th</sup> Street & Decoto Road will be able to use the signalized crosswalk at 11<sup>th</sup> Street (located 300 feet south of the northernmost crosswalk at 10<sup>th</sup> Street) in order to cross Decoto. Therefore, the impact to pedestrian circulation at the 10<sup>th</sup> Street/Decoto Road intersection is **less-than-significant**.

Further north at Cheeves Way, it would be necessary for pedestrians desiring to cross Decoto Road to walk a distance of approximately 510 feet south to cross Decoto Road at 11th Street. However, this crossing location is very close to the railroad tracks, and serves relatively few “pedestrian generators” are given the distance from the BART Station and adjacent development sites. Therefore, the volume of pedestrians desiring to cross Decoto Road at Cheeves Way will be relatively low. Therefore, the impact to pedestrian circulation at the Cheeves Way/Decoto Road intersection is **less-than-significant**.

Based on the findings described above, project impacts on pedestrian circulation would be **less-than-significant**.

## **BICYCLE IMPACTS**

Class II bicycle lanes are currently provided on 11<sup>th</sup> Street fronting the project site as well as on Decoto Road north of 11<sup>th</sup> Street. It is not clear from the site plan whether additional provisions will be afforded to bicyclists within and around the project site; however, existing bicycle facilities are expected to sufficiently accommodate bicycle traffic into and out of the project site.

Based on the findings described above, project impacts on bicycle circulation would be less than significant.

## **TRANSIT IMPACTS**

The proposed project would be expected to increase ridership on local and regional transit systems. The location and density of the proposed project make it consistent with the City’s policy of encouraging transit and other non-automobile trips. Its proximity to the Union City Intermodal Station will encourage transit trips on the systems that use the facility, including BART, Dumbarton Express, Union City Transit, and AC Transit.

The transit analysis for the Union City General Plan update (*Final EIR*, January 2002) indicated that the increased ridership projected for BART, Union City Transit, and AC Transit will be a less than significant impact. The proposed project is not expected to generate transit demand substantially greater than that assumed in the General Plan Update EIR for the proposed project site and is therefore expected to have a less than significant impact to transit.

## 5. EXISTING PLUS PROJECT & PENDING INTERMODAL DEVELOPMENT

The proposed project sits within a larger redevelopment plan area surrounding the Union City Intermodal Station. Although a certain amount of development around the station has been approved and previously analyzed, the anticipated development at these sites is more intense than previously approved and analyzed. The expected Intermodal Station area development consists of residential, office, and community service uses as well as roadway and transit facility improvements such as increased transit service. The Existing Plus Project & Pending Intermodal Development scenario analyzes the impact of project trips, in combination with pending development of adjacent intermodal sites, on the existing roadway network.

In addition to the development and parking expansions near the BART station, transit facility improvements are planned. Station access will be enhanced by providing an expanded entrance/exit area. In addition, bus and rail facilities will be expanded and improved to support multiple transit providers. Potential new transit service providers include the Amtrak Capitol Corridor and the planned Dumbarton Rail service. Additional bus service to the station is possible as well, making this station a major regional connection between local and regional transit providers.

As detailed in Table 5, trip generation increases associated with anticipated pending development of the Intermodal Station Area are expected to add the following additional trips to each peak hour (in addition to project trips):

- 1,104 AM peak hour trips
- 1,064 PM peak hour trips

The vehicle trip assignment to each study intersection under the Existing plus Project & Pending Intermodal Development scenario (including project trips) is shown on Figure 9, while the resulting Existing plus Project & Pending Intermodal Development Conditions vehicle turning movement volumes at each of the study intersections are shown on Figure 10.

### TRAFFIC IMPACTS RESULTING FROM PROJECT + PENDING INTERMODAL DEVELOPMENT

The PM peak hour intersection LOS, with the traffic associated with the Intermodal Station added to the existing traffic, are shown in Table 9 (see Appendix A for detailed LOS calculation sheets). Unacceptable Levels Of Service are shown in **bold**. As shown, the signalized intersection of Decoto Road/11<sup>th</sup> Street will operate at LOS F during both the AM and PM peak hours, indicating unacceptable operations. This impact was previously identified in the EIR transportation analysis prepared for the Avalon at Union Station project (Fehr & Peers, 2006). Measures to mitigate this impact could include:

- A dedicated northbound right-turn lane for vehicles turning from Decoto Road on to 11<sup>th</sup> Street; or
- Widen Decoto Road to three lanes in each direction; or
- An additional westbound lane on 11<sup>th</sup> Street (increase from three to four lanes approaching the intersection with Decoto Road)

As stated in the *Avalon at Union Station EIR*, each of those potential measures was deemed undesirable because widening the intersection was found to be inconsistent with the pedestrian-oriented environment envisioned for the Union City Intermodal Station. The mitigations were thus considered infeasible. Instead, a statement of overriding considerations was prepared, in which the impact would not be mitigated. Based on this precedent, mitigation is considered infeasible and this impact is considered to be **significant and unavoidable**.

The remaining study intersections will operate acceptably under Existing plus Project & Pending Intermodal Development conditions. Therefore, impacts would be less than significant at all other study intersections under this scenario.

**TABLE 9: INTERSECTION LEVELS OF SERVICE – EXISTING PLUS PROJECT & PENDING INTERMODAL DEVELOPMENT**

Intersection	Control <sup>1</sup>	Existing Conditions				Existing Plus Project Conditions				Existing Plus Project & Pending Intermodal Development			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Decoto Road/Mission Boulevard	Signal	18.5	B	16.9	B	19.3	B	19.8	B	40.3	D	25.6	C
2. Decoto Road/5 <sup>th</sup> Street	Signal	13.4	B	8.0	A	13.7	B	5.2	A	15.0	B	5.3	A
3. Decoto Road/7 <sup>th</sup> Street	Signal	13.4	B	9.8	A	13.8	B	9.8	A	14.3	B	10.8	B
4. Decoto Road/Cheeves Way	SSS (planned)					10.2	B	10.8	B	13.8	B	14.5	B
5. Decoto Road/11 <sup>th</sup> Street (current configuration)	Signal	17.2	B	16.1	B								
5. Decoto Road/11 <sup>th</sup> Street <sup>4</sup> (reconfigured as planned)	Signal					22.5	C	44.9	D <sup>4</sup>	<b>&gt; 80.0</b>	<b>F</b>	<b>&gt; 80.0</b>	<b>F</b>
6. Decoto Road/Station Way	Signal (planned)									3.8	A	5.8	A
7. Decoto Road/Meyers Drive/Union Square	Signal	23.0	C	23.4	C	23.6	C	24.5	C	27.1	C	30.4	C
8. Decoto Road/Alvarado-Niles Road (current configuration)	Signal	47.9	D	53.8	D								
8. Decoto Road/Alvarado-Niles Road <sup>5</sup> (reconfigured as planned)	Signal					32.1	C	32.4	C	35.4	D	37.1	D
9. Mission Boulevard/Appian Way	Signal	19.7	B	20.1	C	19.9	B	20.8	C	20.2	C	21.2	C
13. Alvarado-Niles Road/Linda Road	SSS	19.0	C	20.3	C	19.4	C	21.1	C	21.7	C	23.4	C

Note: Bold indicates unacceptable operations as described in Chapter 1.

1. Signal = Signalized intersection; SSS = Side-street stop-controlled intersection

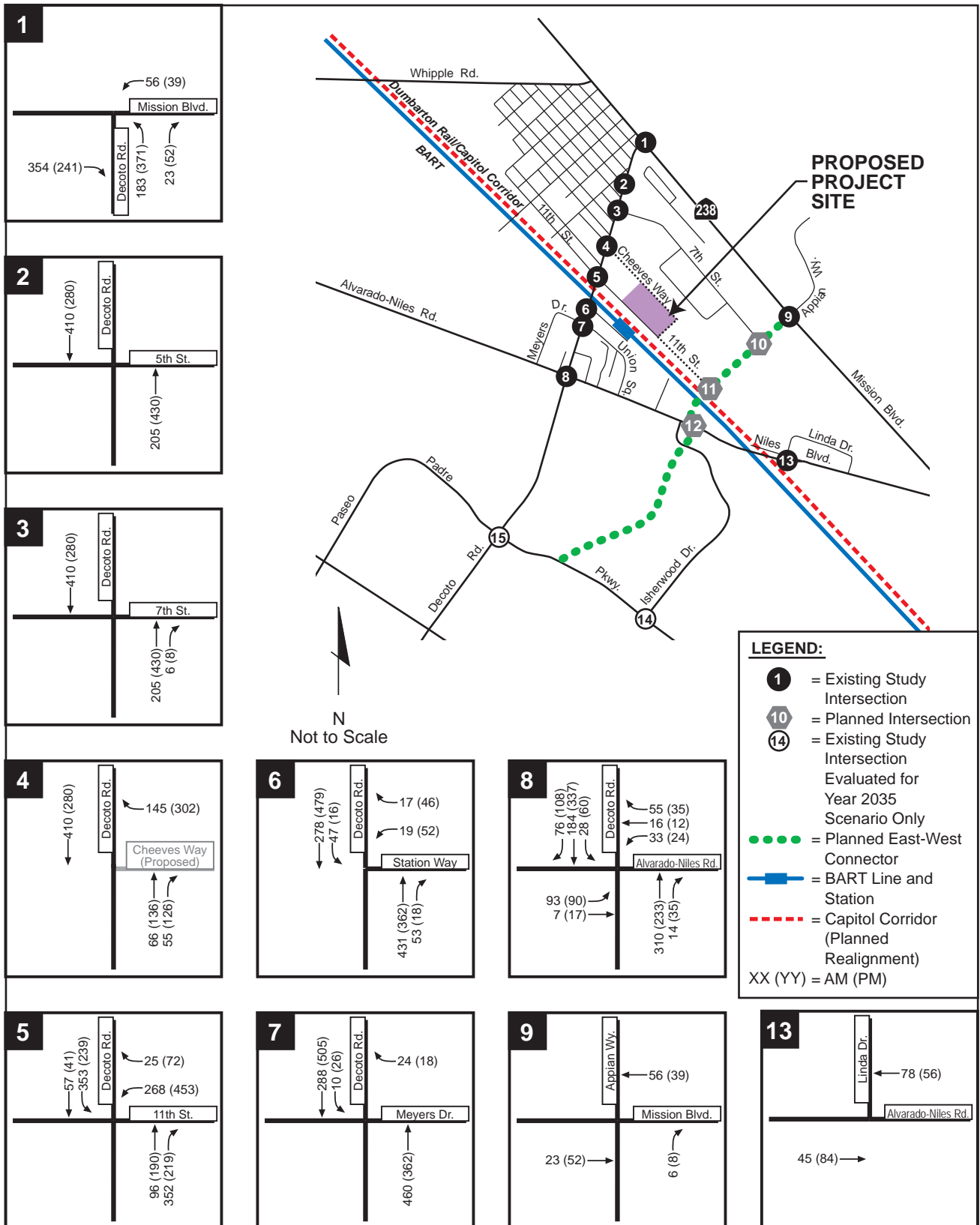
2. Delay in seconds. Delay calculated consistent with methodology presented in the *Highway Capacity Manual*.

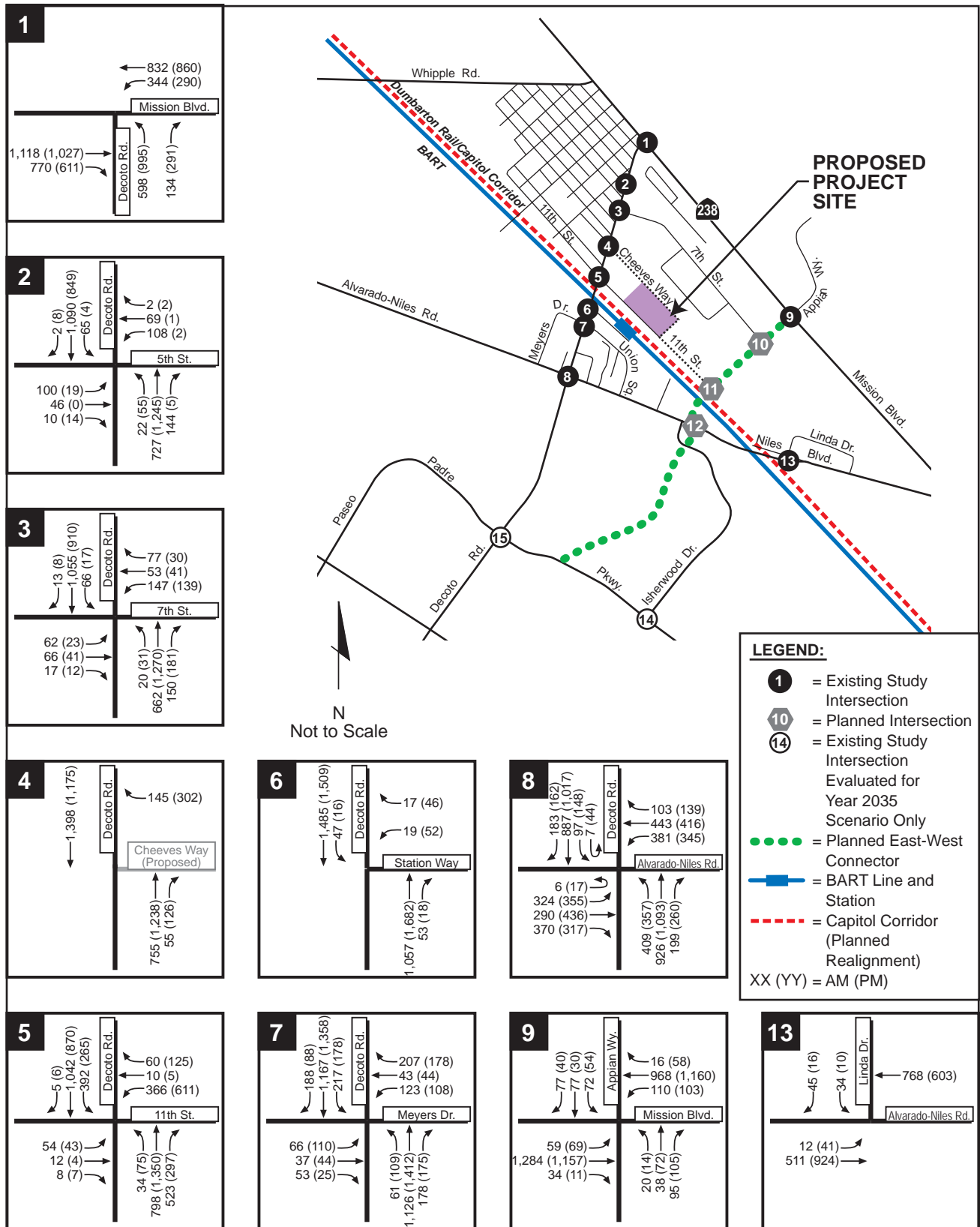
3. LOS = Level of Service

4. Future scenarios assume westbound shared right/through/left-turn lane as planned & optimized signal phasing.

5. Future scenarios assume planned improvements (added left-turn lanes).

Source: Fehr & Peers 2010





## 6. CUMULATIVE (YEAR 2035) BASELINE CONDITIONS

Cumulative conditions were analyzed with and without the proposed project. Traffic conditions were analyzed assuming the planned East-West Connector (realigned SR 84) linking Mission Boulevard with Paseo Padre Parkway will be completed prior to 2035 and would be in full operation. The East-West Connector will cross near the project site and form a “T” intersection with the extension of 11<sup>th</sup> Street (east of the project site), and connect to Alvarado-Niles Road near the Intermodal Station. The planned alignment of the *East-West Connector* is shown on Figure 1.

### CUMULATIVE TRAFFIC FORECASTS

The Cumulative (Year 2035) Baseline projections in this chapter were obtained from *I-880 – SR 238 East-West Connector Traffic Operations Analysis* (Dowling Associates, Inc., May 2008). Year 2035 traffic volume forecasts were developed for that report using the ACCMA travel demand model, with the purpose of assessing relative impacts associated with various alignments for the East-West Connector. The assumptions in this model are based on the previously approved land uses for the project site and adjacent intermodal development sites.

For purposes of this analysis, expected cumulative conditions traffic volumes assuming the East-West Connector described above was in place, were developed using the *East-West Connector Study* report’s Cumulative Year 2035 (Plus Project) scenario. This scenario constitutes Cumulative (Year 2035) Baseline Conditions. The resulting Cumulative (Year 2035) Baseline traffic volumes are depicted on Figure 11.

### INTERSECTION LEVEL OF SERVICE

Cumulative (Year 2035) Baseline intersection conditions were evaluated for the weekday AM and PM peak hours at the study intersections. Signal timing plans were optimized using engineering judgment as well as Synchro 6 software to reflect the likelihood that in the future, existing timings will be changed to accommodate substantially different traffic volumes and conditions. Furthermore, the substantial increase in traffic volumes forecasted for Year 2035 would likely result in greater spreading of peak hour traffic over the entire peak hour (rather than current operations which typically includes peaking within a portion of the peak hour). In order to realistically assess operations resulting from the greater spread of traffic volumes, a peak hour factor (PHF) of 1.00 was used to evaluate operations at study intersections under Year 2035 conditions. Using a PHF of 1.00 assumes that traffic volumes for each 15-minute period within the peak hour are similar.

The detailed Cumulative (Year 2035) Baseline conditions peak-hour intersection LOS calculations for each of the roadway scenarios are presented in Appendix B. As shown in Table 10, the following intersections will operate unacceptably during the AM and PM peak hours under Cumulative (Year 2035) Baseline conditions:

- Decoto Road/7<sup>th</sup> Street (LOS F during the PM peak hour)
- Decoto Road/11<sup>th</sup> Street (LOS F during the AM and PM peak hours)
- Alvarado Niles / Linda Drive (LOS F during the AM peak hour)
- Paseo Parkway / Isherwood Drive (LOS F during the AM and PM peak hours)

All other study intersections will operate acceptably under Cumulative (Year 2035) Baseline conditions. Additional discussion regarding these impacts are discussed further in Section 7 below.

Several intersections along Mission Boulevard, Alvarado-Niles Boulevard, the planned East-West Connector, and Decoto Road would operate worse than mid-range LOS D during one or both peak hours; however, as noted in the significance criteria for this report, LOS E is considered acceptable at these locations.

**TABLE 10: INTERSECTION LEVELS OF SERVICE – CUMULATIVE (YEAR 2035) BASELINE CONDITIONS**

Intersection	Control <sup>1</sup>	Existing Conditions				Cumulative (Year 2035) Baseline Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay <sup>2</sup>	LOS <sup>3</sup>	Delay	LOS	Delay	LOS	Delay	LOS
1. Decoto Road/Mission Boulevard	Signal	18.5	B	16.9	B	45.6	D	30.8	C
2. Decoto Road/5 <sup>th</sup> Street	Signal	13.4	B	8.0	A	14.1	B	5.9	A
3. Decoto Road/7 <sup>th</sup> Street	Signal	13.4	B	9.8	A	48.1	D	<b>&gt; 80.0</b>	<b>F</b>
4. Decoto Road/Cheeves Way <sup>7</sup>	SSS					10.7	B	27.7	D
5. Decoto Road/11 <sup>th</sup> Street (current configuration)	Signal	17.6	B	16.1	B				
5. Decoto Road/11 <sup>th</sup> Street <sup>4</sup> (reconfigured as planned)	Signal					<b>&gt; 80.0</b>	<b>F</b>	<b>&gt; 80.0</b>	<b>F</b>
6. Decoto Road/Station Way	Signal					22.8	C	22.5	C
7. Decoto Road/Meyers Drive/Union Square	Signal	23.0	C	23.4	C	74.8	E	54.6	D
8. Decoto Road/Alvarado-Niles Road (current configuration)	Signal	47.9	D	53.8	D				
8. Decoto Road/Alvarado-Niles Road <sup>5</sup> (reconfigured as planned)	Signal					48.1	D	68.7	E
9. Mission Boulevard/Appian Way	Signal	19.7	B	20.1	C	63.8	E	61.0	E
10. 7 <sup>th</sup> Street/East-West Connector <sup>6</sup>	Signal					52.7	D	19.8	B
11. 11 <sup>th</sup> Street/East-West Connector <sup>6</sup>	Signal					21.4	C	31.2	C
12. Alvarado-Niles Road/East-West Connector <sup>6</sup>	Signal					51.1	D	61.3	E
13. Alvarado-Niles Boulevard/Linda Drive <sup>6,7</sup>	SSS	19.0	C	20.3	C	<b>&gt;50.0</b>	<b>F</b>	<b>49.8</b>	<b>E</b>
14. Paseo Padre Parkway/Isherwood Drive <sup>6</sup>	Signal					<b>&gt; 80.0</b>	<b>F</b>	<b>&gt; 80.0</b>	<b>F</b>
15. Paseo Padre Parkway/Decoto Road <sup>6</sup>	Signal					55.0	E	44.6	D

Note: **Bold** indicates unacceptable operations (LOS of mid-range D or better is acceptable at all locations, and LOS E is acceptable at study intersections located on Mission Boulevard, Decoto Road and the planned East-West Connector).

1. Signal = Signalized intersection SSS = Side-Street Stop<sup>2</sup>. Delay in seconds. Delay calculated consistent with the methodology presented in the 2000 Highway Capacity Manual.

3. LOS = Level of Service

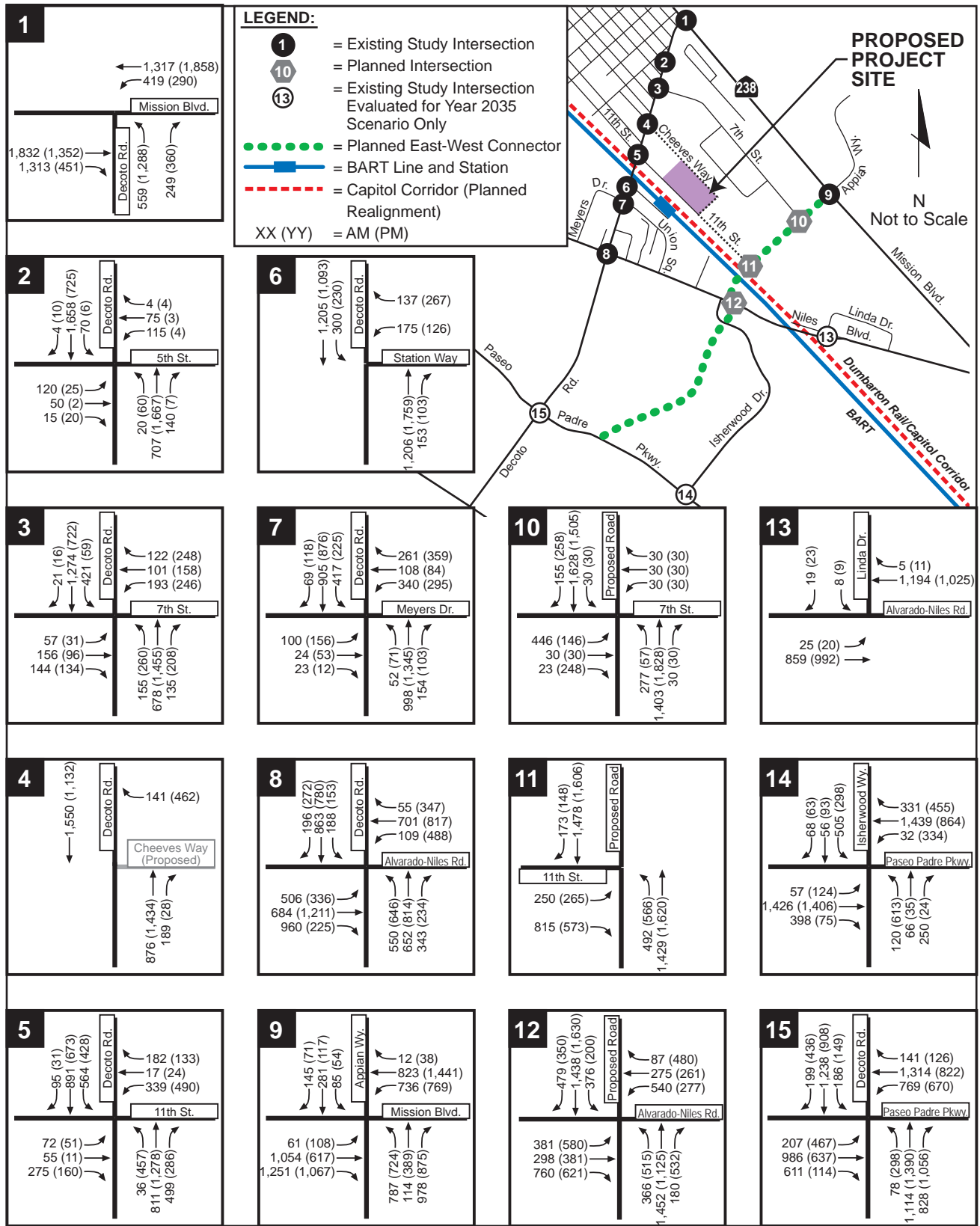
4. Assumes westbound shared right/through/left-turn lane as planned & optimized signal phasing.

5. Assumes intersection reconfiguration as currently planned (second left turn lane added for each approach).

6. LOS reported for this intersection was obtained from I-880 – SR238 East-West Connector Traffic Operations Analysis, Dowling Associates, Inc., May 2008.

7. LOS is based on the average vehicle delay for the worst intersection approach, from the stop-controlled side street.

Source: Fehr & Peers Associates, 2008



## 7. CUMULATIVE (YEAR 2035) WITH PROJECT CONDITIONS

Traffic conditions for the Cumulative (Year 2035) Plus Project scenario were analyzed assuming full build-out and operation of the proposed East-West Connector linking Mission Boulevard with Paseo Padre Parkway. Although there are several potential configurations for the East-West Connector, Fehr & Peers utilized the configuration that would produce the worst-case scenario in the Year 2035 with respect to traffic volumes in the study area. Under this roadway scenario, the proposed East-West Connector would extend near the project site and form a “T” intersection with the extension of 11<sup>th</sup> Street and Cheeves Way, and connect to Paseo Padre Parkway between Decoto Road and Isherwood Drive.

As shown in Tables 4 through 7, the project’s contribution to peak hour traffic volumes are shown as being different in each scenario (i.e. Existing Plus Project, Existing plus Project & Pending Intermodal Development, and Long-Term). This difference is attributable to the fact that the Cumulative (Year 2035) Baseline analysis is predicated on build-out of the previously approved land uses for the Union City Intermodal sites (as described in the 2005 Avalon project traffic study), which have slightly different internalization factors.

The Cumulative (Year 2035) Plus Project analysis indicates that the project, in combination with the adjacent development of the Union City Intermodal Station sites would generate:

- 2,949 new AM peak hour trips
- 2,863 new PM peak hour trips

The resulting Cumulative (Year 2035) With Project traffic volumes are based on the net change at each study intersection. As shown in Table 7, the net change between the Cumulative Baseline and Cumulative With Project scenarios is negative, resulting in fewer trips than what were previously assumed in the *I-880 – SR 238 East-West Connector Traffic Operations Analysis*. However, the directionality and distribution changes trip assignments somewhat due to greater amount of residential development under the “With Project” scenario. The resulting Cumulative with Project traffic volumes are shown on Figure 12.

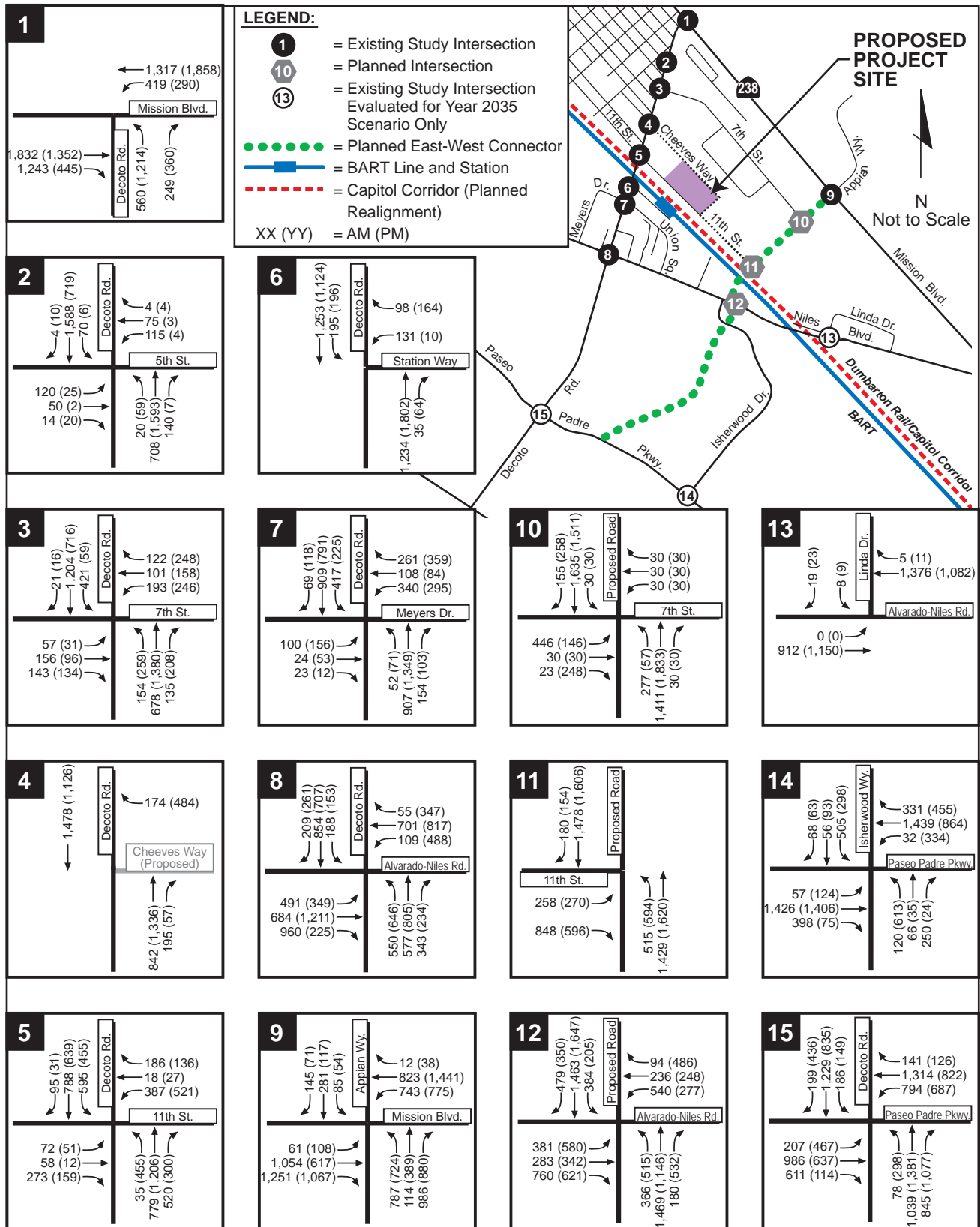
### CUMULATIVE TRAFFIC IMPACTS

Cumulative (Year 2035) Plus Project conditions, which include Cumulative (Year 2035) Baseline traffic volumes plus traffic associated with the proposed project and development assumptions for the Union City Intermodal Station site, were evaluated at each study intersection for the weekday AM and PM peak hours. Intersection cycle lengths, signal timing, and signal phasing were optimized as part of the analysis, and a peak hour factor (PHF) of 1.00 was used to account for the significant increase in traffic expected in the future. Detailed peak hour intersection LOS calculations are presented in Appendix A and are summarized in Table 11.

As shown in Table 11, the following intersections are forecast to operate unacceptably during both the AM and PM peak hours under Cumulative (Year 2035) Baseline and With Project conditions:

- Decoto Road/11<sup>th</sup> Street
- Alvarado-Niles Boulevard/ Linda Drive (north intersection)
- Paseo Padre Parkway/Isherwood Drive

All other study intersections will operate acceptably under Cumulative (Year 2035) With Project conditions.



**TABLE 11: INTERSECTION LEVELS OF SERVICE – CUMULATIVE WITH PROJECT CONDITIONS**

Intersection	Control <sup>1</sup>	Existing Conditions				Cumulative Baseline Conditions				Cumulative with Project Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Decoto Road/Mission Boulevard	Signal	18.5	B	16.9	B	45.6	D	30.8	C	41.8	D	28.3	C
2. Decoto Road/5 <sup>th</sup> Street	Signal	13.4	B	8.0	A	14.1	B	5.9	A	13.6	B	5.7	A
3. Decoto Road/7 <sup>th</sup> Street	Signal	13.4	B	9.8	A	48.1	D	> 80.0	F	53.4	D	79.5	E
4. Decoto Road/Cheeves Way	SSS					10.7	B	27.7	D	11.1	B	25.6	D
5. Decoto Road/11th Street <sup>4</sup>	Signal	17.2	B	16.1	B	> 80.0	F	> 80.0	F	> 80.0	F	> 80.0	F
6. Decoto Road/Station Way	Signal					22.8	C	22.5	C	15.0	B	16.5	B
7. Decoto Road/Meyers Drive/Union Square	Signal	23.0	C	23.4	C	74.8	E	54.6	D	55.3	E	55.6	E
8. Decoto Road/Alvarado-Niles Road <sup>5</sup>	Signal	47.9	D	53.8	D	48.1	D	68.7	E	52.2	D	65.2	E
9. Mission Boulevard/Appian Way / East-West Connector	Signal	19.7	B	20.1	C	63.8	E	61.0	E	66.4	E	61.1	E
10. East-West Connector/7 <sup>th</sup> Street	Signal					52.7	D	19.8	B	39.0	D	19.8	B
11. East-West Connector/11 <sup>th</sup> Street	Signal					21.4	C	31.2	C	22.8	C	32.6	C
12. East-West Connector/Alvarado-Niles Road	Signal					51.1	D	61.3	E	52.1	D	61.9	E
13. Alvarado-Niles Road/Linda Drive	SSS	19.0	C	20.3	C	>50	F	49.8	E	>50.0	F	>50.0	F
14. Paseo Parkway/Isherwood Drive	Signal					> 80.0	F	> 80.0	F	> 80.0	F	> 80.0	F
15. Paseo Parkway/Decoto Road	Signal					55.0	E	44.6	D	54.6	D	43.0	D

Note: **Bold** indicates unacceptable operations (LOS of mid-range D or better is acceptable at all locations, and LOS E is acceptable at study intersections located on Mission Boulevard, Decoto Road and the planned East-West Connector).

1. Signal = Signalized intersection; SSS = Side-street stop-controlled intersection.
2. Delay in seconds calculated using the Highway Capacity Manual.
3. LOS = Level of Service
4. Future scenarios assume westbound shared right/through/left-turn lane as planned & optimized signal phasing.
5. Future scenarios assume planned improvements (added left-turn lanes).
6. Cumulative (Year 2035) scenarios assume completion of the planned East-West Connector.

Source: Fehr & Peers, 2010

### **Findings of Significance for Project Contribution to Cumulative Impacts**

The proposed project would make a **significant contribution to cumulative traffic impacts** at the following study intersections:

- Decoto Road/11<sup>th</sup> Street
  - The intersection would operate at LOS F during both peak hours. The impact would be primarily due to delay experienced by turning movements inbound and outbound to the project site from Decoto Road to 11<sup>th</sup> Street. The Project would add an amount of traffic to these movements that may be noticed by regular users of this facility (53 westbound left turn and 43 southbound left turns, or 14% and 7% of the movement volume respectively in the PM peak hours). Thus, the project's contribution would be considered **significant**.

The proposed project's contribution to cumulative impacts would be **less-than-significant** at the following two study intersections:

- Alvarado-Niles Boulevard/Linda Drive (north intersection)

Although the intersection LOS would operate unacceptably under Year 2035 conditions in the AM and PM peak hours (based on delay experienced by the stop-controlled side street), the peak-hour volumes would not meet signal warrant criteria as defined by the *Manual of Uniform Traffic Control Devices* (MUTCD). The project's cumulative impacts to this intersection would thus be **less-than-significant**.

- Paseo Parkway/Isherwood Drive

The intersection would operate at LOS F during the AM and PM peak hours. This LOS impact results from forecasted traffic volumes for vehicles making the northbound left-turn movement from northbound Isherwood Drive to westbound Paseo Parkway during the PM peak hour that would exceed the capacity of the northbound approach leg. (The opposite movement would result in impacts during the AM peak hour, as vehicles making a right-turn from eastbound Paseo Parkway to southbound Isherwood Drive are forecasted to exceed the capacity of the intersection).

This increase is not caused by project trips, but is related to traffic diverted to the intersection following completion of the planned East-West Connector. The forecasted increase is derived from the *East-West Connector Study* (Dowling Associates, draft report May 2008), which derived volumes from the ACCMA model. Ultimately, the East-West Connector Study was based on conservative land use assumptions. This results in model outputs that show a high level of traffic growth at this intersection. As a result of these circumstances, northbound left-turn movements from Isherwood Drive to Paseo Parkway could not be accommodated by the intersection or downstream road network.

The project would contribute a negative number of trips to the congested movements (to and from Isherwood), and less than 50 project related peak hour trips are expected to travel through the intersection during peak hours, out of a total forecasted intersection volume of over 4,300 trips during the PM peak hour. Therefore, the project contribution to the forecasted cumulative impact at Paseo Parkway/Isherwood Drive is **less-than-significant** and no mitigation is required.

## CUMULATIVE TRAFFIC MITIGATION MEASURES

The following mitigation measures would reduce impacts to less than significant levels:

Decoto Road/11<sup>th</sup> Street: mitigating impacts at this intersection would require measures to increase capacity for movements in and out of the project site, and/or provide alternate routes to access the northern half of the Union City Intermodal Station development area.

The following mitigation measure was evaluated:

- Construct an additional left-turn lane to the westbound approach, for a total of two. In addition, construct a right-turn pocket of 100 feet at minimum to the northbound approach and convert the existing shared through/right-turn lane to an exclusive through lane. Optimize the signal cycle length to 120 seconds. Modify the signal operation appropriately (e.g., northbound right-turn operates with overlap, prohibit southbound u-turns) and optimize the signal timing for 120 second cycle length operation.
  - Significance after mitigation: With implementation of the mitigation measure, the intersection would continue to operate at LOS F during both the AM and PM peak hours. However, average intersection delays during both peak hours would be reduced to a level less than reported for the cumulative baseline (without project) scenario. Thus, this mitigation would reduce the traffic impact to less-than-significant levels; however, the mitigation would potentially result in significant impacts to pedestrians. Pedestrians would experience increased delays due to the 120-second cycle length, and pedestrian crossing distances would increase following installation of additional turn lanes on Decoto Road. This would be inconsistent with the City's General Plan policies promoting pedestrian travel and inconsistent with the vision for a walkable environment in the area around the Intermodal Station.

As noted above, the mitigation measure would potentially impact pedestrians and would be inconsistent with the City's General Plan policies and the vision for the Intermodal Station area. In addition, the adequate right-of-way necessary to implement the mitigation measure is not available; rendering it infeasible. Therefore, the impact would be significant and unavoidable.

Adoption of a "statement of overriding considerations" would be consistent with the Avalon at Union Station EIR (2005) study that identified significant cumulative impacts at Decoto Road/11<sup>th</sup> Street and Decoto Road/Union Square/Meyers Drive, but found that mitigating those impacts would conflict broader goals for the Intermodal Station area related to the promotion of transit-oriented development. Findings in the Avalon Union Station EIR stated that:

*"The conclusion that these intersections will be impacted under year 2035 (cumulative) conditions is the result of a traffic forecasting process that overlays many layers of conservative assumptions. While the use of conservative assumptions (assumptions that would tend to overstate impacts) is appropriate for an environmental document, they result in higher forecasts of traffic than contained in any other forecast process performed for the area. The net result of these assumptions is a conclusion that two critical intersections should be widened. Such widening would increase the vehicular orientation of the area and is counter to many General Plan policies, which envision the Project area as a pedestrian-oriented district."*

*"An alternative approach to providing additional vehicular capacity expansion would be to adopt statements of overriding consideration for the subject vehicular impacts. The City could also monitor traffic growth in the area, through the conducting of transportation impact studies for other developments in the area (new counts should be required for each), to determine whether growth from area development is actually resulting in forecasts that are as high as those presented in this EIR. In the event that traffic growth is less intense, the need for vehicular capacity expansion may be negated. In the event that traffic growth is as high as projected in this*

*EIR, the City could: (a) consider modifying level of service standards within the pedestrian district to permit higher levels of vehicular congestion, in the interest of enhancing pedestrian use; (b) consider other policy changes that would seek to offset pedestrian degradation through pedestrian enhancements (such as median refuge islands in wider street crossings); (c) modify the land use program of area development to scale back traffic forecasts; or (d) some combination of the above.”*

Based on the precedent established in the Avalon at Union Station EIR, a statement of overriding considerations is recommended.

It should be noted that the City has identified a feasible mitigation measure in conjunction with the Avalon Bay and Mid-Peninsula Housing project. This measure would partially address, but not fully mitigate the delays at the Decoto Road/11<sup>th</sup> Street intersection while not adversely impacting pedestrian movements in the area.

*Mitigation TRANS-1:*

Extend the length of the southbound left-turn pocket on Decoto Road (approaching 11<sup>th</sup> Street), relocating the Decoto Road median and eliminating the northbound left-turn pocket from Decoto Road to westbound 10<sup>th</sup>; and install a northbound right-turn lane on Decoto Road, approaching Cheeves Way. Figure ES-1 shows a conceptual plan for the proposed mitigation (in combination with adjacent mitigations to improve bicycle and pedestrian circulation at Decoto/10<sup>th</sup> and Decoto/Cheeves Way). This project is currently underway and will be completed by the end of 2010. The project will be required to pay its fair share similar to the Avalon Bay and Mid-Peninsula Housing projects. This impact would remain **significant and unavoidable** at Decoto Road/11<sup>th</sup> Avenue (see further discussion above with findings supporting a statement of overriding considerations).

## 8. REGIONAL ROADWAYS & FREEWAY SEGMENTS

The Alameda County Congestion Management Program (CMP) requires the assessment of development-driven impacts on regional roadways. Since the project would generate more than 100 “net new” PM peak hour trips, the CMP requires the use of the ACCMA Countywide Travel Demand Model to assess the impacts on regional roadways in the project vicinity during the AM and PM peak hours. The CMP and the Metropolitan Transportation System (MTS) roadways in the project vicinity identified in Notice of Preparation comments by AACMA<sup>2</sup> include Decoto Road, Alvarado-Niles Road, Whipple Road, Mission Boulevard, Paseo Padre Parkway, I-880, and SR-84<sup>3</sup>.

### ALAMEDA COUNTY CMP ANALYSIS METHODOLOGY

The ACCMA Countywide Model is a regional travel demand model that uses socio-economic data and roadway and transit network assumptions to forecast traffic volumes and transit ridership using a four-step modeling process that includes trip generation, trip distribution, mode split, and trip assignment. This process accounts for changes in travel patterns due to future growth and balances trip productions and attractions.

The CMA model includes assumptions as to the level of development anticipated for the project site, and adjoining Union City intermodal development sites, based on previous land use approvals for the Union City Intermodal Station District. Therefore, for the purposes of conducting the CMA Analysis, the “with project” traffic forecast was derived by adding the net change in trips resulting from the change in land use assumptions for the project site and adjoining sites within the Union City Intermodal Station District. The methodology for determining the “net change” was similar to the method described in Chapter 3 of this report, except that the CMA analysis was based on slightly different variables, as described in the following paragraph. In conducting this analysis, the CMA model land use assumptions for the rest of the City of Union City were not modified.

The current version of the Countywide Model is based on Association of Bay Area Governments (ABAG) *Projections 2005* land uses for 2015 and 2030. The ACCMA Countywide Model land use assumptions are primarily tabulated in terms of dwelling units, population characteristics, and employment data for each traffic analysis zone (TAZ). The project, in addition to proposing dwelling units, quantifies office and retail additions in terms of square feet of space and “park and ride” spaces in terms of number of stalls. These quantities were converted into usable quantities for the ACCMA model. The baseline land use files for 2015 and 2030 were checked and verified to have similar assumptions for the project area without the project build-out. Thus, only the incremental change of the project was applied to the project area. After the entire model was run with the project related land use changes, the trip generation produced from the site was verified as being reasonable in magnitude as a result of the land use changes. Changes in land use are provided in Appendix A. The traffic baseline and “plus project” forecasts for 2015 and 2030 were extracted for the CMP and MTS roadway segments from the Countywide Model.

Due to differences in analysis methodologies, the forecasted traffic volumes on the roadway links can differ from the volumes derived for the intersection analysis, particularly at the local level. The intersection forecasts use the output of the ACCMA model as an input to develop intersection volumes in conjunction with existing traffic counts. The MTS roadway analysis is based on the outputs of the ACCMA model directly on a roadway segment level. Also, the CMA analysis required an evaluation of Year 2030 conditions, while the intersection analysis is based on Year 2035 traffic forecasts developed for the *East-West Connector Study*. It is not unusual to have discrepancies given that the two analyses measure impacts at a different scale. For local streets, intersections are typically a more accurate measure of operating conditions because the capacity of an urban street, defined as the number of vehicles that can pass through its intersections, is controlled by the capacity at its intersections.

---

7. May 12, 2008 letter from Alameda County CMA to City of Union City.

8. Note that the roadway segments included in this evaluation are not based on an assessment of the project trip distribution or application of screening criteria to determine if the project would contribute vehicle trips to warrant analysis.

## CMA ANALYSIS FINDINGS & IMPACTS ON REGIONAL FACILITIES

Operations of the MTS freeway and surface street segments were assessed using a volume-to-capacity (v/c) ratio methodology. For freeway segments, a per-lane capacity of 2,000 vehicles per hour (vph) was used, consistent with the 2004 Congestion Management Program documents. For surface streets, a per-lane capacity of 800 vehicles per hour was used. Roadway segments with a v/c ratio greater than 1.00 signify LOS F.

The “plus project” results were compared to the baseline results for each horizon year. Based on the analysis, impacts resulting from the proposed project were evaluated on the CMP and MTS roadways. The 2015 and 2030 peak hour volumes, v/c ratios and the corresponding level of service for baseline and “plus project” conditions are provided in Appendix A.

The project would contribute to 2015 and 2030 increases in traffic congestion on MTS roadways. However, the project would not cause a roadway segment on the MTS to degrade from LOS E or better to LOS F. The project also would not increase the v/c ratio by more than 3 percent for roadway segments that would operate at LOS F without the project. Therefore, project impacts on regional arterials and freeway segments are **less than-significant** and no mitigation measures are required.

## 9. SITE PLAN ANALYSIS

Based on a review of the site plan, this section provides findings of significance, identifies necessary mitigations (if applicable) and includes general recommendation focusing on site access and design, with a particular emphasis on the enhancement of the bicycle and pedestrian environment.

### SITE-ACCESS, ON-SITE CIRCULATION AND PARKING IMPACTS

A review of on-site circulation, site access, and parking was performed based on review of the site plan dated November 1, 2009.

#### *Site Access & On-Site Circulation*

Internal circulation roadways will vary between 35 and 112 feet. Primary circulation will be provided by 11<sup>th</sup> Street, with four travel lanes, two bicycle lanes and turn pockets at intersections. Cheeves Way will have two travel lanes, with some on-street parking permitted; bike lanes will not be provided on Cheeves Way.

The site plan indicates that garage access driveways will connect to Berger Way and Galliano Way, two north-south internal roadways. These roadways will provide a direct connection to Cheeves Way 11<sup>th</sup> Street. According to City staff, the garage access driveways will be sized to accommodate City requirements. Additional garage access driveways may be located on Cheeves Way. In addition, the final design may show garage access driveways relocated to Cheeves Way.

The proposed street widths are generally adequate for the type and volumes of traffic expected to use these roadways, with the exception of the following:

1. Although the design of the project entrance at Decoto Road meets acceptable standards, motorists would experience delays exiting the site westbound on 11<sup>th</sup> Street to Decoto Road during the PM peak hour. For motorists desiring to travel south on Decoto Road, this will be the only direct exit from the site; motorists desiring to travel north on Decoto Road will have a second option by exiting on Cheeves Way. Delay would be related to operations at the intersection of 11<sup>th</sup> Street and Decoto Road, as discussed in the intersection level of service analysis prepared for this report. Significant cumulative traffic impacts would occur at this intersection, and at several other intersections on Decoto Road, but would not be attributable solely to the project.
2. Although delay would be acceptable for motorists exiting via Cheeves Way, the use of this exit is constrained since motorists will be limited to right-turn only movements for vehicles entering or exiting the site. While it would be preferable to provide at least on additional entrance and exit that would allow left-turn movements (inbound and outbound), this would not be possible at Cheeves Way due to the proximity to the adjacent railroad tracks.
3. Inbound circulation for motorists entering the site on 11<sup>th</sup> Street from Decoto Road will be constrained by the lack of left-turn pockets on 11<sup>th</sup> Street for vehicles traveling eastbound *within* the project site. Entrances to parking garages will be provided on internal streets; however, motorists traveling eastbound on 11<sup>th</sup> Street would not be allowed to make a left turn on to Galliano Way to the proximity of the 11<sup>th</sup>/K Street intersection to Decoto Road. In addition, turns could not occur on the easterly portion of Cheeves Way, because the site plan indicates a center median would restrict turning movement at that intersection. Due to these design constraints, left-turn movements for inbound vehicles traveling east on 11<sup>th</sup> Street would be limited to Berger Drive Street. For motorists familiar with the site, entry via Cheeves Way will ultimately be more efficient, which would have the added bonus of reducing delay caused by motorists entering the site at 11<sup>th</sup> Street and exceeding the inbound right-turn capacity from Decoto to 11<sup>th</sup>. For that reason, the impact on internal circulation due to the lack of left-turn opportunities for

motorists traveling eastbound on 11<sup>th</sup> Street is found to be less than significant. Impacts related to site access and on-site circulation resulting from the project will be **less than significant**.

### ***Emergency Access***

The Project site will be accessible by emergency vehicles on all sides due to a combination of new roads and a pedestrian promenade that will also provide emergency vehicle access. With respect to emergency access, the Fire Department has determined that the project site meets applicable requirements.

The 29.84 PG&E site, which the project site is a part of, is bordered on two sides by railroad tracks, and on a third side (east of the site) by a channelized waterway. Emergency vehicle access will be via the following locations:

Emergency vehicles accessing the site from Decoto Road could enter via 11<sup>th</sup> Street or Cheeves Way (although access via Cheeves Way would be limited due to the raised median on Decoto).

Emergency vehicles accessing the site from the east would be able to enter the site via 11<sup>th</sup> Street, with a planned extension of 11<sup>th</sup> Street to include a connection with the planned East-West Connector. Until such time as the East-West Connector is constructed, access from the east on 11<sup>th</sup> Street will utilize a temporary, route through an adjoining residential neighborhood accessed via Linda Street/Niles Boulevard.

The closest Fire station to the Project site is located on 7<sup>th</sup> Street, which is approximately ½ mile away. The Police Station is located on the corner of Alvarado-Niles Road and Royal Ann Drive, which is approximately 1 mile from the project site. Access to the site may be slowed due to the existing railroad tracks that cross Decoto Road. However, Fire Department staff has indicated that this has not been an issue for them in the past. In addition, if a problem does arise regarding delayed response times due to impaired site access, the Fire Department would radio to nearby fire stations in other cities to respond or take an alternate route. This impact is considered **less than significant**.

### **Motor Vehicle & Bicycle Parking**

Environmental impacts under CEQA occur when a project does not supply an adequate amount of parking spaces to meet peak parking demand, either on its own or in combination with existing parking supplies, and results in physical impacts on the environment through the construction of off-site parking improvements. In this case, the provision of parking will be adequate to accommodate peak parking demand; thus no reasonably foreseeable environmental impacts related to inadequate parking capacity are expected to occur.

As a separate issue, the amount of parking spaces proposed for the project does not meet the residential parking requirements stipulated in the City's municipal code. However, this, on its own, does not constitute a physical impact on the environment and therefore is not considered a significant environmental impact under CEQA.

For the purposes of this analysis, peak parking demand for residents and retail/commercial customers is addressed separately in the following sections.

#### Residential Parking Demand

For the proposed residential structures, the project will include 1,430 parking spaces for residential uses and 133 guest spaces, which can also be used to satisfy the residential parking demand, for a total of 1,563 parking spaces. Based on parking demand data collected by the Institute of Transportation Engineers (ITE), the average peak parking demand for low- and mid-rise apartments/condominiums (2-10 stories) in a suburban setting is 1.2 vehicles parked per unit during the daily peak. Therefore, peak parking demand will be 1,168 parking spaces. Since it is generally advisable to provide an additional 5-10 percent "buffer" above peak demand to accommodate higher than anticipated guest or service (cleaning services, etc.) parking, a total of approximately 1,280 parking spaces would be recommended for the residential component of the project (based on typical ITE suburban rates). With the proposed mix of residential and guest spaces, the project will satisfy peak parking demand based on ITE rates. It should also be noted that these rates are based on suburban settings that are not as well-served by public transit as the project site. As such, the project could expect reduced demand due to proximity to transit, linked trips, and internal trips; thus, actual parking demand generated by residences at the project site will likely be less than the ITE rates predict.

Although the project will meet the conservative ITE rates described above, the project will not meet the City's parking standards for the Station Mixed Use Commercial (CSMU) Zoning District. These standards are found in Chapter 18.38 of the Union City Municipal Code and defined as follows:

#### Residential Use (Ownership Units)

- a. One and one-half (1-1/2) covered and enclosed parking stalls per each one (1) bedroom or studio unit.*
- b. Two (2) covered and enclosed parking stalls per each unit with two (2) or more bedrooms.*
- c. A minimum of one (1) motorized cycle parking stall that is enclosed and weather-protected shall be provided for every twenty-five (25) units*

The Zoning Ordinance also contains parking standards for rental units that requires 1.5 parking stalls for each unit irrespective of bedroom count. For purposes of this analysis, the residential parking standards for ownership units were used since they generate a higher parking demand.

Assuming approximately half of the dwelling units will be one bedroom or less and half will be two-or-more bedrooms, the project will be required under the municipal code to provide 1,703 spaces for residential use, 140 more spaces than the project is proposing. As stated above, environmental impacts under CEQA occur when a project does not supply an adequate amount of parking spaces to meet peak parking demand, and results in physical impacts on the environment through the construction of off-site parking improvements. Since it has been

demonstrated that the project will meet conservative ITE parking demand rates for residential parking, it can be assumed that off-site parking improvements will not be necessary; thus, the related environmental effects will not occur. Additionally, in keeping with the project's intended purpose as a transit-oriented development and with the goals of the City's Transit First Policy as outlined in General Plan Goal TR-A.1.1, the project's provision of residential parking below City standards will encourage residents to use alternate forms of transportation, which will reduce traffic-related environmental effects. As such, the project's inability to meet the City's minimum parking standards is not considered a significant environmental impact under CEQA.

#### Retail/Commercial Parking Demand

To satisfy parking demand generated by the proposed retail and commercial units, the City has committed to supplying public parking within the proposed development and has developed a comprehensive parking program for the area. The City has installed two parking lots along 11th Street that accommodate up to 689 spaces. The parking lot located adjacent to the rear of the BART station, on the southerly side of 11th Street, includes 333 parking spaces. A portion of these parking spaces (approximately 179 spaces) were developed as BART replacement parking associated with the Union City BART Station renovation and will need to be maintained for an additional 14 years. The second parking lot is located on Block 2 and includes approximately 356 parking spaces that will be developed during Phase 2 of the project. These parking lots are currently being utilized by BART patrons but there is currently observed excess capacity on the weekdays and week-ends. In addition, the City has purchased 117 public stalls within a garage associated with an approved 157-unit multi-family project, located on Block 4, that will begin construction in Spring 2010. It is anticipated that the garage will be operational prior to occupancy of the retail and commercial space within the project. Approximately 111 on-street parking spaces will also be provided along 11th Street, Cheeves Way, Berger Way and Galliano Way, that will also be installed prior to the occupancy of the retail and commercial space. The City owns several additional blocks within the project area that can be utilized for surface parking, if necessary.

Based on ITE parking demand rates, the retail and commercial components are likely to generate peak demand of approximately four to five spaces per thousand square feet, based on typical suburban parking demand for retail uses. Therefore, assuming the more conservative rate of five spaces per thousand square feet, the peak parking demand generated by 37,500 square feet of the commercial uses would be 188 spaces. Per Chapter 18.38, Station Mixed Use Commercial, and Chapter 18.36, Commercial Districts, of the Union City Zoning Ordinance, the City's parking requirement for the retail and commercial (i.e. office) components are five parking spaces per one thousand square feet of gross floor area, which is consistent with the ITE parking demand rates.

As noted above, adequate public parking in the project vicinity is available to satisfy the required parking demand for retail and commercial uses within the project. As such, there will be sufficient parking to satisfy peak retail/commercial parking demand.

Overall, the project will be capable of meeting peak parking demands for residents as well as retail and commercial customers, as demonstrated through a comparison with ITE demand rates. Impacts related to parking will therefore be less than significant, and no mitigation is required.

The proportion of Americans with Disabilities Act (ADA) compliant stalls is not apparent from the project site plans. Although the City has not defined the number of parking spaces required to be ADA-compliant, industry standard indicates two percent of the total parking stalls all new mixed-use developments should be ADA-compliant and at least four of those stalls should be van-accessible and provide adequate loading zone dimensions.

Bicycle parking will be provided for each phase of the development consistent with the provisions listed in Union City *Zoning Ordinance* Chapter 18.38.190 (Off-street Parking). Provision of *long-term bicycle parking* for the retail employees within the project site is not indicated on the site plans. Although not required, the provision of indoor bicycle storage and/or bicycle storage lockers for employees is recommended.

In addition, the provision of *short-term bicycle storage* (i.e., on-street bike racks) is not indicated on the site plans. Although not required by City standards, bicycle racks are recommended for installation on the sidewalks adjacent to planned commercial entrances within the project site, in order to accommodate customers and other short-term visitors.

Based on the findings described above, impacts related to the provision of motor vehicle and bicycle parking would be **less than significant** and no mitigation is required.

### ***Pedestrian Circulation (On-Site)***

Most internal project intersections will feature pedestrian bulb-outs on at least two sides that will encourage traffic to move through the intersection at slower speeds while reducing the distance pedestrians must travel to cross the street. At many intersections, the roadway width is reduced to approximately 25 feet with the bulb-outs. Intersections that do not include bulb-outs are up to 75 feet in width (along 11<sup>th</sup> Street). No parking will be allowed adjacent to any of the project intersections.

Based on review of the site plan, the proposed project will provide generally adequate pedestrian facilities within the site. Internal facilities will consist of a landscaped main “pedestrian promenade” with colored concrete and pedestrian seating, which will be constructed between Blocks 3 and 4. On the podium deck of each block, landscaped pedestrian paths will be constructed between all internal building entrances and amenities (i.e. swimming pool, BBQ area, etc.).

Based on the findings described above, impacts to on-site pedestrian circulation resulting from the project will be less than significant. Although no mitigations are required, the following improvement recommendation is intended to facilitate pedestrian circulation within the site:

Provide marked crosswalks at the intersection of 11<sup>th</sup> Street/Cheeves Way to facilitate the connection between the Intermodal Station and the channel-side bicycle and pedestrian path.

## **APPENDIX A: CMA MODEL AND VOLUME**





**TABLE A1: INCREMENTAL LAND USE CHANGES ASSOCIATED WITH PROJECT DEVELOPMENT**

	2015 with Project		2030 with Project	
Traffic Analysis Zone	774	778	774	778
Office (ksf) <sup>1</sup>	0	0	17	0
MFDU (# units)	1200	438	534	0
Retail (ksf) <sup>1</sup>	0	0	22	0
Park and Ride (# stalls) <sup>2</sup>	90	0	169	-400

1. Used conversion of 1.4 employees per ksf
2. Used conversion of 2.5 daily trips per stall (SANDAG,2002); then used formula for ITE Code 710, General Office:  $LN(\text{Daily trips}) = .84(\text{\#employees}) + 2.23$  (ITE, 2003)
3. For this 2010 revision to the TIA, the project description assumes decreased development from what was assumed previously in the initial October 2008 analysis in the table above. Since lower development levels leads to decreased traffic contributions, the analysis presented in Appendix A will estimate project impacts more conservatively than an analysis assuming the revised project description.

**TABLE A2: TRIPS GENERATED FROM PROJECT ZONES PM PEAK HOUR**

Traffic Analysis Zone	2015 No Project		2015 Project		2030 No Project		2030 Project		Change in Total Trips	
	In	Out	In	Out	In	Out	In	Out	2015	2030
	774	379	284	597	392	458	558	660	648	326
778	216	197	354	239	415	436	412	134	180	-305

**TABLE A3: MTS SEGMENT VOLUME SUMMARY PM PEAK HOUR**

Road	Segment	D I	D II	2015 No Project		2015 Project		2030 No Project		2030 Project	
				D I	D II	D I	D II	D I	D II	D I	D II
Decoto	7 <sup>th</sup> - Mission	EB	WB	590	680	700	750	1460	780	1400	800
Decoto	11 <sup>th</sup> - Alvarado-Niles	EB	WB	990	960	1100	1000	1140	1140	1170	1140
Decoto	Paseo Padre - Fremont	EB	WB	1860	1410	2000	1470	1910	1370	2110	1420
Alvarado-Niles	Decoto - H	NB	SB	950	1440	1000	1500	1830	1820	1860	1820
Alvarado-Niles	Future SR84 - Niles	NB	SB	680	1020	750	1100	1420	1760	1390	1680
Whipple	Railroad - Central	EB	WB	960	400	980	430	1140	1140	1150	1150
Mission Blvd.	Decoto - Whipple	NB	SB	1790	1760	1820	1780	2610	2150	2670	2180
Mission Blvd.	Decoto - Future SR84	NB	SB	1170	1120	1190	1140	1810	1720	1840	1720
Mission Blvd.	Future SR84 - Niles	NB	SB	1040	1250	1060	1270	1440	1500	1490	1480
Paseo Padre	Decoto - Darwin	NB	SB	500	130	530	140	1810	950	1860	910
Paseo Padre	Decoto - Future SR84	NB	SB					2020	1030	1940	940
Paseo Padre	Future SR84 - N of Isherwood	NB	SB	1230	930	1250	940	2700	2890	2750	2820
I-880	Alvarado-Niles - Whipple	NB	SB	7990	6400	8090	6430	9930	6770	9870	6790
I-880	Decoto - Thorton	NB	SB	6600	5130	6780	5150	8960	5590	9200	5510
SR-84	I-880 - Ardenwood	EB	WB	5200	2420	5240	2400	7130	3150	7170	3130

**TABLE A4: VOLUME TO CAPACITY RATIO**

Road	Segment	D I	D II	2015 No Project		2015 Project		2030 No Project		2030 Project	
				D I	D II	D I	D II	D I	D II	D I	D II
Decoto	7 <sup>th</sup> - Mission	EB	WB	0.37	0.43	0.44	0.47	0.91	0.49	0.88	0.50
Decoto	11 <sup>th</sup> - Alvarado-Niles	EB	WB	0.62	0.60	0.69	0.63	0.71	0.71	0.73	0.71
Decoto	Paseo Padre - Fremont	EB	WB	0.78	0.59	0.83	0.61	0.80	0.57	0.88	0.59
Alvarado-Niles	Decoto - H	NB	SB	0.59	0.90	0.63	0.94	1.14	1.14	1.16	1.14
Alvarado-Niles	Future SR84 - Niles	NB	SB	0.43	0.64	0.47	0.69	0.89	1.10	0.87	1.05
Whipple	Railroad - Central	EB	WB	1.20	0.50	1.23	0.54	1.43	1.43	1.44	1.44
Mission Blvd.	Decoto - Whipple	NB	SB	0.75	0.73	0.76	0.74	1.09	0.90	1.11	0.91
Mission Blvd.	Decoto - Future SR84	NB	SB	0.73	0.70	0.74	0.71	1.13	1.08	1.15	1.08
Mission Blvd.	Future SR84 - Niles	NB	SB	0.65	0.78	0.66	0.79	0.90	0.94	0.93	0.93
Paseo Padre	Decoto - Darwin	NB	SB	0.31	0.08	0.33	0.09	1.13	0.59	1.16	0.57
Paseo Padre	Decoto - Future SR84	NB	SB					0.84	0.43	0.81	0.39
Paseo Padre	Future SR84 - N of Isherwood	NB	SB	0.51	0.39	0.52	0.39	1.13	1.20	1.15	1.18
I-880	Alvarado-Niles - Whipple	NB	SB	1.33	1.07	1.35	1.07	1.66	1.13	1.65	1.13
I-880	Decoto - Thorton	NB	SB	1.10	0.64	1.13	0.64	1.49	0.70	1.53	0.69
SR-84	I-880 - Ardenwood	EB	WB	0.87	0.40	0.87	0.40	1.19	0.53	1.20	0.52

**TABLE A5: MTS SEGMENT LEVEL OF SERVICE BASED ON VOLUME TO CAPACITY RATIO**

Road	Segment	D I	D II	2015 No Project		2015 Project		2030 No Project		2030 Project	
				D I	D II	D I	D II	D I	D II	D I	D II
Decoto	7 <sup>th</sup> - Mission	EB	WB	B	B	B	B	E	B	D	B
Decoto	11 <sup>th</sup> - Alvarado-Niles	EB	WB	C	C	C	C	C	C	C	C
Decoto	Paseo Padre - Fremont	EB	WB	D	C	D	C	D	B	D	C
Alvarado-Niles	Decoto - H	NB	SB	C	E	C	E	F	F	F	F
Alvarado-Niles	Future SR84 - Niles	NB	SB	B	C	B	C	D	F	D	F
Whipple	Railroad - Central	EB	WB	F	B	F	B	F	F	F	F
Mission Blvd.	Decoto - Whipple	NB	SB	C	C	D	C	F	D	F	E
Mission Blvd.	Decoto - Future SR84	NB	SB	C	C	C	C	F	F	F	F
Mission Blvd.	Future SR84 - Niles	NB	SB	C	D	C	D	E	E	E	E
Paseo Padre	Decoto - Darwin	NB	SB	A	A	A	A	F	C	F	B
Paseo Padre	Decoto - Future SR84	NB	SB					D	B	D	B
Paseo Padre	Future SR84 - N of Isherwood	NB	SB	B	B	B	B	F	F	F	F
I-880	Alvarado-Niles - Whipple	NB	SB	F	F	F	F	F	F	F	F
I-880	Decoto - Thorton	NB	SB	F	C	F	C	F	C	F	C
SR-84	I-880 - Ardenwood	EB	WB	D	B	D	B	F	B	F	B

**TABLE A6: CHANGE IN VOLUME TO CAPACITY RATIO CAUSED BY PROJECT**

Road	Segment	D I	D II	2015 Project		2030 Project	
				D I	D II	D I	D II
Decoto	7 <sup>th</sup> - Mission	EB	WB	-19%	-10%	4%	-3%
Decoto	11 <sup>th</sup> - Alvarado-Niles	EB	WB	-11%	-4%	-3%	0%
Decoto	Paseo Padre - Fremont	EB	WB	-8%	-4%	-10%	-4%
Alvarado-Niles	Decoto - H	NB	SB	-5%	-4%	-2%	0%
Alvarado-Niles	Future SR84 - Niles	NB	SB	-10%	-8%	2%	5%
Whipple	Railroad - Central	EB	WB	-2%	-8%	-1%	-1%
Mission Blvd.	Decoto - Whipple	NB	SB	-2%	-1%	-2%	-1%
Mission Blvd.	Decoto - Future SR84	NB	SB	-2%	-2%	-2%	0%
Mission Blvd.	Future SR84 - Niles	NB	SB	-2%	-2%	-3%	1%
Paseo Padre	Decoto - Darwin	NB	SB	-6%	-8%	-3%	4%
Paseo Padre	Decoto - Future SR84	NB	SB			4%	9%
Paseo Padre	Future SR84 - N of Isherwood	NB	SB	-2%	-1%	-2%	2%
I-880	Alvarado-Niles - Whipple	NB	SB	-1%	0%	1%	0%
I-880	Decoto - Thorton	NB	SB	-3%	0%	-3%	1%
SR-84	I-880 - Ardenwood	EB	WB	-1%	1%	-1%	1%

## **APPENDIX B: LOS CALCULATION WORKSHEETS**



# HCM Signalized Intersection Capacity Analysis

1: Mission Blvd. & Decoto Rd.

4/8/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Frt		0.96		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4878		3433	5085		3433		1583			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4878		3433	5085		3433		1583			
Volume (vph)	0	1118	416	288	832	0	415	0	111	0	0	0
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	1285	478	331	956	0	477	0	128	0	0	0
RTOR Reduction (vph)	0	112	0	0	0	0	0	0	92	0	0	0
Lane Group Flow (vph)	0	1651	0	331	956	0	477	0	36	0	0	0
Turn Type	Perm			Prot			custom		custom			
Protected Phases		4		3	8							
Permitted Phases	4						2		2			
Actuated Green, G (s)		23.0		8.0	35.0		17.0		17.0			
Effective Green, g (s)		23.0		8.0	35.0		17.0		17.0			
Actuated g/C Ratio		0.38		0.13	0.58		0.28		0.28			
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		1870		458	2966		973		449			
v/s Ratio Prot		c0.34		c0.10	0.19							
v/s Ratio Perm							c0.14		0.02			
v/c Ratio		0.88		0.72	0.32		0.49		0.08			
Uniform Delay, d1		17.2		24.9	6.4		17.9		15.8			
Progression Factor		1.00		1.00	1.00		1.00		1.00			
Incremental Delay, d2		5.3		5.6	0.1		1.8		0.4			
Delay (s)		22.6		30.5	6.5		19.7		16.1			
Level of Service		C		C	A		B		B			
Approach Delay (s)		22.6			12.7			18.9			0.0	
Approach LOS		C			B			B			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			18.5			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			60.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			61.0%			ICU Level of Service			B			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

4/8/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕	↗	↗	↗	↕
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	0.95	1.00	1.00	0.95	
Frt		0.99			1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790			1806		1770	3539	1583	1770	3538	
Flt Permitted		0.71			0.74		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1304			1372		1770	3539	1583	1770	3538	
Volume (vph)	100	46	10	108	69	2	22	522	144	65	680	2
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	125	58	12	135	86	2	28	652	180	81	850	2
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	93	0	0	0
Lane Group Flow (vph)	0	192	0	0	222	0	28	652	87	81	852	0
Turn Type	Perm		Perm			Prot		Perm		Prot		
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8					2			
Actuated Green, G (s)		12.6			12.6		2.1	27.5	27.5	4.4	29.8	
Effective Green, g (s)		13.2			13.2		2.7	28.1	28.1	5.0	30.4	
Actuated g/C Ratio		0.23			0.23		0.05	0.48	0.48	0.09	0.52	
Clearance Time (s)		4.6			4.6		4.6	4.6	4.6	4.6	4.6	
Vehicle Extension (s)		0.5			3.0		2.0	5.0	5.0	2.0	2.0	
Lane Grp Cap (vph)		295			311		82	1706	763	152	1845	
v/s Ratio Prot							0.02	0.18		c0.05	c0.24	
v/s Ratio Perm		0.15			c0.16				0.05			
v/c Ratio		0.65			0.71		0.34	0.38	0.11	0.53	0.46	
Uniform Delay, d1		20.5			20.8		26.9	9.6	8.3	25.5	8.8	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		3.9			7.6		0.9	0.3	0.1	1.8	0.1	
Delay (s)		24.3			28.4		27.8	9.9	8.4	27.3	8.9	
Level of Service		C			C		C	A	A	C	A	
Approach Delay (s)		24.3			28.4			10.2			10.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
3: 7th St. & Decoto Rd.

4/8/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕↕		↕	↕↕	
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	0.95		1.00	0.95	
Frt		0.98		1.00	0.91		1.00	0.96		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1795		1770	1697		1770	3412		1770	3529	
Flt Permitted		0.80		0.62	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1470		1162	1697		1770	3412		1770	3529	
Volume (vph)	62	66	17	147	53	77	20	457	144	66	645	13
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	73	78	20	173	62	91	24	538	169	78	759	15
RTOR Reduction (vph)	0	6	0	0	65	0	0	25	0	0	1	0
Lane Group Flow (vph)	0	165	0	173	88	0	24	682	0	78	773	0
Turn Type	Perm		Perm			Prot			Prot			
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		12.6		12.6	12.6		1.0	31.5		4.5	35.0	
Effective Green, g (s)		13.2		13.2	13.2		1.6	32.1		5.1	35.6	
Actuated g/C Ratio		0.21		0.21	0.21		0.03	0.51		0.08	0.57	
Clearance Time (s)		4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		1.0	4.0		1.0	4.0	
Lane Grp Cap (vph)		311		246	359		45	1755		145	2013	
v/s Ratio Prot					0.05		0.01	0.20		c0.04	c0.22	
v/s Ratio Perm		0.11		c0.15								
v/c Ratio		0.53		0.70	0.24		0.53	0.39		0.54	0.38	
Uniform Delay, d1		21.9		22.8	20.5		30.0	9.2		27.5	7.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.9		7.2	0.1		6.0	0.2		1.9	0.2	
Delay (s)		22.7		30.0	20.6		36.0	9.4		29.4	7.5	
Level of Service		C		C	C		D	A		C	A	
Approach Delay (s)		22.7			25.6			10.3			9.5	
Approach LOS		C			C			B			A	

Intersection Summary

HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	62.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

5: 11th St. & Decoto Rd.

4/8/2008


























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	
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	0.95		1.00	0.95	
Frt		0.99		1.00	0.88		1.00	0.97		1.00	1.00	
Flt Protected		0.96		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1772		1770	1647		1770	3435		1770	3536	
Flt Permitted		0.96		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1772		1770	1647		1770	3435		1770	3536	
Volume (vph)	54	12	8	98	10	35	34	702	171	39	985	5
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	63	14	9	114	12	41	40	816	199	45	1145	6
RTOR Reduction (vph)	0	5	0	0	35	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	81	0	114	18	0	40	1001	0	45	1151	0
Turn Type	Split		Split		Prot		Prot					
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)		7.9		10.6	10.6		2.6	42.4		2.6	42.4	
Effective Green, g (s)		8.5		11.2	11.2		3.2	43.0		3.2	43.0	
Actuated g/C Ratio		0.10		0.14	0.14		0.04	0.53		0.04	0.53	
Clearance Time (s)		4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		184		242	225		69	1803		69	1857	
v/s Ratio Prot		c0.05		c0.06	0.01		0.02	0.29		c0.03	c0.33	
v/s Ratio Perm												
v/c Ratio		0.44		0.47	0.08		0.58	0.56		0.65	0.62	
Uniform Delay, d1		34.5		32.6	30.8		38.7	13.0		38.8	13.7	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6		0.5	0.1		7.1	0.5		15.6	0.7	
Delay (s)		35.1		33.1	30.9		45.8	13.5		54.4	14.4	
Level of Service		D		C	C		D	B		D	B	
Approach Delay (s)		35.1			32.4			14.7			15.9	
Approach LOS		D			C			B			B	

## Intersection Summary

HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	81.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

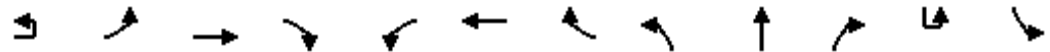
HCM Signalized Intersection Capacity Analysis  
7: Meyers Dr & Decoto Rd.

4/8/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1698		1770	1863	1583	1770	3427		1770	3446	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1698		1770	1863	1583	1770	3427		1770	3446	
Volume (vph)	66	37	53	123	43	183	61	666	178	207	879	188
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	69	39	56	129	45	193	64	701	187	218	925	198
RTOR Reduction (vph)	0	50	0	0	0	165	0	22	0	0	14	0
Lane Group Flow (vph)	69	45	0	129	45	28	64	866	0	218	1109	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							8					
Actuated Green, G (s)	4.2	8.2		7.6	11.6	11.6	4.1	35.4		11.7	43.0	
Effective Green, g (s)	4.2	8.2		7.6	11.6	11.6	4.1	35.9		11.7	43.5	
Actuated g/C Ratio	0.05	0.10		0.10	0.15	0.15	0.05	0.45		0.15	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	94	175		169	272	231	91	1549		261	1888	
v/s Ratio Prot	0.04	c0.03		c0.07	c0.02		0.04	0.25		c0.12	c0.32	
v/s Ratio Perm							0.02					
v/c Ratio	0.73	0.26		0.76	0.17	0.12	0.70	0.56		0.84	0.59	
Uniform Delay, d1	37.0	32.8		35.0	29.7	29.5	37.1	15.9		32.9	12.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.3	0.3		16.6	0.1	0.1	18.2	0.7		19.3	0.7	
Delay (s)	59.3	33.1		51.7	29.8	29.6	55.2	16.7		52.2	12.7	
Level of Service	E	C		D	C	C	E	B		D	B	
Approach Delay (s)	44.1			37.4			19.3			19.1		
Approach LOS	D			D			B			B		
<b>Intersection Summary</b>												
HCM Average Control Delay			23.0	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			79.4	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			59.0%	ICU Level of Service				B				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 8: Alvarado-Niles Road & Decoto Rd.

4/8/2008



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔		↔
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		0.91	0.91	1.00	0.91	0.91	1.00	0.91	0.91	1.00		0.91
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	0.99	1.00	0.95	0.99	1.00	0.95	0.99	1.00		0.95
Satd. Flow (prot)		1610	3341	1583	1610	3359	1583	1610	3371	1583		1610
Flt Permitted		0.16	0.99	1.00	0.95	0.99	1.00	0.95	0.99	1.00		0.36
Satd. Flow (perm)		276	3341	1583	1610	3359	1583	1610	3371	1583		619
Volume (vph)	6	231	283	370	348	427	47	409	616	185	7	69
Peak-hour factor, PHF	0.95	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.96
Adj. Flow (vph)	6	241	295	385	362	445	49	426	642	193	7	72
RTOR Reduction (vph)	0	0	0	177	0	0	39	0	0	27	0	0
Lane Group Flow (vph)	0	124	418	208	260	547	10	344	724	166	0	79
Turn Type	Perm	Split		Perm	Split		Perm	Split		Perm	Perm	Split
Protected Phases		4	4		8	8		2	2			6
Permitted Phases	4			4			8			2	6	
Actuated Green, G (s)		24.0	24.0	24.0	21.8	21.8	21.8	24.2	24.2	24.2		23.4
Effective Green, g (s)		24.6	24.6	24.6	22.4	22.4	22.4	24.8	24.8	24.8		24.0
Actuated g/C Ratio		0.22	0.22	0.22	0.20	0.20	0.20	0.22	0.22	0.22		0.21
Clearance Time (s)		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6		4.6
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	5.0		2.5
Lane Grp Cap (vph)		61	735	348	323	673	317	357	748	351		133
v/s Ratio Prot			0.13		0.16	c0.16		0.21	c0.21			
v/s Ratio Perm		c0.45		0.13			0.01			0.10		0.13
v/c Ratio		2.03	0.57	0.60	0.80	0.81	0.03	0.96	0.97	0.47		0.59
Uniform Delay, d1		43.6	38.9	39.2	42.6	42.7	36.0	43.1	43.1	37.8		39.5
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		517.0	0.6	1.8	12.8	7.1	0.0	38.3	25.3	2.1		5.8
Delay (s)		560.6	39.5	41.0	55.5	49.7	36.0	81.4	68.4	39.9		45.3
Level of Service		F	D	D	E	D	D	F	E	D		D
Approach Delay (s)			109.8			50.7			67.6			
Approach LOS			F			D			E			

Intersection Summary

HCM Average Control Delay	74.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	111.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 8: Alvarado-Niles Road & Decoto Rd.

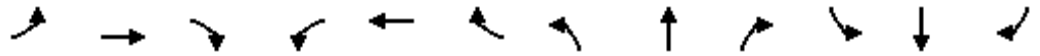
4/8/2008



Movement	SBT	SBR
Lane Configurations	↔↑	↗
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3390	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3390	1583
Volume (vph)	703	107
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	732	111
RTOR Reduction (vph)	0	16
Lane Group Flow (vph)	732	95
Turn Type		Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	23.4	23.4
Effective Green, g (s)	24.0	24.0
Actuated g/C Ratio	0.21	0.21
Clearance Time (s)	4.6	4.6
Vehicle Extension (s)	2.5	2.5
Lane Grp Cap (vph)	728	340
v/s Ratio Prot	0.22	
v/s Ratio Perm		0.06
v/c Ratio	1.01	0.28
Uniform Delay, d1	43.9	36.7
Progression Factor	1.00	1.00
Incremental Delay, d2	34.7	0.3
Delay (s)	78.6	37.0
Level of Service	E	D
Approach Delay (s)	70.7	
Approach LOS	E	
<b>Intersection Summary</b>		

HCM Signalized Intersection Capacity Analysis  
 9: Mission Blvd. & Appian Way

4/8/2008



























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖		↕		↖	↗	↖
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	0.95	1.00		1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	3525		1770	3539	1583		1698		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96		0.67	1.00	1.00
Satd. Flow (perm)	1770	3525		1770	3539	1583		1646		1239	1863	1583
Volume (vph)	59	1261	34	110	912	16	20	38	89	72	77	77
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	60	1274	34	111	921	16	20	38	90	73	78	78
RTOR Reduction (vph)	0	3	0	0	0	9	0	66	0	0	0	57
Lane Group Flow (vph)	60	1305	0	111	921	7	0	82	0	73	78	21
Turn Type	Prot			Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	6.0	26.0		6.0	26.0	26.0		16.0		16.0	16.0	16.0
Effective Green, g (s)	6.0	26.0		6.0	26.0	26.0		16.0		16.0	16.0	16.0
Actuated g/C Ratio	0.10	0.43		0.10	0.43	0.43		0.27		0.27	0.27	0.27
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	177	1528		177	1534	686		439		330	497	422
v/s Ratio Prot	0.03	c0.37		c0.06	0.26						0.04	
v/s Ratio Perm						0.00		0.05		c0.06		0.01
v/c Ratio	0.34	0.85		0.63	0.60	0.01		0.19		0.22	0.16	0.05
Uniform Delay, d1	25.2	15.3		25.9	13.0	9.7		17.0		17.1	16.8	16.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	5.1	6.3		15.6	1.7	0.0		0.9		1.5	0.7	0.2
Delay (s)	30.3	21.6		41.6	14.8	9.7		17.9		18.7	17.5	16.6
Level of Service	C	C		D	B	A		B		B	B	B
Approach Delay (s)		22.0			17.5			17.9			17.6	
Approach LOS		C			B			B			B	

Intersection Summary		
HCM Average Control Delay	19.7	HCM Level of Service B
HCM Volume to Capacity ratio	0.61	
Actuated Cycle Length (s)	60.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	68.0%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 13: Alvarado-Niles Road & Union Square
























4/8/2008

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 				 		 		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)													
Lane Util. Factor													
Frt													
Flt Protected													
Satd. Flow (prot)													
Flt Permitted													
Satd. Flow (perm)													
Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Turn Type	Prot		Prot				Perm		Perm		Perm		
Protected Phases	5	2		1	6			8		8		4	
Permitted Phases							8		8		4		
Actuated Green, G (s)													
Effective Green, g (s)													
Actuated g/C Ratio													
Clearance Time (s)													
Vehicle Extension (s)													
Lane Grp Cap (vph)													
v/s Ratio Prot													
v/s Ratio Perm													
v/c Ratio													
Uniform Delay, d1													
Progression Factor													
Incremental Delay, d2													
Delay (s)													
Level of Service													
Approach Delay (s)	0.0			0.0				0.0			0.0		
Approach LOS	A			A				A			A		
<b>Intersection Summary</b>													
HCM Average Control Delay	0.0			HCM Level of Service				A					
HCM Volume to Capacity ratio	0.00												
Actuated Cycle Length (s)	120.0			Sum of lost time (s)				0.0					
Intersection Capacity Utilization	0.0%			ICU Level of Service				A					
Analysis Period (min)	15												
c Critical Lane Group													

# HCM Signalized Intersection Capacity Analysis

## 1: Mission Blvd. & Decoto Rd.

4/8/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Frt		0.96		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4883		3433	5085		3433		1583			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4883		3433	5085		3433		1583			
Volume (vph)	0	1027	370	251	860	0	617	0	239	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1070	385	261	896	0	643	0	249	0	0	0
RTOR Reduction (vph)	0	135	0	0	0	0	0	0	153	0	0	0
Lane Group Flow (vph)	0	1320	0	261	896	0	643	0	96	0	0	0
Turn Type	Perm			Prot			custom		custom			
Protected Phases		4		3	8							
Permitted Phases	4						2		2			
Actuated Green, G (s)		16.0		4.0	24.0		16.0		16.0			
Effective Green, g (s)		16.0		4.0	24.0		16.0		16.0			
Actuated g/C Ratio		0.33		0.08	0.50		0.33		0.33			
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		1628		286	2543		1144		528			
v/s Ratio Prot		c0.27		c0.08	0.18							
v/s Ratio Perm							c0.19		0.06			
v/c Ratio		0.81		0.91	0.35		0.56		0.18			
Uniform Delay, d1		14.6		21.8	7.3		13.1		11.4			
Progression Factor		1.00		1.00	1.00		1.00		1.00			
Incremental Delay, d2		3.2		31.3	0.1		2.0		0.8			
Delay (s)		17.8		53.1	7.4		15.1		12.1			
Level of Service		B		D	A		B		B			
Approach Delay (s)		17.8			17.7			14.3			0.0	
Approach LOS		B			B			B			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			16.9			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			48.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			62.9%			ICU Level of Service			B			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

4/8/2008



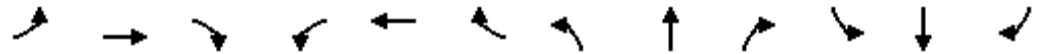
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕	↗	↗	↗	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.94			0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1707			1728		1770	3539	1583	1770	3532	
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1757			1762		1770	3539	1583	1770	3532	
Volume (vph)	19	0	14	2	1	2	55	815	5	4	569	8
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	22	0	16	2	1	2	65	959	6	5	669	9
RTOR Reduction (vph)	0	16	0	0	2	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	22	0	0	3	0	65	959	5	5	678	0
Turn Type	Perm			Perm			Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)		1.3			1.3		1.9	49.3	49.3	1.1	48.5	
Effective Green, g (s)		1.9			1.9		2.5	49.9	49.9	1.7	49.1	
Actuated g/C Ratio		0.03			0.03		0.04	0.76	0.76	0.03	0.75	
Clearance Time (s)		4.6			4.6		4.6	4.6	4.6	4.6	4.6	
Vehicle Extension (s)		0.5			3.0		2.0	5.0	5.0	2.0	2.0	
Lane Grp Cap (vph)		51			51		68	2696	1206	46	2648	
v/s Ratio Prot							c0.04	c0.27		0.00	0.19	
v/s Ratio Perm		c0.01			0.00				0.00			
v/c Ratio		0.44			0.06		0.96	0.36	0.00	0.11	0.26	
Uniform Delay, d1		31.3			30.9		31.4	2.5	1.9	31.2	2.5	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.2			0.5		92.3	0.2	0.0	0.4	0.0	
Delay (s)		33.5			31.4		123.8	2.7	1.9	31.5	2.6	
Level of Service		C			C		F	A	A	C	A	
Approach Delay (s)		33.5			31.4			10.4			2.8	
Approach LOS		C			C			B			A	

Intersection Summary

HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 3: 7th St. & Decoto Rd.

4/8/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕↕		↕	↕↕	
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	0.95		1.00	0.95	
Frt		0.98		1.00	0.94		1.00	0.97		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1797		1770	1744		1770	3448		1770	3533	
Flt Permitted		0.90		0.82	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1644		1523	1744		1770	3448		1770	3533	
Volume (vph)	23	41	12	139	41	30	31	840	173	17	630	8
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	23	42	12	142	42	31	32	857	177	17	643	8
RTOR Reduction (vph)	0	8	0	0	25	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	69	0	142	48	0	32	1022	0	17	651	0
Turn Type	Perm		Perm			Prot			Prot			
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		10.3		10.3	10.3		2.3	35.4		0.9	34.0	
Effective Green, g (s)		10.9		10.9	10.9		2.9	36.0		1.5	34.6	
Actuated g/C Ratio		0.18		0.18	0.18		0.05	0.60		0.02	0.57	
Clearance Time (s)		4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		1.0	4.0		1.0	4.0	
Lane Grp Cap (vph)		297		275	315		85	2055		44	2024	
v/s Ratio Prot					0.03		c0.02	c0.30		0.01	0.18	
v/s Ratio Perm		0.04		c0.09								
v/c Ratio		0.23		0.52	0.15		0.38	0.50		0.39	0.32	
Uniform Delay, d1		21.2		22.4	20.9		27.9	7.0		29.0	6.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.7	0.1		1.0	0.3		2.0	0.1	
Delay (s)		21.3		23.1	20.9		28.9	7.3		31.0	6.9	
Level of Service		C		C	C		C	A		C	A	
Approach Delay (s)		21.3			22.3			7.9			7.5	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

5: 11th St. & Decoto Rd.

4/8/2008


























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗		↖	↗		↖	↗	
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	0.95		1.00	0.95	
Frt		0.98		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected		0.96		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1761		1770	1606		1770	3506		1770	3536	
Flt Permitted		0.96		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1761		1770	1606		1770	3506		1770	3536	
Volume (vph)	43	4	7	158	5	53	75	1160	78	26	829	6
Peak-hour factor, PHF	0.94	0.94	0.94	1.00	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	4	7	158	5	56	80	1234	83	28	882	6
RTOR Reduction (vph)	0	7	0	0	48	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	50	0	158	13	0	80	1314	0	28	887	0
Turn Type	Split		Split			Prot			Prot			
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)		4.4		9.3	9.3		4.9	38.2		1.5	34.8	
Effective Green, g (s)		5.0		9.9	9.9		5.5	38.8		2.1	35.4	
Actuated g/C Ratio		0.07		0.14	0.14		0.08	0.54		0.03	0.49	
Clearance Time (s)		4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		123		244	221		136	1895		52	1743	
v/s Ratio Prot		c0.03		c0.09	0.01		c0.05	c0.37		0.02	0.25	
v/s Ratio Perm												
v/c Ratio		0.41		0.65	0.06		0.59	0.69		0.54	0.51	
Uniform Delay, d1		32.0		29.3	26.9		32.1	12.1		34.4	12.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8		4.4	0.0		4.1	1.2		5.3	0.3	
Delay (s)		32.8		33.7	26.9		36.2	13.3		39.6	12.6	
Level of Service		C		C	C		D	B		D	B	
Approach Delay (s)		32.8			31.8			14.6			13.5	
Approach LOS		C			C			B			B	

## Intersection Summary

HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

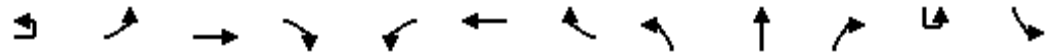
HCM Signalized Intersection Capacity Analysis  
7: Meyers Dr & Decoto Rd.

4/8/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1762		1770	1863	1583	1770	3463		1770	3489	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1762		1770	1863	1583	1770	3463		1770	3489	
Volume (vph)	110	44	25	108	44	160	109	1050	175	152	853	88
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	46	26	114	46	168	115	1105	184	160	898	93
RTOR Reduction (vph)	0	24	0	0	0	156	0	11	0	0	6	0
Lane Group Flow (vph)	116	48	0	114	46	12	115	1278	0	160	985	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	5.9	5.7		5.9	5.7	5.7	7.2	42.2		9.6	44.6	
Effective Green, g (s)	5.9	5.7		5.9	5.7	5.7	7.2	42.7		9.6	45.1	
Actuated g/C Ratio	0.07	0.07		0.07	0.07	0.07	0.09	0.53		0.12	0.56	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	131	126		131	133	113	159	1851		213	1969	
v/s Ratio Prot	c0.07	c0.03		0.06	0.02		0.06	c0.37		c0.09	0.28	
v/s Ratio Perm						0.01						
v/c Ratio	0.89	0.38		0.87	0.35	0.11	0.72	0.69		0.75	0.50	
Uniform Delay, d1	36.7	35.4		36.6	35.3	34.7	35.4	13.7		34.0	10.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	44.6	0.7		41.3	0.6	0.2	12.9	1.4		12.4	0.4	
Delay (s)	81.3	36.1		78.0	35.9	34.9	48.3	15.2		46.4	11.0	
Level of Service	F	D		E	D	C	D	B		D	B	
Approach Delay (s)	64.0			50.0			17.9			15.9		
Approach LOS	E			D			B			B		
<b>Intersection Summary</b>												
HCM Average Control Delay			23.4			HCM Level of Service		C				
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			79.9			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												

HCM Signalized Intersection Capacity Analysis  
 8: Alvarado-Niles Road & Decoto Rd.

4/8/2008



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔		↔
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		0.91	0.91	1.00	0.91	0.91	1.00	0.91	0.91	1.00		0.91
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00		0.95
Satd. Flow (prot)		1610	3348	1583	1610	3360	1583	1610	3390	1583		1610
Flt Permitted		0.16	0.99	1.00	0.95	0.99	1.00	0.95	1.00	1.00		0.31
Satd. Flow (perm)		276	3348	1583	1610	3360	1583	1610	3390	1583		528
Volume (vph)	17	265	419	317	321	404	100	357	860	225	44	88
Peak-hour factor, PHF	0.95	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.95	0.98
Adj. Flow (vph)	18	270	428	323	328	412	102	364	878	230	46	90
RTOR Reduction (vph)	0	0	0	100	0	0	83	0	0	25	0	0
Lane Group Flow (vph)	0	144	572	223	238	502	19	364	878	205	0	112
Turn Type	Perm	Split		Perm	Split		Perm	Split		Perm	Perm	Split
Protected Phases		4	4		8	8		2	2			6
Permitted Phases	4			4			8			2	6	
Actuated Green, G (s)		24.0	24.0	24.0	21.8	21.8	21.8	32.2	32.2	32.2		25.4
Effective Green, g (s)		24.6	24.6	24.6	22.4	22.4	22.4	32.8	32.8	32.8		26.0
Actuated g/C Ratio		0.20	0.20	0.20	0.18	0.18	0.18	0.27	0.27	0.27		0.21
Clearance Time (s)		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6		4.6
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	5.0		2.5
Lane Grp Cap (vph)		56	676	320	296	618	291	434	913	426		113
v/s Ratio Prot			0.17		0.15	c0.15		0.23	c0.26			
v/s Ratio Perm		c0.52		0.14			0.01			0.13		c0.21
v/c Ratio		2.57	0.85	0.70	0.80	0.81	0.06	0.84	0.96	0.48		0.99
Uniform Delay, d1		48.6	46.8	45.1	47.6	47.7	41.0	42.0	43.9	37.4		47.8
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		756.3	9.2	5.3	13.8	7.6	0.0	14.6	21.3	1.8		81.6
Delay (s)		804.9	56.0	50.4	61.4	55.3	41.1	56.6	65.1	39.2		129.4
Level of Service		F	E	D	E	E	D	E	E	D		F
Approach Delay (s)			158.1			55.3			59.0			
Approach LOS			F			E			E			

Intersection Summary

HCM Average Control Delay	87.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	121.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 8: Alvarado-Niles Road & Decoto Rd.

4/8/2008



Movement	SBT	SBR
Lane Configurations	↔↑↑	↗
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3385	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3385	1583
Volume (vph)	680	54
Peak-hour factor, PHF	0.98	0.98
Adj. Flow (vph)	694	55
RTOR Reduction (vph)	0	7
Lane Group Flow (vph)	718	48
Turn Type		Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	25.4	25.4
Effective Green, g (s)	26.0	26.0
Actuated g/C Ratio	0.21	0.21
Clearance Time (s)	4.6	4.6
Vehicle Extension (s)	2.5	2.5
Lane Grp Cap (vph)	723	338
v/s Ratio Prot	0.21	
v/s Ratio Perm		0.03
v/c Ratio	0.99	0.14
Uniform Delay, d1	47.8	38.9
Progression Factor	1.00	1.00
Incremental Delay, d2	31.6	0.1
Delay (s)	79.4	39.0
Level of Service	E	D
Approach Delay (s)	83.2	
Approach LOS	F	

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 9: Mission Blvd. & Appian Way

4/8/2008



























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗		↕		↖	↗	↗
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	0.95	1.00		1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3534		1770	3539	1583		1723		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98		0.61	1.00	1.00
Satd. Flow (perm)	1770	3534		1770	3539	1583		1701		1140	1863	1583
Volume (vph)	69	1105	11	103	1121	58	14	72	97	54	30	40
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	74	1188	12	111	1205	62	15	77	104	58	32	43
RTOR Reduction (vph)	0	1	0	0	0	36	0	66	0	0	0	30
Lane Group Flow (vph)	74	1199	0	111	1205	26	0	130	0	58	32	13
Turn Type	Prot			Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	3.0	22.7		4.5	24.2	24.2		17.5		17.5	17.5	17.5
Effective Green, g (s)	3.0	22.7		4.5	24.2	24.2		17.5		17.5	17.5	17.5
Actuated g/C Ratio	0.05	0.40		0.08	0.43	0.43		0.31		0.31	0.31	0.31
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	94	1415		140	1510	676		525		352	575	489
v/s Ratio Prot	0.04	0.34		c0.06	c0.34						0.02	
v/s Ratio Perm						0.02		c0.08		0.05		0.01
v/c Ratio	0.79	0.85		0.79	0.80	0.04		0.25		0.16	0.06	0.03
Uniform Delay, d1	26.5	15.4		25.6	14.1	9.5		14.7		14.3	13.8	13.7
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	34.1	4.9		25.7	3.0	0.0		1.1		1.0	0.2	0.1
Delay (s)	60.6	20.3		51.3	17.2	9.5		15.8		15.3	14.0	13.8
Level of Service	E	C		D	B	A		B		B	B	B
Approach Delay (s)		22.7			19.6			15.8			14.5	
Approach LOS		C			B			B			B	

### Intersection Summary

HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 13: Alvarado-Niles Road & Union Square

























4/8/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 				 		 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)												
Lane Util. Factor												
Frt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8				4
Permitted Phases							8		8	4		
Actuated Green, G (s)												
Effective Green, g (s)												
Actuated g/C Ratio												
Clearance Time (s)												
Vehicle Extension (s)												
Lane Grp Cap (vph)												
v/s Ratio Prot												
v/s Ratio Perm												
v/c Ratio												
Uniform Delay, d1												
Progression Factor												
Incremental Delay, d2												
Delay (s)												
Level of Service												
Approach Delay (s)		0.0			0.0			0.0			0.0	
Approach LOS		A			A			A			A	
<b>Intersection Summary</b>												
HCM Average Control Delay		0.0			HCM Level of Service			A				
HCM Volume to Capacity ratio		0.00										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			0.0				
Intersection Capacity Utilization		0.0%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 1: Mission Blvd. & Decoto Rd.

1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		 	  		 					
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Frt		0.96		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4868		3433	5085		3433		1583			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4868		3433	5085		3433		1583			
Volume (vph)	0	1118	446	294	832	0	492	0	123	0	0	0
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	1285	513	338	956	0	566	0	141	0	0	0
RTOR Reduction (vph)	0	120	0	0	0	0	0	0	101	0	0	0
Lane Group Flow (vph)	0	1678	0	338	956	0	566	0	40	0	0	0
Turn Type	Perm		Prot		custom		custom					
Protected Phases	4		3		8							
Permitted Phases	4						2		2			
Actuated Green, G (s)	23.0		8.0		35.0		17.0		17.0			
Effective Green, g (s)	23.0		8.0		35.0		17.0		17.0			
Actuated g/C Ratio	0.38		0.13		0.58		0.28		0.28			
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0			
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0			
Lane Grp Cap (vph)	1866		458		2966		973		449			
v/s Ratio Prot	c0.34		c0.10		0.19							
v/s Ratio Perm							c0.16		0.03			
v/c Ratio	0.90		0.74		0.32		0.58		0.09			
Uniform Delay, d1	17.4		25.0		6.4		18.4		15.8			
Progression Factor	1.00		1.00		1.00		1.00		1.00			
Incremental Delay, d2	6.2		6.1		0.1		2.5		0.4			
Delay (s)	23.7		31.1		6.5		21.0		16.2			
Level of Service	C		C		A		C		B			
Approach Delay (s)	23.7				12.9		20.0				0.0	
Approach LOS	C				B		C				A	
<b>Intersection Summary</b>												
HCM Average Control Delay			19.3		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			60.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			64.0%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

1/27/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕	↗	↗	↗	↕
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	0.95	1.00	1.00	0.95	
Frt		0.99			1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790			1806		1770	3539	1583	1770	3538	
Flt Permitted		0.70			0.74		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1301			1369		1770	3539	1583	1770	3538	
Volume (vph)	100	46	10	108	69	2	22	611	144	65	715	2
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	125	58	12	135	86	2	28	764	180	81	894	2
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	90	0	0	0
Lane Group Flow (vph)	0	192	0	0	222	0	28	764	90	81	896	0
Turn Type		Perm		Perm			Prot		Perm		Prot	
Protected Phases		4		8			5	2			1	6
Permitted Phases	4			8					2			
Actuated Green, G (s)		12.9			12.9		2.1	30.1	30.1		4.4	32.4
Effective Green, g (s)		13.5			13.5		2.7	30.7	30.7		5.0	33.0
Actuated g/C Ratio		0.22			0.22		0.04	0.50	0.50		0.08	0.54
Clearance Time (s)		4.6			4.6		4.6	4.6	4.6		4.6	4.6
Vehicle Extension (s)		0.5			3.0		2.0	5.0	5.0		2.0	2.0
Lane Grp Cap (vph)		287			302		78	1775	794		145	1908
v/s Ratio Prot							0.02	0.22			c0.05	c0.25
v/s Ratio Perm		0.15			c0.16						0.06	
v/c Ratio		0.67			0.74		0.36	0.43	0.11		0.56	0.47
Uniform Delay, d1		21.8			22.2		28.4	9.7	8.1		27.0	8.7
Progression Factor		1.00			1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		4.5			9.0		1.0	0.4	0.1		2.6	0.1
Delay (s)		26.3			31.2		29.4	10.0	8.2		29.7	8.8
Level of Service		C			C		C	B	A		C	A
Approach Delay (s)		26.3			31.2			10.3				10.5
Approach LOS		C			C			B				B




















Intersection Summary

HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	61.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

3: 7th St. & Decoto Rd.

1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95		1.00	0.95	
Frt		0.98		1.00	0.91		1.00	0.97		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1795		1770	1697		1770	3427		1770	3529	
Flt Permitted		0.80		0.62	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1458		1150	1697		1770	3427		1770	3529	
Volume (vph)	62	66	17	147	53	77	20	546	147	66	680	13
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	73	78	20	173	62	91	24	642	173	78	800	15
RTOR Reduction (vph)	0	6	0	0	66	0	0	19	0	0	1	0
Lane Group Flow (vph)	0	165	0	173	87	0	24	796	0	78	814	0
Turn Type	Perm		Perm			Prot		Prot				
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		12.9		12.9	12.9		2.0	33.5		4.5	36.0	
Effective Green, g (s)		13.5		13.5	13.5		2.6	34.1		5.1	36.6	
Actuated g/C Ratio		0.21		0.21	0.21		0.04	0.53		0.08	0.57	
Clearance Time (s)		4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		1.0	4.0		1.0	4.0	
Lane Grp Cap (vph)		304		240	354		71	1806		140	1996	
v/s Ratio Prot					0.05		0.01	c0.23		c0.04	0.23	
v/s Ratio Perm		0.11		c0.15								
v/c Ratio		0.54		0.72	0.25		0.34	0.44		0.56	0.41	
Uniform Delay, d1		22.9		23.8	21.4		30.2	9.4		28.7	7.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1		8.7	0.1		1.0	0.2		2.7	0.2	
Delay (s)		23.9		32.5	21.5		31.2	9.7		31.4	8.1	
Level of Service		C		C	C		C	A		C	A	
Approach Delay (s)		23.9			27.4			10.3			10.2	
Approach LOS		C			C			B			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			13.8			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			64.7			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			52.9%			ICU Level of Service				A		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis  
4: Railroad Ave & Decoto Rd.

1/27/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↖
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	81	700	21	0	1023
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	88	761	23	0	1112
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			497			972
pX, platoon unblocked	0.89	0.87			0.87	
vC, conflicting volume	1328	392			784	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1077	149			600	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	88			100	
cM capacity (veh/h)	191	757			845	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	88	507	276	556	556	
Volume Left	0	0	0	0	0	
Volume Right	88	0	23	0	0	
cSH	757	1700	1700	1700	1700	
Volume to Capacity	0.12	0.30	0.16	0.33	0.33	
Queue Length 95th (ft)	10	0	0	0	0	
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.4	0.0		0.0		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			31.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis  
5: 11th St. & Decoto Rd.

1/27/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	
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		0.95	0.95		1.00	0.95		1.00	0.95	
Frt		0.99		1.00	0.96		1.00	0.97		1.00	1.00	
Flt Protected		0.96		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1772		1681	1639		1770	3423		1770	3536	
Flt Permitted		0.96		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1772		1681	1639		1770	3423		1770	3536	
Volume (vph)	54	12	8	261	10	46	34	723	202	74	985	5
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	63	14	9	303	12	53	40	841	235	86	1145	6
RTOR Reduction (vph)	0	5	0	0	17	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	81	0	188	163	0	40	1056	0	86	1151	0
Turn Type	Split		Split		Prot		Prot					
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)		8.4		12.5	12.5		2.2	31.1		4.1	33.0	
Effective Green, g (s)		9.0		13.1	13.1		2.8	31.7		4.7	33.6	
Actuated g/C Ratio		0.12		0.18	0.18		0.04	0.43		0.06	0.45	
Clearance Time (s)		4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		214		296	288		67	1456		112	1595	
v/s Ratio Prot		c0.05		c0.11	0.10		0.02	0.31		c0.05	c0.33	
v/s Ratio Perm												
v/c Ratio		0.38		0.64	0.56		0.60	0.73		0.77	0.72	
Uniform Delay, d1		30.2		28.5	28.1		35.3	17.8		34.4	16.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4		3.3	1.5		9.2	2.0		24.2	1.8	
Delay (s)		30.6		31.7	29.6		44.5	19.7		58.5	18.4	
Level of Service		C		C	C		D	B		E	B	
Approach Delay (s)		30.6			30.7			20.6			21.2	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
6: BART & Decoto Rd.

1/27/2010


























Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑			↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	678	0	0	1370
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	714	0	0	1442
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			677			497
pX, platoon unblocked	0.73					
vC, conflicting volume	1435	357			714	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1223	357			714	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	125	640			882	
<b>Direction, Lane #</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>		
Volume Total	357	357	721	721		
Volume Left	0	0	0	0		
Volume Right	0	0	0	0		
cSH	1700	1700	1700	1700		
Volume to Capacity	0.21	0.21	0.42	0.42		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	0.0		
Lane LOS						
Approach Delay (s)	0.0		0.0			
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			41.2%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Signalized Intersection Capacity Analysis

































## 7: Meyers Dr & Decoto Rd.

1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1698		1770	1863	1583	1770	3434		1770	3458	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1698		1770	1863	1583	1770	3434		1770	3458	
Volume (vph)	66	37	53	123	43	183	61	718	178	207	1042	188
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	69	39	56	129	45	193	64	756	187	218	1097	198
RTOR Reduction (vph)	0	50	0	0	0	165	0	20	0	0	11	0
Lane Group Flow (vph)	69	45	0	129	45	28	64	923	0	218	1284	0
Turn Type	Prot			Prot			Perm	Prot		Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	8											
Actuated Green, G (s)	4.3	8.3		7.7	11.7	11.7	4.2	37.5		11.7	45.0	
Effective Green, g (s)	4.3	8.3		7.7	11.7	11.7	4.2	38.0		11.7	45.5	
Actuated g/C Ratio	0.05	0.10		0.09	0.14	0.14	0.05	0.47		0.14	0.56	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	93	173		167	267	227	91	1597		253	1926	
v/s Ratio Prot	0.04	c0.03		c0.07	c0.02		0.04	0.27		c0.12	c0.37	
v/s Ratio Perm	0.02											
v/c Ratio	0.74	0.26		0.77	0.17	0.12	0.70	0.58		0.86	0.67	
Uniform Delay, d1	38.2	33.9		36.1	30.7	30.5	38.1	16.0		34.2	12.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	24.0	0.3		18.0	0.1	0.1	18.2	0.8		23.9	1.2	
Delay (s)	62.1	34.1		54.2	30.8	30.6	56.3	16.8		58.1	13.9	
Level of Service	E	C		D	C	C	E	B		E	B	
Approach Delay (s)	45.9			38.9			19.3			20.3		
Approach LOS	D			D			B			C		
<b>Intersection Summary</b>												
HCM Average Control Delay	23.6			HCM Level of Service		C						
HCM Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	81.7			Sum of lost time (s)		16.0						
Intersection Capacity Utilization	61.7%			ICU Level of Service		B						
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 8: Alvarado-Niles Road & Decoto Rd.

1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	
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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	244	283	370	348	427	53	409	649	185	85	804	153
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	254	295	385	362	445	55	426	676	193	89	838	159
RTOR Reduction (vph)	0	0	281	0	0	45	0	0	24	0	0	19
Lane Group Flow (vph)	254	295	104	362	445	10	426	676	169	89	838	140
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	13.1	14.2	14.2	14.7	15.8	15.8	18.0	35.4	35.4	7.9	25.3	25.3
Effective Green, g (s)	13.7	14.8	14.8	15.3	16.4	16.4	18.6	36.0	36.0	8.5	25.9	25.9
Actuated g/C Ratio	0.15	0.16	0.16	0.17	0.18	0.18	0.21	0.40	0.40	0.09	0.29	0.29
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	5.0	2.5	2.5	2.5
Lane Grp Cap (vph)	519	578	259	580	641	287	705	1406	629	322	1012	453
v/s Ratio Prot	0.07	0.08		c0.11	c0.13		c0.12	0.19		0.03	c0.24	
v/s Ratio Perm			0.07			0.01			0.11			0.09
v/c Ratio	0.49	0.51	0.40	0.62	0.69	0.03	0.60	0.48	0.27	0.28	0.83	0.31
Uniform Delay, d1	35.2	34.6	33.9	35.0	34.8	30.6	32.7	20.3	18.4	38.2	30.3	25.3
Progression Factor	1.00	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	0.3	0.3	0.4	1.5	2.6	0.0	2.2	0.5	0.5	0.3	5.6	0.3
Delay (s)	35.5	34.9	34.3	36.5	37.4	30.6	34.8	20.9	18.9	38.5	35.8	25.6
Level of Service	D	C	C	D	D	C	C	C	B	D	D	C
Approach Delay (s)		34.8			36.6			25.2			34.6	
Approach LOS		C			D			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			32.1				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			90.6				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			67.4%				ICU Level of Service				C	
Analysis Period (min)			15									
c	Critical Lane Group											

# HCM Signalized Intersection Capacity Analysis

## 9: Mission Blvd. & Appian Way

1/27/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↕		↘	↕	↘		↕		↘	↕	↘
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	0.95	1.00		1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	3526		1770	3539	1583		1697		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96		0.66	1.00	1.00
Satd. Flow (perm)	1770	3526		1770	3539	1583		1645		1229	1863	1583
Volume (vph)	59	1273	34	110	918	16	20	38	92	72	77	77
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	60	1286	34	111	927	16	20	38	93	73	78	78
RTOR Reduction (vph)	0	3	0	0	0	9	0	68	0	0	0	57
Lane Group Flow (vph)	60	1317	0	111	927	7	0	83	0	73	78	21
Turn Type	Prot			Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	6.0	26.0		6.0	26.0	26.0		16.0		16.0	16.0	16.0
Effective Green, g (s)	6.0	26.0		6.0	26.0	26.0		16.0		16.0	16.0	16.0
Actuated g/C Ratio	0.10	0.43		0.10	0.43	0.43		0.27		0.27	0.27	0.27
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	177	1528		177	1534	686		439		328	497	422
v/s Ratio Prot	0.03	c0.37		c0.06	0.26						0.04	
v/s Ratio Perm						0.00		0.05		c0.06		0.01
v/c Ratio	0.34	0.86		0.63	0.60	0.01		0.19		0.22	0.16	0.05
Uniform Delay, d1	25.2	15.4		25.9	13.1	9.7		17.0		17.2	16.8	16.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	5.1	6.6		15.6	1.8	0.0		1.0		1.6	0.7	0.2
Delay (s)	30.3	22.0		41.6	14.8	9.7		17.9		18.7	17.5	16.6
Level of Service	C	C		D	B	A		B		B	B	B
Approach Delay (s)		22.4			17.6			17.9			17.6	
Approach LOS		C			B			B			B	

























### Intersection Summary

HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 13: Alvarado-Niles Road & Union Square

























1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 				 		 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3539			3539							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3539			3539							
Volume (vph)	0	16	0	0	6	0	0	0	0	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	17	0	0	6	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	17	0	0	6	0	0	0	0	0	0	0
Turn Type		Prot		Prot		Perm		Perm	Perm			
Protected Phases		5	2	1	6			8	8	4		
Permitted Phases						8		8	4			
Actuated Green, G (s)		120.0			120.0							
Effective Green, g (s)		120.0			120.0							
Actuated g/C Ratio		1.00			1.00							
Clearance Time (s)		5.0			5.0							
Vehicle Extension (s)		4.0			4.0							
Lane Grp Cap (vph)		3539			3539							
v/s Ratio Prot		c0.00			0.00							
v/s Ratio Perm												
v/c Ratio		0.00			0.00							
Uniform Delay, d1		0.0			0.0							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.0			0.0							
Delay (s)		0.0			0.0							
Level of Service		A			A							
Approach Delay (s)		0.0			0.0			0.0			0.0	
Approach LOS		A			A			A			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			0.0			HCM Level of Service				A		
HCM Volume to Capacity ratio			0.00									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				0.0		
Intersection Capacity Utilization			11.7%			ICU Level of Service				A		
Analysis Period (min)			15									
c	Critical Lane Group											

# HCM Signalized Intersection Capacity Analysis





















## 1: Mission Blvd. & Decoto Rd.

1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		 	  		 					
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Frt		0.95		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4842		3433	5085		3433		1583			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4842		3433	5085		3433		1583			
Volume (vph)	0	1027	481	273	860	0	695	0	250	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1070	501	284	896	0	724	0	260	0	0	0
RTOR Reduction (vph)	0	175	0	0	0	0	0	0	153	0	0	0
Lane Group Flow (vph)	0	1396	0	284	896	0	724	0	107	0	0	0
Turn Type	Perm		Prot		custom		custom					
Protected Phases		4		3	8							
Permitted Phases	4						2		2			
Actuated Green, G (s)		16.0		4.0	24.0		16.0		16.0			
Effective Green, g (s)		16.0		4.0	24.0		16.0		16.0			
Actuated g/C Ratio		0.33		0.08	0.50		0.33		0.33			
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		1614		286	2543		1144		528			
v/s Ratio Prot		c0.29		c0.08	0.18							
v/s Ratio Perm							c0.21		0.07			
v/c Ratio		0.86		0.99	0.35		0.63		0.20			
Uniform Delay, d1		15.0		22.0	7.3		13.5		11.4			
Progression Factor		1.00		1.00	1.00		1.00		1.00			
Incremental Delay, d2		5.1		51.1	0.1		2.7		0.9			
Delay (s)		20.1		73.0	7.4		16.2		12.3			
Level of Service		C		E	A		B		B			
Approach Delay (s)		20.1			23.2			15.2			0.0	
Approach LOS		C			C			B			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			19.8			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			48.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			68.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

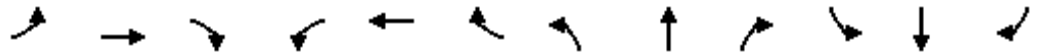
1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95	1.00	1.00	0.95	
Frt		0.94			0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1707			1728		1770	3539	1583	1770	3533	
Flt Permitted		0.93			0.85		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1632			1502		1770	3539	1583	1770	3533	
Volume (vph)	19	0	14	2	1	2	55	904	5	4	702	8
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	22	0	16	2	1	2	65	1064	6	5	826	9
RTOR Reduction (vph)	0	15	0	0	2	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	23	0	0	3	0	65	1064	5	5	835	0
Turn Type	Perm		Perm			Prot		Perm		Prot		
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8					2			
Actuated Green, G (s)		2.8			2.8		4.1	51.8	51.8		1.2	48.9
Effective Green, g (s)		3.4			3.4		4.7	52.4	52.4		1.8	49.5
Actuated g/C Ratio		0.05			0.05		0.07	0.75	0.75		0.03	0.71
Clearance Time (s)		4.6			4.6		4.6	4.6	4.6		4.6	4.6
Vehicle Extension (s)		0.5			3.0		2.0	5.0	5.0		2.0	2.0
Lane Grp Cap (vph)		80			73		120	2664	1192		46	2513
v/s Ratio Prot							c0.04	c0.30			0.00	0.24
v/s Ratio Perm		c0.01			0.00						0.00	
v/c Ratio		0.28			0.04		0.54	0.40	0.00		0.11	0.33
Uniform Delay, d1		31.9			31.5		31.4	3.0	2.1		33.1	3.8
Progression Factor		1.00			1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.7			0.2		2.7	0.2	0.0		0.4	0.0
Delay (s)		32.6			31.8		34.1	3.2	2.1		33.5	3.8
Level of Service		C			C		C	A	A		C	A
Approach Delay (s)		32.6			31.8			5.0				4.0
Approach LOS		C			C			A				A
<b>Intersection Summary</b>												
HCM Average Control Delay			5.2				HCM Level of Service				A	
HCM Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			69.6				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			41.7%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											

# HCM Signalized Intersection Capacity Analysis

3: 7th St. & Decoto Rd.

1/27/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕↕		↕	↕↕	
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	0.95		1.00	0.95	
Frt		0.98		1.00	0.94		1.00	0.98		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1797		1770	1744		1770	3454		1770	3534	
Flt Permitted		0.90		0.81	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1641		1515	1744		1770	3454		1770	3534	
Volume (vph)	23	41	12	139	41	30	31	929	178	17	763	8
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	23	42	12	142	42	31	32	948	182	17	779	8
RTOR Reduction (vph)	0	8	0	0	26	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	69	0	142	47	0	32	1119	0	17	787	0
Turn Type	Perm		Perm		Prot		Prot					
Protected Phases	4		8		5		2		1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	10.1		10.1		2.2		36.8		0.9		35.5	
Effective Green, g (s)	10.7		10.7		2.8		37.4		1.5		36.1	
Actuated g/C Ratio	0.17		0.17		0.05		0.61		0.02		0.59	
Clearance Time (s)	4.6		4.6		4.6		4.6		4.6		4.6	
Vehicle Extension (s)	2.0		2.0		1.0		4.0		1.0		4.0	
Lane Grp Cap (vph)	285		263		303		80		2097		43	
v/s Ratio Prot			0.03		c0.02		c0.32		0.01		0.22	
v/s Ratio Perm	0.04		c0.09									
v/c Ratio	0.24		0.54		0.16		0.40		0.53		0.40	
Uniform Delay, d1	21.9		23.2		21.6		28.6		7.0		29.6	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.2		1.1		0.1		1.2		0.3		2.2	
Delay (s)	22.1		24.3		21.7		29.8		7.4		31.8	
Level of Service	C		C		C		C		A		C	
Approach Delay (s)	22.1		23.4				8.0				7.5	
Approach LOS	C		C				A				A	

## Intersection Summary

HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
4: Railroad Ave & Decoto Rd.




















1/27/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↖
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	83	1113	97	0	1028
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	86	1159	101	0	1071
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			497			972
pX, platoon unblocked	0.65	0.64			0.64	
vC, conflicting volume	1745	630			1260	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1506	0			842	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	88			100	
cM capacity (veh/h)	73	692			504	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	86	773	488	535	535	
Volume Left	0	0	0	0	0	
Volume Right	86	0	101	0	0	
cSH	692	1700	1700	1700	1700	
Volume to Capacity	0.12	0.45	0.29	0.31	0.31	
Queue Length 95th (ft)	11	0	0	0	0	
Control Delay (s)	10.9	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.9	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		45.7%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis  
5: 11th St. & Decoto Rd.

1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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		0.95	0.95		1.00	0.95		1.00	0.95	
Frt		0.98		1.00	0.94		1.00	0.98		1.00	1.00	
Flt Protected		0.96		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1761		1681	1621		1770	3470		1770	3536	
Flt Permitted		0.96		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1761		1681	1621		1770	3470		1770	3536	
Volume (vph)	43	4	7	292	5	64	75	1257	190	159	829	6
Peak-hour factor, PHF	0.94	0.94	0.94	1.00	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	4	7	292	5	68	80	1337	202	169	882	6
RTOR Reduction (vph)	0	6	0	0	25	0	0	9	0	0	1	0
Lane Group Flow (vph)	0	51	0	185	155	0	80	1530	0	169	887	0
Turn Type	Split		Split			Prot		Prot				
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)		4.1		11.1	11.1		4.8	27.4		4.1	26.7	
Effective Green, g (s)		4.7		11.7	11.7		5.4	28.0		4.7	27.3	
Actuated g/C Ratio		0.07		0.18	0.18		0.08	0.43		0.07	0.42	
Clearance Time (s)		4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		127		302	291		147	1492		128	1483	
v/s Ratio Prot		c0.03		c0.11	0.10		0.05	c0.44		c0.10	0.25	
v/s Ratio Perm												
v/c Ratio		0.40		0.61	0.53		0.54	1.03		1.32	0.60	
Uniform Delay, d1		28.8		24.6	24.2		28.7	18.5		30.2	14.7	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7		2.6	0.9		2.2	30.0		188.5	0.8	
Delay (s)		29.6		27.2	25.2		30.9	48.5		218.7	15.4	
Level of Service		C		C	C		C	D		F	B	
Approach Delay (s)		29.6			26.2			47.7			47.9	
Approach LOS		C			C			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			44.9			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			65.1			Sum of lost time (s)		12.0				
Intersection Capacity Utilization			70.7%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
6: BART & Decoto Rd.

1/27/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑			↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	1528	0	0	1164
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	1608	0	0	1225
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			677			497
pX, platoon unblocked	0.73	0.63			0.63	
vC, conflicting volume	2221	804			1608	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1515	102			1378	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	80	588			311	
<b>Direction, Lane #</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>		
Volume Total	804	804	613	613		
Volume Left	0	0	0	0		
Volume Right	0	0	0	0		
cSH	1700	1700	1700	1700		
Volume to Capacity	0.47	0.47	0.36	0.36		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	0.0		
Lane LOS						
Approach Delay (s)	0.0		0.0			
Approach LOS						
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			45.6%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Signalized Intersection Capacity Analysis































## 7: Meyers Dr & Decoto Rd.

1/27/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1762		1770	1863	1583	1770	3474		1770	3496	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1762		1770	1863	1583	1770	3474		1770	3496	
Volume (vph)	110	44	25	108	44	160	109	1258	175	152	987	88
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	46	26	114	46	168	115	1324	184	160	1039	93
RTOR Reduction (vph)	0	24	0	0	0	152	0	9	0	0	5	0
Lane Group Flow (vph)	116	48	0	114	46	16	115	1499	0	160	1127	0
Turn Type	Prot			Prot			Perm	Prot		Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	8											
Actuated Green, G (s)	7.5	6.0		9.4	7.9	7.9	7.6	41.6		9.8	43.8	
Effective Green, g (s)	7.5	6.0		9.4	7.9	7.9	7.6	42.1		9.8	44.3	
Actuated g/C Ratio	0.09	0.07		0.11	0.09	0.09	0.09	0.51		0.12	0.53	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	159	127		200	177	150	161	1756		208	1859	
v/s Ratio Prot	c0.07	c0.03		0.06	0.02		0.06	c0.43		c0.09	0.32	
v/s Ratio Perm	0.01											
v/c Ratio	0.73	0.38		0.57	0.26	0.11	0.71	0.85		0.77	0.61	
Uniform Delay, d1	36.9	36.9		35.0	35.0	34.5	36.8	17.9		35.7	13.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.2	0.7		2.2	0.3	0.1	11.8	4.7		14.2	0.8	
Delay (s)	50.1	37.6		37.3	35.3	34.6	48.6	22.6		49.9	14.3	
Level of Service	D	D		D	D	C	D	C		D	B	
Approach Delay (s)	45.3			35.6			24.5			18.7		
Approach LOS	D			D			C			B		
<b>Intersection Summary</b>												
HCM Average Control Delay	24.5			HCM Level of Service		C						
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	83.3			Sum of lost time (s)		16.0						
Intersection Capacity Utilization	71.5%			ICU Level of Service		C						
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
8: Alvarado-Niles Road & Decoto Rd.

1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 		
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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	320	419	317	321	404	122	357	991	225	103	766	87
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	327	428	323	328	412	124	364	1011	230	105	782	89
RTOR Reduction (vph)	0	0	144	0	0	102	0	0	19	0	0	10
Lane Group Flow (vph)	327	428	179	328	412	22	364	1011	211	105	782	79
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	14.1	16.3	16.3	14.1	16.3	16.3	17.1	39.2	39.2	6.4	28.5	28.5
Effective Green, g (s)	14.7	16.9	16.9	14.7	16.9	16.9	17.7	39.8	39.8	7.0	29.1	29.1
Actuated g/C Ratio	0.16	0.18	0.18	0.16	0.18	0.18	0.19	0.42	0.42	0.07	0.31	0.31
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	5.0	2.5	2.5	2.5
Lane Grp Cap (vph)	535	634	283	535	634	283	644	1492	667	255	1091	488
v/s Ratio Prot	0.10	c0.12		c0.10	0.12		c0.11	c0.29		0.03	0.22	
v/s Ratio Perm			0.11			0.01			0.13			0.05
v/c Ratio	0.61	0.68	0.63	0.61	0.65	0.08	0.57	0.68	0.32	0.41	0.72	0.16
Uniform Delay, d1	37.2	36.2	35.9	37.2	36.0	32.3	34.9	22.1	18.2	41.7	29.0	23.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	2.2	3.4	1.5	1.7	0.0	1.9	1.6	0.6	0.8	2.1	0.1
Delay (s)	38.6	38.4	39.3	38.7	37.7	32.3	36.7	23.7	18.8	42.5	31.1	23.9
Level of Service	D	D	D	D	D	C	D	C	B	D	C	C
Approach Delay (s)		38.7			37.3			26.0			31.7	
Approach LOS		D			D			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			32.4			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			94.4			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			67.3%			ICU Level of Service			C			
Analysis Period (min)			15									
c	Critical Lane Group											

# HCM Signalized Intersection Capacity Analysis

## 9: Mission Blvd. & Appian Way

1/27/2010

























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕	↖		↕		↖	↕	↖
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	0.95	1.00		1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3534		1770	3539	1583		1719		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98		0.60	1.00	1.00
Satd. Flow (perm)	1770	3534		1770	3539	1583		1698		1122	1863	1583
Volume (vph)	69	1116	11	103	1143	58	14	72	102	54	30	40
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	74	1200	12	111	1229	62	15	77	110	58	32	43
RTOR Reduction (vph)	0	1	0	0	0	35	0	69	0	0	0	30
Lane Group Flow (vph)	74	1211	0	111	1229	27	0	133	0	58	32	13
Turn Type	Prot			Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	3.0	22.8		4.5	24.3	24.3		17.5		17.5	17.5	17.5
Effective Green, g (s)	3.0	22.8		4.5	24.3	24.3		17.5		17.5	17.5	17.5
Actuated g/C Ratio	0.05	0.40		0.08	0.43	0.43		0.31		0.31	0.31	0.31
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	93	1419		140	1514	677		523		346	574	488
v/s Ratio Prot	0.04	0.34		c0.06	c0.35						0.02	
v/s Ratio Perm						0.02		c0.08		0.05		0.01
v/c Ratio	0.80	0.85		0.79	0.81	0.04		0.25		0.17	0.06	0.03
Uniform Delay, d1	26.6	15.5		25.7	14.2	9.5		14.7		14.3	13.8	13.7
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	36.1	5.2		25.7	3.4	0.0		1.2		1.0	0.2	0.1
Delay (s)	62.7	20.7		51.4	17.7	9.5		15.9		15.4	14.0	13.8
Level of Service	E	C		D	B	A		B		B	B	B
Approach Delay (s)		23.1			20.0			15.9			14.5	
Approach LOS		C			B			B			B	

### Intersection Summary

HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
 13: Alvarado-Niles Road & Union Square

1/27/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3539			3539							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3539			3539							
Volume (vph)	0	15	0	0	22	0	0	0	0	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	16	0	0	23	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	16	0	0	23	0	0	0	0	0	0	0
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8	8	4		
Permitted Phases							8		8	4		
Actuated Green, G (s)		120.0			120.0							
Effective Green, g (s)		120.0			120.0							
Actuated g/C Ratio		1.00			1.00							
Clearance Time (s)		5.0			5.0							
Vehicle Extension (s)		4.0			4.0							
Lane Grp Cap (vph)		3539			3539							
v/s Ratio Prot		0.00			0.01							
v/s Ratio Perm												
v/c Ratio		0.00			0.01							
Uniform Delay, d1		0.0			0.0							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.0			0.0							
Delay (s)		0.0			0.0							
Level of Service		A			A							
Approach Delay (s)		0.0			0.0			0.0			0.0	
Approach LOS		A			A			A			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			0.0			HCM Level of Service				A		
HCM Volume to Capacity ratio			0.01									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				0.0		
Intersection Capacity Utilization			11.7%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 1: Mission Blvd. & Decoto Rd.

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↗↘	↑↑↑		↗↘		↗			
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Frt		0.94		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4774		3433	5085		3433		1583			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4774		3433	5085		3433		1583			
Volume (vph)	0	1118	770	344	832	0	598	0	134	0	0	0
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	1285	885	395	956	0	687	0	154	0	0	0
RTOR Reduction (vph)	0	207	0	0	0	0	0	0	110	0	0	0
Lane Group Flow (vph)	0	1963	0	395	956	0	687	0	44	0	0	0
Turn Type	Perm		Prot		custom		custom					
Protected Phases		4		3	8							
Permitted Phases	4						2		2			
Actuated Green, G (s)		23.0		8.0	35.0		17.0		17.0			
Effective Green, g (s)		23.0		8.0	35.0		17.0		17.0			
Actuated g/C Ratio		0.38		0.13	0.58		0.28		0.28			
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		1830		458	2966		973		449			
v/s Ratio Prot		c0.41		c0.12	0.19							
v/s Ratio Perm							c0.20		0.03			
v/c Ratio		1.09dr		0.86	0.32		0.71		0.10			
Uniform Delay, d1		18.5		25.5	6.4		19.3		15.8			
Progression Factor		1.00		1.00	1.00		1.00		1.00			
Incremental Delay, d2		43.7		15.3	0.1		4.3		0.4			
Delay (s)		62.2		40.8	6.5		23.6		16.3			
Level of Service		E		D	A		C		B			
Approach Delay (s)		62.2			16.5			22.2			0.0	
Approach LOS		E			B			C			A	

### Intersection Summary

HCM Average Control Delay	40.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕	↗	↗	↗	↕
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	0.95	1.00	1.00	0.95	
Frt		0.99			1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790			1806		1770	3539	1583	1770	3538	
Flt Permitted		0.70			0.73		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1291			1358		1770	3539	1583	1770	3538	
Volume (vph)	100	46	10	108	69	2	22	727	144	65	1090	2
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	125	58	12	135	86	2	28	909	180	81	1362	2
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	90	0	0	0
Lane Group Flow (vph)	0	192	0	0	222	0	28	909	90	81	1364	0
Turn Type	Perm		Perm			Prot		Perm		Prot		
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8					2			
Actuated Green, G (s)		15.6			15.6		2.3	33.4	33.4		4.9	36.0
Effective Green, g (s)		16.2			16.2		2.9	34.0	34.0		5.5	36.6
Actuated g/C Ratio		0.24			0.24		0.04	0.50	0.50		0.08	0.54
Clearance Time (s)		4.6			4.6		4.6	4.6	4.6		4.6	4.6
Vehicle Extension (s)		0.5			3.0		2.0	5.0	5.0		2.0	2.0
Lane Grp Cap (vph)		309			325		76	1777	795	144	1913	
v/s Ratio Prot							0.02	0.26		c0.05	c0.39	
v/s Ratio Perm		0.15			c0.16				0.06			
v/c Ratio		0.62			0.68		0.37	0.51	0.11	0.56	0.71	
Uniform Delay, d1		23.0			23.4		31.5	11.3	8.9	29.9	11.6	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.8			5.8		1.1	0.5	0.1	3.0	1.1	
Delay (s)		25.8			29.3		32.6	11.8	9.0	32.9	12.7	
Level of Service		C			C		C	B	A	C	B	
Approach Delay (s)		25.8			29.3			11.9			13.8	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	67.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

3: 7th St. & Decoto Rd.

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↗	↘		↗	↕		↗	↕	
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	0.95		1.00	0.95	
Frt		0.98		1.00	0.91		1.00	0.97		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1795		1770	1697		1770	3441		1770	3533	
Flt Permitted		0.75		0.60	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1373		1121	1697		1770	3441		1770	3533	
Volume (vph)	62	66	17	147	53	77	20	662	150	66	1055	13
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	73	78	20	173	62	91	24	779	176	78	1241	15
RTOR Reduction (vph)	0	6	0	0	67	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	165	0	173	86	0	24	941	0	78	1256	0
Turn Type	Perm		Perm			Prot		Prot				
Protected Phases	4		8			5		2		1		6
Permitted Phases	4		8									
Actuated Green, G (s)	12.3		12.3			1.8		37.3		4.2		39.7
Effective Green, g (s)	12.9		12.9			2.4		37.9		4.8		40.3
Actuated g/C Ratio	0.19		0.19			0.04		0.56		0.07		0.60
Clearance Time (s)	4.6		4.6			4.6		4.6		4.6		4.6
Vehicle Extension (s)	2.0		2.0			1.0		4.0		1.0		4.0
Lane Grp Cap (vph)	262		214			324		63		1929		126
v/s Ratio Prot			0.05			0.01		0.27		c0.04		c0.36
v/s Ratio Perm	0.12		c0.15									
v/c Ratio	0.63		0.81			0.26		0.38		0.49		0.62
Uniform Delay, d1	25.2		26.2			23.3		31.9		9.0		30.5
Progression Factor	1.00		1.00			1.00		1.00		1.00		1.00
Incremental Delay, d2	3.6		18.7			0.2		1.4		0.3		6.2
Delay (s)	28.8		44.8			23.5		33.3		9.2		36.7
Level of Service	C		D			C		C		A		D
Approach Delay (s)	28.8		34.8					9.8				10.7
Approach LOS	C		C					A				B

## Intersection Summary

HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
 4: Railroad Ave & Decoto Rd.

6/24/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↖
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	145	755	55	0	1398
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	158	821	60	0	1520
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			497			972
pX, platoon unblocked	0.78					
vC, conflicting volume	1610	440			880	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1500	440			880	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	72			100	
cM capacity (veh/h)	88	565			763	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	158	547	333	760	760	
Volume Left	0	0	0	0	0	
Volume Right	158	0	60	0	0	
cSH	565	1700	1700	1700	1700	
Volume to Capacity	0.28	0.32	0.20	0.45	0.45	
Queue Length 95th (ft)	28	0	0	0	0	
Control Delay (s)	13.8	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	13.8	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		42.0%		ICU Level of Service	A	
Analysis Period (min)		15				

# HCM Signalized Intersection Capacity Analysis

5: 11th St. & Decoto Rd.

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↕		↙	↕		↙	↕	
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		0.95	0.95		1.00	0.95		1.00	0.95	
Frt		0.99		1.00	0.96		1.00	0.94		1.00	1.00	
Flt Protected		0.96		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1772		1681	1640		1770	3329		1770	3537	
Flt Permitted		0.96		0.95	0.97		0.95	1.00		0.12	1.00	
Satd. Flow (perm)		1772		1681	1640		1770	3329		221	3537	
Volume (vph)	54	12	8	366	10	60	34	798	523	392	1042	5
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	63	14	9	426	12	70	40	928	608	456	1212	6
RTOR Reduction (vph)	0	5	0	0	15	0	0	91	0	0	0	0
Lane Group Flow (vph)	0	81	0	260	233	0	40	1445	0	456	1218	0
Turn Type	Split		Split			Prot		pm+pt				
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases										2		
Actuated Green, G (s)		8.4		15.2	15.2		2.2	30.6		39.9	33.1	
Effective Green, g (s)		9.0		15.8	15.8		2.8	31.2		39.0	33.7	
Actuated g/C Ratio		0.12		0.20	0.20		0.04	0.40		0.50	0.44	
Clearance Time (s)		4.6		4.6	4.6		4.6	4.6		2.0	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		206		344	335		64	1344		218	1542	
v/s Ratio Prot		c0.05		c0.15	0.14		0.02	0.43		c0.14	0.34	
v/s Ratio Perm										c0.91		
v/c Ratio		0.39		0.76	0.70		0.62	1.08		2.09	0.79	
Uniform Delay, d1		31.6		28.9	28.5		36.7	23.0		18.4	18.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4		8.1	5.0		12.9	47.6		506.6	2.9	
Delay (s)		32.1		37.1	33.5		49.6	70.6		525.0	21.7	
Level of Service		C		D	C		D	E		F	C	
Approach Delay (s)		32.1			35.3			70.1			158.8	
Approach LOS		C			D			E			F	

## Intersection Summary

HCM Average Control Delay	103.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 6: BART & Decoto Rd.

6/24/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3514		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3514		1770	3539
Volume (vph)	19	17	1057	53	47	1485
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	18	1113	56	49	1563
RTOR Reduction (vph)	0	17	2	0	0	0
Lane Group Flow (vph)	20	1	1167	0	49	1563
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	3.6	3.6	58.6		4.4	67.0
Effective Green, g (s)	3.6	3.6	58.6		4.4	67.0
Actuated g/C Ratio	0.05	0.05	0.75		0.06	0.85
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	81	73	2620		99	3017
v/s Ratio Prot	c0.01		0.33		0.03	c0.44
v/s Ratio Perm		0.00				
v/c Ratio	0.25	0.01	0.45		0.49	0.52
Uniform Delay, d1	36.2	35.8	3.8		36.0	1.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.1	0.1		3.9	0.2
Delay (s)	37.8	35.9	3.9		39.9	1.7
Level of Service	D	D	A		D	A
Approach Delay (s)	36.9		3.9			2.8
Approach LOS	D		A			A

### Intersection Summary

HCM Average Control Delay	3.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	78.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis
































## 7: Meyers Dr & Decoto Rd.

6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1698		1770	1863	1583	1770	3467		1770	3466	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1698		1770	1863	1583	1770	3467		1770	3466	
Volume (vph)	66	37	53	123	43	207	61	1126	178	217	1167	188
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	69	39	56	129	45	218	64	1185	187	228	1228	198
RTOR Reduction (vph)	0	50	0	0	0	189	0	11	0	0	10	0
Lane Group Flow (vph)	69	45	0	129	45	29	64	1361	0	228	1416	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	5.6	8.8		8.1	11.3	11.3	5.5	40.3		11.4	46.2	
Effective Green, g (s)	5.6	8.8		8.1	11.3	11.3	5.5	40.8		11.4	46.7	
Actuated g/C Ratio	0.07	0.10		0.10	0.13	0.13	0.06	0.48		0.13	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	116	176		168	247	210	114	1662		237	1902	
v/s Ratio Prot	0.04	c0.03		c0.07	0.02		0.04	c0.39		c0.13	0.41	
v/s Ratio Perm						0.02						
v/c Ratio	0.59	0.25		0.77	0.18	0.14	0.56	0.82		0.96	0.74	
Uniform Delay, d1	38.6	35.1		37.6	32.8	32.6	38.6	19.0		36.6	14.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.4	0.3		17.1	0.1	0.1	3.7	3.7		47.4	2.0	
Delay (s)	44.0	35.4		54.6	32.9	32.7	42.4	22.7		84.0	16.6	
Level of Service	D	D		D	C	C	D	C		F	B	
Approach Delay (s)		39.0			40.0			23.6			25.9	
Approach LOS		D			D			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			27.1									HCM Level of Service C
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			85.1									Sum of lost time (s) 16.0
Intersection Capacity Utilization			72.3%									ICU Level of Service C
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
8: Alvarado-Niles Road & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	
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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	324	290	370	381	443	103	409	926	199	97	887	183
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	338	302	385	397	461	107	426	965	207	101	924	191
RTOR Reduction (vph)	0	0	272	0	0	88	0	0	18	0	0	20
Lane Group Flow (vph)	338	302	113	397	461	19	426	965	189	101	924	171
Turn Type	Prot		Prot	Prot		Prot	Prot		Prot	Prot		Prot
Protected Phases	7	4	4	3	8	8	5	2	2	1	6	6
Permitted Phases												
Actuated Green, G (s)	14.3	15.1	15.1	15.4	16.2	16.2	18.3	35.5	35.5	8.1	25.3	25.3
Effective Green, g (s)	14.9	15.7	15.7	16.0	16.8	16.8	18.9	36.1	36.1	8.7	25.9	25.9
Actuated g/C Ratio	0.16	0.17	0.17	0.17	0.18	0.18	0.20	0.39	0.39	0.09	0.28	0.28
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	5.0	2.5	2.5	2.5
Lane Grp Cap (vph)	553	601	269	594	643	288	701	1381	618	323	991	443
v/s Ratio Prot	0.10	0.09	0.07	c0.12	c0.13	0.01	c0.12	c0.27	0.12	0.03	c0.26	0.11
v/s Ratio Perm												
v/c Ratio	0.61	0.50	0.42	0.67	0.72	0.07	0.61	0.70	0.31	0.31	0.93	0.39
Uniform Delay, d1	36.1	34.9	34.3	35.8	35.6	31.4	33.4	23.6	19.5	39.1	32.4	26.9
Progression Factor	1.00	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	1.4	0.2	0.4	2.2	3.2	0.0	2.2	2.0	0.6	0.4	14.9	0.4
Delay (s)	37.5	35.1	34.7	38.0	38.8	31.4	35.6	25.6	20.1	39.5	47.4	27.3
Level of Service	D	D	C	D	D	C	D	C	C	D	D	C
Approach Delay (s)		35.7			37.6			27.6			43.6	
Approach LOS		D			D			C			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			35.4				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			92.5				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			71.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 9: Mission Blvd. & Appian Way

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗	↖		↕		↖	↖↗	↖
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	0.95	1.00		1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	1.00
Satd. Flow (prot)	1770	3526		1770	3539	1583		1695		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96		0.65	1.00	1.00
Satd. Flow (perm)	1770	3526		1770	3539	1583		1644		1218	1863	1583
Volume (vph)	59	1284	34	110	968	16	20	38	95	72	77	77
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	60	1297	34	111	978	16	20	38	96	73	78	78
RTOR Reduction (vph)	0	3	0	0	0	9	0	70	0	0	0	57
Lane Group Flow (vph)	60	1328	0	111	978	7	0	84	0	73	78	21
Turn Type	Prot			Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	6.0	26.0		6.0	26.0	26.0		16.0		16.0	16.0	16.0
Effective Green, g (s)	6.0	26.0		6.0	26.0	26.0		16.0		16.0	16.0	16.0
Actuated g/C Ratio	0.10	0.43		0.10	0.43	0.43		0.27		0.27	0.27	0.27
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	177	1528		177	1534	686		438		325	497	422
v/s Ratio Prot	0.03	c0.38		c0.06	0.28						0.04	
v/s Ratio Perm						0.00		0.05		c0.06		0.01
v/c Ratio	0.34	0.87		0.63	0.64	0.01		0.19		0.22	0.16	0.05
Uniform Delay, d1	25.2	15.5		25.9	13.3	9.7		17.0		17.2	16.8	16.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	5.1	7.0		15.6	2.0	0.0		1.0		1.6	0.7	0.2
Delay (s)	30.3	22.5		41.6	15.3	9.7		18.0		18.8	17.5	16.6
Level of Service	C	C		D	B	A		B		B	B	B
Approach Delay (s)		22.8			17.9			18.0			17.6	
Approach LOS		C			B			B			B	

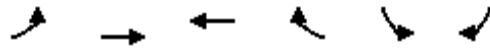
### Intersection Summary

HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
 13: Alvarado-Niles Road & Linda

6/24/2010



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↘		↙	↖
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	12	511	768	0	34	45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	511	768	0	34	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	768				1303	768
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	768				1303	768
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				81	89
cM capacity (veh/h)	846				175	402



























Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	12	511	768	34	45
Volume Left	12	0	0	34	0
Volume Right	0	0	0	0	45
cSH	846	1700	1700	175	402
Volume to Capacity	0.01	0.30	0.45	0.19	0.11
Queue Length 95th (ft)	1	0	0	17	9
Control Delay (s)	9.3	0.0	0.0	30.5	15.1
Lane LOS	A			D	C
Approach Delay (s)	0.2		0.0	21.7	
Approach LOS				C	

Intersection Summary					
Average Delay			1.3		
Intersection Capacity Utilization		50.4%		ICU Level of Service	A
Analysis Period (min)			15		

# HCM Signalized Intersection Capacity Analysis





















## 1: Mission Blvd. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		 	  		 		 			
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Frt		0.94		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4801		3433	5085		3433		1583			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4801		3433	5085		3433		1583			
Volume (vph)	0	1027	611	290	860	0	995	0	291	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1070	636	302	896	0	1036	0	303	0	0	0
RTOR Reduction (vph)	0	223	0	0	0	0	0	0	153	0	0	0
Lane Group Flow (vph)	0	1483	0	302	896	0	1036	0	150	0	0	0
Turn Type	Perm			Prot			custom		custom			
Protected Phases		4		3	8							
Permitted Phases	4						2		2			
Actuated Green, G (s)		16.0		4.0	24.0		16.0		16.0			
Effective Green, g (s)		16.0		4.0	24.0		16.0		16.0			
Actuated g/C Ratio		0.33		0.08	0.50		0.33		0.33			
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		1600		286	2543		1144		528			
v/s Ratio Prot		c0.31		c0.09	0.18							
v/s Ratio Perm							c0.30		0.09			
v/c Ratio		0.93		1.06	0.35		0.91		0.28			
Uniform Delay, d1		15.4		22.0	7.3		15.3		11.8			
Progression Factor		1.00		1.00	1.00		1.00		1.00			
Incremental Delay, d2		9.6		68.7	0.1		11.8		1.4			
Delay (s)		25.1		90.7	7.4		27.1		13.1			
Level of Service		C		F	A		C		B			
Approach Delay (s)		25.1			28.4			23.9			0.0	
Approach LOS		C			C			C			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			25.6			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			48.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			80.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c	Critical Lane Group											




















HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95	1.00	1.00	0.95	
Frt		0.94			0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1707			1728		1770	3539	1583	1770	3534	
Flt Permitted		0.90			0.85		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1585			1502		1770	3539	1583	1770	3534	
Volume (vph)	19	0	14	2	1	2	55	1245	5	4	849	8
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	22	0	16	2	1	2	65	1465	6	5	999	9
RTOR Reduction (vph)	0	15	0	0	2	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	23	0	0	3	0	65	1465	5	5	1008	0
Turn Type		Perm		Perm			Prot		Perm	Prot		
Protected Phases		4		8			5	2		1	6	
Permitted Phases		4		8					2			
Actuated Green, G (s)		2.9		2.9			4.2	55.4	55.4	1.3	52.5	
Effective Green, g (s)		3.5		3.5			4.8	56.0	56.0	1.9	53.1	
Actuated g/C Ratio		0.05		0.05			0.07	0.76	0.76	0.03	0.72	
Clearance Time (s)		4.6		4.6			4.6	4.6	4.6	4.6	4.6	
Vehicle Extension (s)		0.5		3.0			2.0	5.0	5.0	2.0	2.0	
Lane Grp Cap (vph)		76		72			116	2700	1208	46	2557	
v/s Ratio Prot							c0.04	c0.41		0.00	0.29	
v/s Ratio Perm		c0.01		0.00					0.00			
v/c Ratio		0.30		0.04			0.56	0.54	0.00	0.11	0.39	
Uniform Delay, d1		33.8		33.4			33.3	3.5	2.1	34.9	3.9	
Progression Factor		1.00		1.00			1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.8		0.2			3.7	0.4	0.0	0.4	0.0	
Delay (s)		34.6		33.6			36.9	3.9	2.1	35.3	4.0	
Level of Service		C		C			D	A	A	D	A	
Approach Delay (s)		34.6		33.6			5.3				4.1	
Approach LOS		C		C			A				A	
<b>Intersection Summary</b>												
HCM Average Control Delay			5.3				HCM Level of Service			A		
HCM Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			73.4				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			51.1%				ICU Level of Service			A		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
3: 7th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95		1.00	0.95	
Frt		0.98		1.00	0.94		1.00	0.98		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1797		1770	1744		1770	3473		1770	3535	
Flt Permitted		0.90		0.76	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1646		1412	1744		1770	3473		1770	3535	
Volume (vph)	23	41	12	139	41	30	31	1270	181	17	910	8
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	23	42	12	142	42	31	32	1296	185	17	929	8
RTOR Reduction (vph)	0	8	0	0	26	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	69	0	142	47	0	32	1474	0	17	937	0
Turn Type	Perm		Perm		Prot		Prot					
Protected Phases	4		8		5		2		1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	11.9		11.9		2.6		49.1		1.1		47.6	
Effective Green, g (s)	12.5		12.5		3.2		49.7		1.7		48.2	
Actuated g/C Ratio	0.16		0.16		0.04		0.65		0.02		0.64	
Clearance Time (s)	4.6		4.6		4.6		4.6		4.6		4.6	
Vehicle Extension (s)	2.0		2.0		1.0		4.0		1.0		4.0	
Lane Grp Cap (vph)	271		233		287		75		2274		40	
v/s Ratio Prot			0.03		c0.02		c0.42		0.01		0.26	
v/s Ratio Perm	0.04		c0.10									
v/c Ratio	0.25		0.61		0.16		0.43		0.65		0.42	
Uniform Delay, d1	27.6		29.4		27.2		35.5		7.9		36.6	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.2		3.1		0.1		1.4		0.7		2.6	
Delay (s)	27.8		32.5		27.3		36.9		8.6		39.3	
Level of Service	C		C		C		D		A		D	
Approach Delay (s)	27.8		30.7		9.2		7.6					
Approach LOS	C		C		A		A					
<b>Intersection Summary</b>												
HCM Average Control Delay	10.8		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.61											
Actuated Cycle Length (s)	75.9		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	61.9%		ICU Level of Service		B							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 4: Railroad Ave & Decoto Rd.

6/24/2010






















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↖		↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	302	1238	126	0	1175
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	315	1290	131	0	1224
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			497			972
pX, platoon unblocked	0.69	0.65			0.65	
vC, conflicting volume	1967	710			1421	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1583	13			1108	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	54			100	
cM capacity (veh/h)	69	691			406	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	315	860	561	612	612	
Volume Left	0	0	0	0	0	
Volume Right	315	0	131	0	0	
cSH	691	1700	1700	1700	1700	
Volume to Capacity	0.46	0.51	0.33	0.36	0.36	
Queue Length 95th (ft)	60	0	0	0	0	
Control Delay (s)	14.5	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	14.5	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		1.5				
Intersection Capacity Utilization		63.6%		ICU Level of Service	B	
Analysis Period (min)		15				

# HCM Signalized Intersection Capacity Analysis

5: 11th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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		0.95	0.95		1.00	0.95		1.00	0.95	
Frt		0.98		1.00	0.95		1.00	0.97		1.00	1.00	
Flt Protected		0.96		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1761		1681	1622		1770	3443		1770	3536	
Flt Permitted		0.96		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1761		1681	1622		1770	3443		1770	3536	
Volume (vph)	43	4	7	611	5	125	75	1350	297	265	870	6
Peak-hour factor, PHF	0.94	0.94	0.94	1.00	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	4	7	611	5	133	80	1436	316	282	926	6
RTOR Reduction (vph)	0	7	0	0	20	0	0	16	0	0	1	0
Lane Group Flow (vph)	0	50	0	385	344	0	80	1736	0	282	931	0
Turn Type	Split		Split			Prot			Prot			
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)		4.3		20.5	20.5		4.8	27.0		4.1	26.3	
Effective Green, g (s)		4.9		21.1	21.1		5.4	27.6		4.7	26.9	
Actuated g/C Ratio		0.07		0.28	0.28		0.07	0.37		0.06	0.36	
Clearance Time (s)		4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		116		477	461		129	1279		112	1280	
v/s Ratio Prot		c0.03		c0.23	0.21		0.05	c0.50		c0.16	0.26	
v/s Ratio Perm												
v/c Ratio		0.44		0.81	0.75		0.62	1.36		2.52	0.73	
Uniform Delay, d1		33.4		24.7	24.2		33.5	23.3		34.8	20.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0		9.1	5.7		6.5	165.9		708.7	2.2	
Delay (s)		34.3		33.9	29.9		40.0	189.2		743.5	22.8	
Level of Service		C		C	C		D	F		F	C	
Approach Delay (s)		34.3			31.9			182.7			190.2	
Approach LOS		C			C			F			F	
<b>Intersection Summary</b>												
HCM Average Control Delay			153.5			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			74.3			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			99.0%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 6: BART & Decoto Rd.

6/24/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3534		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3534		1770	3539
Volume (vph)	52	46	1682	18	16	1509
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	55	48	1771	19	17	1588
RTOR Reduction (vph)	0	44	0	0	0	0
Lane Group Flow (vph)	55	4	1790	0	17	1588
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.6	7.6	65.5		1.2	70.7
Effective Green, g (s)	7.6	7.6	65.5		1.2	70.7
Actuated g/C Ratio	0.09	0.09	0.76		0.01	0.82
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	156	139	2682		25	2899
v/s Ratio Prot	c0.03		c0.51		0.01	c0.45
v/s Ratio Perm		0.00				
v/c Ratio	0.35	0.03	0.67		0.68	0.55
Uniform Delay, d1	37.0	36.0	5.1		42.4	2.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4	0.1	0.6		56.0	0.2
Delay (s)	38.4	36.1	5.7		98.3	2.8
Level of Service	D	D	A		F	A
Approach Delay (s)	37.3		5.7			3.8
Approach LOS	D		A			A

### Intersection Summary

HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	86.3	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			

# HCM Signalized Intersection Capacity Analysis

































## 7: Meyers Dr & Decoto Rd.

6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1762		1770	1863	1583	1770	3481		1770	3507	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1762		1770	1863	1583	1770	3481		1770	3507	
Volume (vph)	110	44	25	108	44	178	109	1412	175	178	1358	88
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	46	26	114	46	187	115	1486	184	187	1429	93
RTOR Reduction (vph)	0	24	0	0	0	169	0	8	0	0	4	0
Lane Group Flow (vph)	116	48	0	114	46	18	115	1662	0	187	1518	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	7.5	6.1		9.3	7.9	7.9	7.7	41.4		10.9	44.6	
Effective Green, g (s)	7.5	6.1		9.3	7.9	7.9	7.7	41.9		10.9	45.1	
Actuated g/C Ratio	0.09	0.07		0.11	0.09	0.09	0.09	0.50		0.13	0.54	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	158	128		195	175	149	162	1732		229	1878	
v/s Ratio Prot	c0.07	c0.03		0.06	0.02		0.06	c0.48		c0.11	c0.43	
v/s Ratio Perm						0.01						
v/c Ratio	0.73	0.37		0.58	0.26	0.12	0.71	0.96		0.82	0.81	
Uniform Delay, d1	37.4	37.2		35.6	35.4	35.0	37.2	20.3		35.7	16.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.1	0.7		2.9	0.3	0.1	11.0	13.5		18.8	3.0	
Delay (s)	51.5	37.9		38.5	35.7	35.1	48.2	33.8		54.4	19.1	
Level of Service	D	D		D	D	D	D	C		D	B	
Approach Delay (s)		46.3			36.3			34.7			22.9	
Approach LOS		D			D			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			30.4				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			84.2				Sum of lost time (s)		20.0			
Intersection Capacity Utilization			77.2%				ICU Level of Service				D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
8: Alvarado-Niles Road & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	
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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	355	436	317	345	416	139	357	1093	260	148	1017	162
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	362	445	323	352	424	142	364	1115	265	151	1038	165
RTOR Reduction (vph)	0	0	139	0	0	118	0	0	19	0	0	15
Lane Group Flow (vph)	362	445	184	352	424	24	364	1115	246	151	1038	150
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	15.2	17.3	17.3	14.9	17.0	17.0	17.9	42.5	42.5	9.6	34.2	34.2
Effective Green, g (s)	15.8	17.9	17.9	15.5	17.6	17.6	18.5	43.1	43.1	10.2	34.8	34.8
Actuated g/C Ratio	0.15	0.17	0.17	0.15	0.17	0.17	0.18	0.42	0.42	0.10	0.34	0.34
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	5.0	2.5	2.5	2.5
Lane Grp Cap (vph)	528	617	276	518	606	271	618	1485	664	341	1199	536
v/s Ratio Prot	c0.11	c0.13		0.10	0.12		c0.11	c0.32		0.04	c0.29	
v/s Ratio Perm			0.12			0.02			0.16			0.10
v/c Ratio	0.69	0.72	0.67	0.68	0.70	0.09	0.59	0.75	0.37	0.44	0.87	0.28
Uniform Delay, d1	41.1	40.0	39.6	41.3	40.1	35.8	38.6	25.3	20.5	43.6	31.8	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	3.5	4.7	2.8	2.9	0.1	2.2	2.6	0.7	0.7	6.7	0.2
Delay (s)	44.0	43.6	44.3	44.0	42.9	35.9	40.8	27.9	21.2	44.2	38.5	25.0
Level of Service	D	D	D	D	D	D	D	C	C	D	D	C
Approach Delay (s)		43.9			42.3			29.6			37.5	
Approach LOS		D			D			C			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			37.1	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			102.7	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			73.5%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

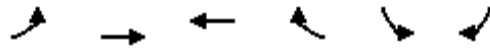
## 9: Mission Blvd. & Appian Way

6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95	1.00		1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3534		1770	3539	1583		1718		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98		0.59	1.00	1.00
Satd. Flow (perm)	1770	3534		1770	3539	1583		1697		1108	1863	1583
Volume (vph)	69	1157	11	103	1160	58	14	72	105	54	30	40
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	74	1244	12	111	1247	62	15	77	113	58	32	43
RTOR Reduction (vph)	0	1	0	0	0	35	0	72	0	0	0	30
Lane Group Flow (vph)	74	1255	0	111	1247	27	0	133	0	58	32	13
Turn Type	Prot			Prot		Perm	Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	3.0	23.3		4.5	24.8	24.8		17.4		17.4	17.4	17.4
Effective Green, g (s)	3.0	23.3		4.5	24.8	24.8		17.4		17.4	17.4	17.4
Actuated g/C Ratio	0.05	0.41		0.08	0.43	0.43		0.30		0.30	0.30	0.30
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	93	1440		139	1534	686		516		337	567	482
v/s Ratio Prot	0.04	c0.36		c0.06	0.35						0.02	
v/s Ratio Perm						0.02		c0.08		0.05		0.01
v/c Ratio	0.80	0.87		0.80	0.81	0.04		0.26		0.17	0.06	0.03
Uniform Delay, d1	26.8	15.6		25.9	14.2	9.3		15.0		14.6	14.1	14.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	36.1	6.1		26.5	3.4	0.0		1.2		1.1	0.2	0.1
Delay (s)	62.9	21.6		52.4	17.6	9.4		16.2		15.7	14.3	14.1
Level of Service	E	C		D	B	A		B		B	B	B
Approach Delay (s)		23.9			19.9			16.2			14.8	
Approach LOS		C			B			B			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			21.2				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			57.2				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			65.7%				ICU Level of Service				C	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis  
 13: Alvarado-Niles Road &

6/24/2010



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↙	↘
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	41	924	603	0	10	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	41	924	603	0	10	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	603				1609	603
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	603				1609	603
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				91	97
cM capacity (veh/h)	975				110	499













Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	41	924	603	10	16
Volume Left	41	0	0	10	0
Volume Right	0	0	0	0	16
cSH	975	1700	1700	110	499
Volume to Capacity	0.04	0.54	0.35	0.09	0.03
Queue Length 95th (ft)	3	0	0	7	2
Control Delay (s)	8.9	0.0	0.0	40.8	12.5
Lane LOS	A			E	B
Approach Delay (s)	0.4		0.0	23.4	
Approach LOS				C	

Intersection Summary					
Average Delay			0.6		
Intersection Capacity Utilization		58.6%		ICU Level of Service	B
Analysis Period (min)		15			

# HCM Signalized Intersection Capacity Analysis





















## 1: Mission Blvd. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑↑	↑↑↑		↑↑		↑			
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Frt		0.94		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4767		3433	5085		3433		1583			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4767		3433	5085		3433		1583			
Volume (vph)	0	1832	1313	419	1317	0	559	0	249	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1832	1313	419	1317	0	559	0	249	0	0	0
RTOR Reduction (vph)	0	100	0	0	0	0	0	0	14	0	0	0
Lane Group Flow (vph)	0	3045	0	419	1317	0	559	0	235	0	0	0
Turn Type				Prot			Prot		custom			
Protected Phases		4		3	8		5		3	5		
Permitted Phases												
Actuated Green, G (s)		81.0		16.0	101.0		21.0		41.0			
Effective Green, g (s)		81.0		16.0	101.0		21.0		41.0			
Actuated g/C Ratio		0.62		0.12	0.78		0.16		0.32			
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0					
Lane Grp Cap (vph)		2970		423	3951		555		499			
v/s Ratio Prot		c0.64		c0.12	0.26		c0.16		0.15			
v/s Ratio Perm												
v/c Ratio		1.19dr		0.99	0.33		1.01		0.47			
Uniform Delay, d1		24.5		56.9	4.4		54.5		35.8			
Progression Factor		1.00		1.00	1.00		1.00		1.00			
Incremental Delay, d2		23.4		41.1	0.1		40.0		0.7			
Delay (s)		47.9		98.1	4.4		94.5		36.5			
Level of Service		D		F	A		F		D			
Approach Delay (s)		47.9			27.0			76.6			0.0	
Approach LOS		D			C			E			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			45.6			HCM Level of Service			D			
HCM Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			102.7%			ICU Level of Service			G			
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95	1.00	1.00	0.95	
Frt		0.99			1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1784			1804		1770	3539	1583	1770	3538	
Flt Permitted		0.71			0.75		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1303			1386		1770	3539	1583	1770	3538	
Volume (vph)	120	50	15	115	75	4	20	707	140	70	1658	4
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	50	15	115	75	4	20	707	140	70	1658	4
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	62	0	0	0
Lane Group Flow (vph)	0	180	0	0	193	0	20	707	78	70	1662	0
Turn Type	Perm		Perm			Prot		Perm		Prot		
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8					2			
Actuated Green, G (s)		11.9			11.9		1.0	36.5	36.5		4.2	39.7
Effective Green, g (s)		12.5			12.5		1.6	37.1	37.1		4.8	40.3
Actuated g/C Ratio		0.19			0.19		0.02	0.56	0.56		0.07	0.61
Clearance Time (s)		4.6			4.6		4.6	4.6	4.6		4.6	4.6
Vehicle Extension (s)		0.5			3.0		2.0	5.0	5.0		2.0	2.0
Lane Grp Cap (vph)		245			261		43	1977	884		128	2147
v/s Ratio Prot							0.01	0.20			c0.04	c0.47
v/s Ratio Perm		0.14			c0.14				0.05			
v/c Ratio		0.74			0.74		0.47	0.36	0.09		0.55	0.77
Uniform Delay, d1		25.4			25.4		32.0	8.1	6.8		29.7	9.7
Progression Factor		1.00			1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		9.5			10.7		2.9	0.2	0.1		2.5	1.6
Delay (s)		34.8			36.1		34.9	8.3	6.9		32.3	11.3
Level of Service		C			D		C	A	A		C	B
Approach Delay (s)		34.8			36.1			8.7				12.2
Approach LOS		C			D			A				B
<b>Intersection Summary</b>												
HCM Average Control Delay			14.1				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			66.4				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			72.0%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 3: 7th St. & Decoto Rd.

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	
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	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.96		1.00	0.98		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1747			1748		1770	3451		1770	3531	
Flt Permitted		0.89			0.59		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1567			1052		1770	3451		1770	3531	
Volume (vph)	57	156	144	193	101	122	155	678	135	421	1274	21
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	156	144	193	101	122	155	678	135	421	1274	21
RTOR Reduction (vph)	0	32	0	0	20	0	0	22	0	0	2	0
Lane Group Flow (vph)	0	325	0	0	396	0	155	791	0	421	1293	0
Turn Type	Perm		Perm			Prot		Prot				
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		25.7			25.7		6.6	19.0		16.5	28.9	
Effective Green, g (s)		26.3			26.3		7.2	19.6		17.1	29.5	
Actuated g/C Ratio		0.35			0.35		0.10	0.26		0.23	0.39	
Clearance Time (s)		4.6			4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0			2.0		1.0	4.0		1.0	4.0	
Lane Grp Cap (vph)		549			369		170	902		404	1389	
v/s Ratio Prot							0.09	0.23		c0.24	c0.37	
v/s Ratio Perm		0.21			c0.38							
v/c Ratio		0.59			1.07		0.91	0.88		1.04	0.93	
Uniform Delay, d1		19.9			24.4		33.6	26.5		28.9	21.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1			67.6		43.7	9.9		56.1	11.5	
Delay (s)		21.1			92.0		77.3	36.4		85.1	33.3	
Level of Service		C			F		E	D		F	C	
Approach Delay (s)		21.1			92.0			42.9			46.0	
Approach LOS		C			F			D			D	

**Intersection Summary**

HCM Average Control Delay	48.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
 4: Railroad Ave & Decoto Rd.






















6/24/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↖		↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	141	876	189	0	1550
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	141	876	189	0	1550
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			497			972
pX, platoon unblocked	0.80	0.75			0.75	
vC, conflicting volume	1746	532			1065	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	735	33			747	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	82			100	
cM capacity (veh/h)	285	771			640	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	141	584	481	775	775	
Volume Left	0	0	0	0	0	
Volume Right	141	0	189	0	0	
cSH	771	1700	1700	1700	1700	
Volume to Capacity	0.18	0.34	0.28	0.46	0.46	
Queue Length 95th (ft)	17	0	0	0	0	
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.7	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		46.2%		ICU Level of Service	A	
Analysis Period (min)		15				














HCM Signalized Intersection Capacity Analysis  
5: 11th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95	0.95		1.00	0.95		1.00	0.95	
Frt		1.00	0.85	1.00	0.90		1.00	0.94		1.00	0.99	
Flt Protected		0.97	1.00	0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1811	1583	1681	1573		1770	3337		1770	3488	
Flt Permitted		0.97	1.00	0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1811	1583	1681	1573		1770	3337		1770	3488	
Volume (vph)	72	55	275	339	17	182	36	811	499	564	891	95
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	55	275	339	17	182	36	811	499	564	891	95
RTOR Reduction (vph)	0	0	161	0	73	0	0	83	0	0	7	0
Lane Group Flow (vph)	0	127	114	260	205	0	36	1227	0	564	979	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)		13.4	13.4	16.2	16.2		2.9	29.2		5.6	31.9	
Effective Green, g (s)		14.0	14.0	16.8	16.8		3.5	29.8		6.2	32.5	
Actuated g/C Ratio		0.17	0.17	0.20	0.20		0.04	0.36		0.07	0.39	
Clearance Time (s)		4.6	4.6	4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		306	268	341	319		75	1201		133	1369	
v/s Ratio Prot		0.07		c0.15	0.13		0.02	c0.37		c0.32	c0.28	
v/s Ratio Perm			c0.07									
v/c Ratio		0.42	0.42	0.76	0.64		0.48	1.02		4.24	0.72	
Uniform Delay, d1		30.7	30.8	31.1	30.2		38.8	26.5		38.3	21.2	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3	0.4	8.8	3.3		1.8	31.7		1475.8	1.9	
Delay (s)		31.1	31.2	39.9	33.5		40.5	58.2		1514.1	23.2	
Level of Service		C	C	D	C		D	E		F	C	
Approach Delay (s)		31.2			36.6			57.7			565.7	
Approach LOS		C			D			E			F	
<b>Intersection Summary</b>												
HCM Average Control Delay			257.2			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			82.8			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			105.3%			ICU Level of Service				G		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
6: BART & Decoto Rd.
























6/24/2010

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3479		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3479		1770	3539
Volume (vph)	175	137	1206	153	300	1205
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	175	137	1206	153	300	1205
RTOR Reduction (vph)	0	116	14	0	0	0
Lane Group Flow (vph)	175	21	1345	0	300	1205
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	15.1	15.1	44.3		28.6	76.9
Effective Green, g (s)	15.1	15.1	44.3		28.6	76.9
Actuated g/C Ratio	0.15	0.15	0.44		0.29	0.77
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	267	239	1541		506	2721
v/s Ratio Prot	c0.10		c0.39		c0.17	0.34
v/s Ratio Perm		0.01				
v/c Ratio	0.66	0.09	0.87		0.59	0.44
Uniform Delay, d1	40.0	36.5	25.3		30.7	4.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.7	0.2	7.1		1.9	0.5
Delay (s)	45.7	36.7	32.4		32.6	4.6
Level of Service	D	D	C		C	A
Approach Delay (s)	41.7		32.4			10.2
Approach LOS	D		C			B
<b>Intersection Summary</b>						
HCM Average Control Delay			22.8		HCM Level of Service	C
HCM Volume to Capacity ratio			0.74			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			74.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

# HCM Signalized Intersection Capacity Analysis
































## 7: Meyers Dr & Decoto Rd.

6/24/2010

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
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	1.00	1.00	1.00	0.95		1.00	0.95		
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.98		1.00	0.99		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1770	1726		1770	1863	1583	1770	3468		1770	3502		
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	1770	1726		1770	1863	1583	1770	3468		1770	3502		
Volume (vph)	100	24	23	340	108	261	52	998	154	417	905	69	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	100	24	23	340	108	261	52	998	154	417	905	69	
RTOR Reduction (vph)	0	20	0	0	0	217	0	11	0	0	5	0	
Lane Group Flow (vph)	100	27	0	340	108	44	52	1141	0	417	969	0	
Turn Type	Prot			Prot		Perm	Prot			Prot			
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases						8							
Actuated Green, G (s)	6.2	10.0		11.2	15.0	15.0	4.0	35.7		15.5	47.2		
Effective Green, g (s)	6.2	10.0		11.2	15.0	15.0	4.0	36.2		15.5	47.7		
Actuated g/C Ratio	0.07	0.11		0.13	0.17	0.17	0.04	0.41		0.17	0.54		
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5		
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0		
Lane Grp Cap (vph)	123	194		223	314	267	80	1412		309	1879		
v/s Ratio Prot	0.06	0.02		c0.19	c0.06		0.03	c0.33		c0.24	0.28		
v/s Ratio Perm						0.03							
v/c Ratio	0.81	0.14		1.52	0.34	0.16	0.65	0.81		1.35	0.52		
Uniform Delay, d1	40.8	35.6		38.9	32.6	31.6	41.8	23.3		36.7	13.2		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	30.7	0.1		257.6	0.2	0.1	13.5	4.0		177.2	0.5		
Delay (s)	71.5	35.7		296.4	32.8	31.7	55.2	27.3		213.9	13.7		
Level of Service	E	D		F	C	C	E	C		F	B		
Approach Delay (s)		60.0			158.8			28.5			73.7		
Approach LOS		E			F			C			E		
<b>Intersection Summary</b>													
HCM Average Control Delay			74.8									HCM Level of Service	E
HCM Volume to Capacity ratio			0.93										
Actuated Cycle Length (s)			88.9									Sum of lost time (s)	12.0
Intersection Capacity Utilization			91.1%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
8: Alvarado Niles Rd & Decoto Rd.



































6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	
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	0.97	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3501		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3501		3433	3539	1583	3433	3539	1583
Volume (vph)	506	684	960	109	701	55	550	652	343	188	863	196
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	506	684	960	109	701	55	550	652	343	188	863	196
RTOR Reduction (vph)	0	0	111	0	5	0	0	0	54	0	0	14
Lane Group Flow (vph)	506	684	849	109	751	0	550	652	289	188	863	182
Turn Type	Prot		pt+ov	Prot			Prot		pt+ov	Prot		pt+ov
Protected Phases	7	4	4 5	3	8		5	2	2 3	1	6	6 7
Permitted Phases												
Actuated Green, G (s)	20.8	39.4	68.1	10.2	28.8		24.1	40.5	55.3	11.4	27.8	53.2
Effective Green, g (s)	21.4	40.0	68.7	10.8	29.4		24.7	41.1	55.9	12.0	28.4	53.8
Actuated g/C Ratio	0.18	0.33	0.57	0.09	0.25		0.21	0.34	0.47	0.10	0.24	0.45
Clearance Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		5.0	5.0		2.5	2.5	
Lane Grp Cap (vph)	613	1181	907	309	858		707	1213	738	344	838	710
v/s Ratio Prot	c0.15	0.19	c0.54	0.03	0.21		0.16	0.18	0.18	0.05	c0.24	0.12
v/s Ratio Perm												
v/c Ratio	0.83	0.58	0.94	0.35	0.88		0.78	0.54	0.39	0.55	1.03	0.26
Uniform Delay, d1	47.5	33.0	23.6	51.3	43.5		45.0	31.7	20.9	51.4	45.8	20.6
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	8.5	0.4	16.3	0.3	9.7		6.3	0.8	0.7	1.4	39.0	0.1
Delay (s)	55.9	33.4	39.9	51.5	53.2		51.3	32.6	21.6	52.8	84.7	20.7
Level of Service	E	C	D	D	D		D	C	C	D	F	C
Approach Delay (s)		41.6			53.0			36.8			69.8	
Approach LOS		D			D			D			E	
<b>Intersection Summary</b>												
HCM Average Control Delay			48.1			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			119.9			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			101.6%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis



























## 9: Mission Blvd. & East-West Connector

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 	  	  	 			 	  		 	 
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	0.95	0.88	0.97	0.95		0.95	0.95	0.88	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	2787	3433	3532		1681	1705	2787	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	2787	3433	3532		1681	1705	2787	1770	1863	1583
Volume (vph)	61	1054	1251	736	823	12	787	114	978	85	281	145
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	1054	1251	736	823	12	787	114	978	85	281	145
RTOR Reduction (vph)	0	0	27	0	1	0	0	0	161	0	0	125
Lane Group Flow (vph)	61	1054	1224	736	834	0	439	462	817	85	281	20
Turn Type	Prot		pt+ov	Prot			Split		pt+ov	Split		Perm
Protected Phases	1	6	6 4	5	2		4	4	4 5	8	8	
Permitted Phases												8
Actuated Green, G (s)	7.6	37.8	74.8	26.0	56.2		33.0	33.0	59.0	18.0	18.0	18.0
Effective Green, g (s)	7.6	37.8	74.8	26.0	56.2		33.0	33.0	59.0	18.0	18.0	18.0
Actuated g/C Ratio	0.06	0.29	0.57	0.20	0.43		0.25	0.25	0.45	0.14	0.14	0.14
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	103	1023	1594	682	1518		424	430	1257	244	256	218
v/s Ratio Prot	0.03	c0.30	0.44	c0.21	0.24		0.26	c0.27	0.29	0.05	c0.15	
v/s Ratio Perm												0.01
v/c Ratio	0.59	1.03	0.77	1.08	0.55		1.04	1.07	0.65	0.35	1.10	0.09
Uniform Delay, d1	60.1	46.5	21.4	52.4	27.9		48.9	48.9	27.9	51.1	56.4	49.3
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	8.8	36.2	2.3	57.8	1.4		53.1	64.7	1.2	3.9	84.9	0.8
Delay (s)	68.9	82.7	23.6	110.2	29.3		102.0	113.6	29.1	55.0	141.3	50.1
Level of Service	E	F	C	F	C		F	F	C	D	F	D
Approach Delay (s)		51.1			67.2			66.9			101.0	
Approach LOS		D			E			E			F	
<b>Intersection Summary</b>												
HCM Average Control Delay			63.8			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			130.8			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			103.0%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 10: 7th St. & East-West Connector

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 			 	
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	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.93		1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1741		1770	1723		1770	3528		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1741		1770	1723		1770	3528		1770	3539	1583
Volume (vph)	446	30	23	30	30	30	277	1403	30	30	1628	155
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	446	30	23	30	30	30	277	1403	30	30	1628	155
RTOR Reduction (vph)	0	18	0	0	27	0	0	1	0	0	0	73
Lane Group Flow (vph)	446	35	0	30	33	0	277	1432	0	30	1628	82
Turn Type	Prot		Prot			Prot			Prot		Perm	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												8
Actuated Green, G (s)	10.0	17.6		2.0	9.6		12.0	47.9		1.6	37.5	37.5
Effective Green, g (s)	10.0	17.6		2.0	9.6		12.0	47.9		1.6	37.5	37.5
Actuated g/C Ratio	0.12	0.21		0.02	0.11		0.14	0.56		0.02	0.44	0.44
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	403	360		42	194		250	1986		33	1559	698
v/s Ratio Prot	c0.13	0.02		0.02	c0.02		c0.16	0.41		0.02	c0.46	
v/s Ratio Perm												0.05
v/c Ratio	1.11	0.10		0.71	0.17		1.11	0.72		0.91	1.04	0.12
Uniform Delay, d1	37.5	27.3		41.3	34.2		36.5	13.7		41.7	23.8	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	76.9	0.1		44.2	0.4		89.0	1.3		118.0	35.3	0.1
Delay (s)	114.5	27.4		85.4	34.6		125.5	15.0		159.7	59.1	14.1
Level of Service	F	C		F	C		F	B		F	E	B
Approach Delay (s)		105.2			51.5			32.9			56.9	
Approach LOS		F			D			C			E	
<b>Intersection Summary</b>												
HCM Average Control Delay			52.7	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			85.1	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			89.7%	ICU Level of Service				E				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 11: 11th St. & East-West Connector

6/24/2010



































Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
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	0.88	0.97	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	2787	3433	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	2787	3433	3539	3539	1583
Volume (vph)	250	815	492	1429	1478	173
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	250	815	492	1429	1478	173
RTOR Reduction (vph)	0	19	0	0	0	8
Lane Group Flow (vph)	250	796	492	1429	1478	165
Turn Type		pm+ov	Prot		pm+ov	
Protected Phases	6	7	7	4	8	6
Permitted Phases		6				8
Actuated Green, G (s)	18.1	33.7	15.6	60.3	40.7	58.8
Effective Green, g (s)	18.1	33.7	15.6	60.3	40.7	58.8
Actuated g/C Ratio	0.21	0.39	0.18	0.70	0.47	0.68
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	371	1216	620	2470	1667	1151
v/s Ratio Prot	0.14	c0.12	c0.14	0.40	c0.42	0.03
v/s Ratio Perm		0.17				0.07
v/c Ratio	0.67	0.65	0.79	0.58	0.89	0.14
Uniform Delay, d1	31.4	21.6	33.9	6.6	20.8	4.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.4	1.3	6.9	0.3	6.1	0.1
Delay (s)	40.9	22.9	40.8	6.9	26.8	4.9
Level of Service	D	C	D	A	C	A
Approach Delay (s)	27.1			15.6	24.6	
Approach LOS	C			B	C	

Intersection Summary

HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	86.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

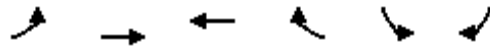
HCM Signalized Intersection Capacity Analysis  
 12: Alvarado Niles Rd & East-West Connector

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 	 	 			 	 		 	 	
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	4.0
Lane Util. Factor	0.97	0.95	0.88	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	1863	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	3433	1863	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	381	298	760	540	275	87	366	1452	180	376	1438	479
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	381	298	760	540	275	87	366	1452	180	376	1438	479
RTOR Reduction (vph)	0	0	12	0	0	6	0	0	19	0	0	53
Lane Group Flow (vph)	381	298	748	540	275	81	366	1452	161	376	1438	426
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases			6			2			4			8
Actuated Green, G (s)	10.0	11.8	21.8	15.0	16.8	26.8	10.0	36.0	51.0	10.0	36.0	46.0
Effective Green, g (s)	10.0	11.8	21.8	15.0	16.8	26.8	10.0	36.0	51.0	10.0	36.0	46.0
Actuated g/C Ratio	0.11	0.13	0.25	0.17	0.19	0.30	0.11	0.41	0.57	0.11	0.41	0.52
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	387	470	810	580	352	549	387	1435	980	387	1435	891
v/s Ratio Prot	0.11	0.08	c0.10	c0.16	0.15	0.02	0.11	c0.41	0.03	0.11	0.41	0.05
v/s Ratio Perm			0.16			0.03			0.07			0.22
v/c Ratio	0.98	0.63	0.92	0.93	0.78	0.15	0.95	1.01	0.16	0.97	1.00	0.48
Uniform Delay, d1	39.3	36.5	32.7	36.4	34.3	22.7	39.1	26.4	8.9	39.3	26.4	13.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	41.3	2.8	16.0	21.8	10.7	0.1	31.8	26.7	0.1	38.1	24.3	0.4
Delay (s)	80.6	39.2	48.6	58.2	45.0	22.8	70.9	53.1	9.0	77.3	50.7	14.1
Level of Service	F	D	D	E	D	C	E	D	A	E	D	B
Approach Delay (s)		55.2			50.8			52.4			47.4	
Approach LOS		E			D			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			51.1				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			88.8				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			91.7%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 13: Alvarado Niles Rd & Linda Dr. North

6/24/2010



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	25	859	1194	5	8	19
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	859	1194	5	8	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		1053				
pX, platoon unblocked					0.88	
vC, conflicting volume	1199				2106	1196
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1199				2255	1196
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				79	92
cM capacity (veh/h)	582				38	227

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	25	859	1199	8	19
Volume Left	25	0	0	8	0
Volume Right	0	0	5	0	19
cSH	582	1700	1700	38	227
Volume to Capacity	0.04	0.51	0.71	0.21	0.08
Queue Length 95th (ft)	3	0	0	17	7
Control Delay (s)	11.5	0.0	0.0	122.1	22.3
Lane LOS	B			F	C
Approach Delay (s)	0.3		0.0	51.9	
Approach LOS				F	

Intersection Summary					
Average Delay			0.8		
Intersection Capacity Utilization		73.1%		ICU Level of Service	D
Analysis Period (min)		15			

# HCM Signalized Intersection Capacity Analysis


































## 14: Paseo Padre & Isherwood Way

6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.91		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85		0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1770	4919		1770	3539	1583		1695			1783	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (perm)	1770	4919		1770	3539	1583		1695			1783	1583
Volume (vph)	57	1426	398	32	1439	331	120	66	250	505	56	68
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	1426	398	32	1439	331	120	66	250	505	56	68
RTOR Reduction (vph)	0	33	0	0	0	112	0	33	0	0	0	32
Lane Group Flow (vph)	57	1791	0	32	1439	219	0	403	0	0	561	36
Turn Type	Prot			Prot		pt+ov	Split			Split		pt+ov
Protected Phases	1	6		5	2	2 8	4	4		8	8	8 1
Permitted Phases												
Actuated Green, G (s)	4.0	58.6		3.2	57.8	99.8		31.0			42.0	50.0
Effective Green, g (s)	4.0	58.6		3.2	57.8	99.8		31.0			42.0	50.0
Actuated g/C Ratio	0.03	0.39		0.02	0.38	0.66		0.21			0.28	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	47	1911		38	1356	1048		348			497	525
v/s Ratio Prot	c0.03	0.36		0.02	c0.41	0.14		c0.24			c0.31	0.02
v/s Ratio Perm												
v/c Ratio	1.21	0.94		0.84	1.06	0.21		1.16			1.13	0.07
Uniform Delay, d1	73.4	44.3		73.5	46.5	10.0		59.9			54.4	34.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	200.2	10.3		85.4	42.5	0.1		98.9			80.7	0.1
Delay (s)	273.6	54.6		158.9	89.0	10.1		158.8			135.1	34.5
Level of Service	F	D		F	F	B		F			F	C
Approach Delay (s)		61.3			75.7			158.8			124.3	
Approach LOS		E			E			F			F	
<b>Intersection Summary</b>												
HCM Average Control Delay			84.1				HCM Level of Service				F	
HCM Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			150.8				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			112.8%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 15: Paseo Padre & Decoto Rd.













6/24/2010

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 		  	 			 	 	 	 		
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	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	1.00	0.95	0.88	0.97	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	4990	3539	1583	1770	3539	2787	3433	3539	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	4990	3539	1583	1770	3539	2787	3433	3539	1583	
Volume (vph)	207	986	611	769	1314	141	78	1114	828	186	1238	199	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	207	986	611	769	1314	141	78	1114	828	186	1238	199	
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	8	0	0	14	
Lane Group Flow (vph)	207	986	606	769	1314	134	78	1114	820	186	1238	185	
Turn Type	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	
Protected Phases	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7	
Permitted Phases													
Actuated Green, G (s)	6.0	28.0	37.0	15.0	37.0	47.0	5.0	35.0	54.0	6.0	36.0	46.0	
Effective Green, g (s)	6.0	28.0	37.0	15.0	37.0	47.0	5.0	35.0	54.0	6.0	36.0	46.0	
Actuated g/C Ratio	0.06	0.28	0.37	0.15	0.37	0.47	0.05	0.35	0.54	0.06	0.36	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	206	991	586	749	1309	744	89	1239	1505	206	1274	728	
v/s Ratio Prot	0.06	0.28	c0.38	c0.15	c0.37	0.08	0.04	0.31	0.29	0.05	c0.35	0.12	
v/s Ratio Perm													
v/c Ratio	1.00	0.99	1.03	1.03	1.00	0.18	0.88	0.90	0.54	0.90	0.97	0.25	
Uniform Delay, d1	47.0	35.9	31.5	42.5	31.5	15.3	47.2	30.8	15.0	46.7	31.5	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	64.0	27.2	46.2	39.9	25.8	0.1	56.4	10.5	0.4	37.0	19.3	0.2	
Delay (s)	111.0	63.1	77.7	82.4	57.3	15.5	103.6	41.3	15.4	83.7	50.8	16.7	
Level of Service	F	E	E	F	E	B	F	D	B	F	D	B	
Approach Delay (s)		73.6			63.3			33.1			50.4		
Approach LOS		E			E			C			D		
<b>Intersection Summary</b>													
HCM Average Control Delay			55.0									HCM Level of Service	E
HCM Volume to Capacity ratio			0.92										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	4.0
Intersection Capacity Utilization			96.7%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

# HCM Signalized Intersection Capacity Analysis





















## 1: Mission Blvd. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑↑	↑↑↑		↑↑		↑			
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Fr <sub>t</sub>		0.96		1.00	1.00		1.00		0.85			
Fl <sub>t</sub> Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4894		3433	5085		3433		1583			
Fl <sub>t</sub> Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4894		3433	5085		3433		1583			
Volume (vph)	0	1352	451	290	1858	0	1288	0	360	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1352	451	290	1858	0	1288	0	360	0	0	0
RTOR Reduction (vph)	0	75	0	0	0	0	0	0	4	0	0	0
Lane Group Flow (vph)	0	1728	0	290	1858	0	1288	0	356	0	0	0
Turn Type				Prot			Prot		custom			
Protected Phases		4		3	8		5		3	5		
Permitted Phases												
Actuated Green, G (s)		30.0		7.0	41.0		31.0		42.0			
Effective Green, g (s)		30.0		7.0	41.0		31.0		42.0			
Actuated g/C Ratio		0.38		0.09	0.51		0.39		0.52			
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		1835		300	2606		1330		831			
v/s Ratio Prot		c0.35		c0.08	0.37		c0.38		0.22			
v/s Ratio Perm												
v/c Ratio		0.94		0.97	0.71		0.97		0.43			
Uniform Delay, d <sub>1</sub>		24.2		36.4	15.0		24.0		11.6			
Progression Factor		1.00		1.00	1.00		1.00		1.00			
Incremental Delay, d <sub>2</sub>		10.3		42.5	0.9		17.4		0.4			
Delay (s)		34.4		78.9	15.9		41.5		12.0			
Level of Service		C		E	B		D		B			
Approach Delay (s)		34.4			24.4			35.0			0.0	
Approach LOS		C			C			D			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			30.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			91.2%			ICU Level of Service			F			
Analysis Period (min)			15									
c	Critical Lane Group											



















HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95	1.00	1.00	0.95	
Frt		0.94			0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1710			1740		1770	3539	1583	1770	3532	
Flt Permitted		0.88			0.92		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1537			1628		1770	3539	1583	1770	3532	
Volume (vph)	25	2	20	4	3	4	60	1667	7	6	725	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	2	20	4	3	4	60	1667	7	6	725	10
RTOR Reduction (vph)	0	19	0	0	4	0	0	0	2	0	1	0
Lane Group Flow (vph)	0	28	0	0	7	0	60	1667	5	6	734	0
Turn Type		Perm		Perm		Prot		Perm		Prot		
Protected Phases		4		8		5		2		1		6
Permitted Phases		4		8				2				
Actuated Green, G (s)		2.9		2.9		3.2	52.9	52.9	1.2	50.9		
Effective Green, g (s)		3.5		3.5		3.8	53.5	53.5	1.8	51.5		
Actuated g/C Ratio		0.05		0.05		0.05	0.76	0.76	0.03	0.73		
Clearance Time (s)		4.6		4.6		4.6	4.6	4.6	4.6	4.6		
Vehicle Extension (s)		0.5		3.0		2.0	5.0	5.0	2.0	2.0		
Lane Grp Cap (vph)		76		80		95	2674	1196	45	2569		
v/s Ratio Prot						c0.03	c0.47		0.00	0.21		
v/s Ratio Perm		c0.02		0.00				0.00				
v/c Ratio		0.37		0.09		0.63	0.62	0.00	0.13	0.29		
Uniform Delay, d1		32.6		32.1		32.8	4.0	2.1	33.7	3.3		
Progression Factor		1.00		1.00		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.1		0.5		9.6	0.6	0.0	0.5	0.0		
Delay (s)		33.7		32.6		42.5	4.6	2.1	34.2	3.3		
Level of Service		C		C		D	A	A	C	A		
Approach Delay (s)		33.7		32.6			5.9			3.6		
Approach LOS		C		C			A			A		
<b>Intersection Summary</b>												
HCM Average Control Delay			5.9			HCM Level of Service			A			
HCM Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			70.8			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			60.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
3: 7th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.93			0.95		1.00	0.98		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1723			1734		1770	3473		1770	3528	
Flt Permitted		0.89			0.71		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1550			1255		1770	3473		1770	3528	
Volume (vph)	31	96	134	246	158	248	260	1455	208	59	722	16
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	96	134	246	158	248	260	1455	208	59	722	16
RTOR Reduction (vph)	0	29	0	0	17	0	0	9	0	0	1	0
Lane Group Flow (vph)	0	232	0	0	635	0	260	1654	0	59	737	0
Turn Type		Perm		Perm		Prot		Prot		Prot		
Protected Phases		4		8		5	2			1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		57.4		57.4		20.7	54.8			4.0	38.1	
Effective Green, g (s)		58.0		58.0		21.3	55.4			4.6	38.7	
Actuated g/C Ratio		0.45		0.45		0.16	0.43			0.04	0.30	
Clearance Time (s)		4.6		4.6		4.6	4.6			4.6	4.6	
Vehicle Extension (s)		2.0		2.0		1.0	4.0			1.0	4.0	
Lane Grp Cap (vph)		692		560		290	1480			63	1050	
v/s Ratio Prot						c0.15	c0.48			0.03	0.21	
v/s Ratio Perm		0.15		c0.51								
v/c Ratio		0.33		1.13		0.90	1.12			0.94	0.70	
Uniform Delay, d1		23.4		36.0		53.3	37.3			62.6	40.5	
Progression Factor		1.00		1.00		1.00	1.00			1.00	1.00	
Incremental Delay, d2		0.1		80.5		27.2	62.8			89.3	2.3	
Delay (s)		23.5		116.5		80.5	100.1			151.8	42.8	
Level of Service		C		F		F	F			F	D	
Approach Delay (s)		23.5		116.5			97.4				50.9	
Approach LOS		C		F			F				D	
<b>Intersection Summary</b>												
HCM Average Control Delay			85.3			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			115.6%			ICU Level of Service				H		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis  
4: Railroad Ave & Decoto Rd.

6/24/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↗
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	462	1434	28	0	1132
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	462	1434	28	0	1132
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			497			972
pX, platoon unblocked	0.77	0.68			0.68	
vC, conflicting volume	2014	731			1462	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1333	136			1210	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	24			100	
cM capacity (veh/h)	112	604			390	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	462	956	506	566	566	
Volume Left	0	0	0	0	0	
Volume Right	462	0	28	0	0	
cSH	604	1700	1700	1700	1700	
Volume to Capacity	0.76	0.56	0.30	0.33	0.33	
Queue Length 95th (ft)	175	0	0	0	0	
Control Delay (s)	27.7	0.0	0.0	0.0	0.0	
Lane LOS	D					
Approach Delay (s)	27.7	0.0		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			75.8%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis  
5: 11th St. & Decoto Rd.

6/24/2010
















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↔		↖	↕		↖	↕	
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	0.95	0.95		1.00	0.95		1.00	0.95	
Frt		1.00	0.85	1.00	0.94		1.00	0.97		1.00	0.99	
Flt Protected		0.96	1.00	0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1789	1583	1681	1618		1770	3442		1770	3516	
Flt Permitted		0.96	1.00	0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1789	1583	1681	1618		1770	3442		1770	3516	
Volume (vph)	51	11	160	490	24	133	457	1278	286	428	673	31
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	51	11	160	490	24	133	457	1278	286	428	673	31
RTOR Reduction (vph)	0	0	134	0	26	0	0	17	0	0	3	0
Lane Group Flow (vph)	0	62	26	327	294	0	457	1547	0	428	701	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)		12.2	12.2	18.9	18.9		5.6	27.0		5.6	27.0	
Effective Green, g (s)		12.8	12.8	19.5	19.5		6.2	27.6		6.2	27.6	
Actuated g/C Ratio		0.16	0.16	0.24	0.24		0.08	0.34		0.08	0.34	
Clearance Time (s)		4.6	4.6	4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		279	247	399	384		134	1157		134	1182	
v/s Ratio Prot		c0.03		c0.19	0.18		c0.26	c0.45		0.24	0.20	
v/s Ratio Perm			0.02									
v/c Ratio		0.22	0.10	0.82	0.77		3.41	1.34		3.19	0.59	
Uniform Delay, d1		30.3	29.7	29.6	29.2		37.9	27.2		37.9	22.6	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1	0.1	11.8	8.0		1103.4	157.5		1006.5	0.9	
Delay (s)		30.4	29.8	41.4	37.2		1141.3	184.8		1044.4	23.5	
Level of Service		C	C	D	D		F	F		F	C	
Approach Delay (s)		30.0			39.3			401.1			409.5	
Approach LOS		C			D			F			F	

Intersection Summary

HCM Average Control Delay	324.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			
























HCM Signalized Intersection Capacity Analysis  
 6: BART & Decoto Rd.

6/24/2010

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3510		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3510		1770	3539
Volume (vph)	126	267	1759	103	230	1093
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	126	267	1759	103	230	1093
RTOR Reduction (vph)	0	150	5	0	0	0
Lane Group Flow (vph)	126	117	1857	0	230	1093
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	12.3	12.3	58.5		17.2	79.7
Effective Green, g (s)	12.3	12.3	58.5		17.2	79.7
Actuated g/C Ratio	0.12	0.12	0.58		0.17	0.80
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	218	195	2053		304	2821
v/s Ratio Prot	0.07		c0.53		c0.13	0.31
v/s Ratio Perm		c0.07				
v/c Ratio	0.58	0.60	0.90		0.76	0.39
Uniform Delay, d1	41.4	41.5	18.3		39.4	3.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	5.1	7.1		10.3	0.4
Delay (s)	45.1	46.6	25.4		49.7	3.4
Level of Service	D	D	C		D	A
Approach Delay (s)	46.1		25.4			11.4
Approach LOS	D		C			B
<b>Intersection Summary</b>						
HCM Average Control Delay			22.5		HCM Level of Service	C
HCM Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			81.6%		ICU Level of Service	D
Analysis Period (min)			15			
c	Critical Lane Group					

HCM Signalized Intersection Capacity Analysis  
7: Meyers Dr & Decoto Rd.
































6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1811		1770	1863	1583	1770	3501		1770	3476	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1811		1770	1863	1583	1770	3501		1770	3476	
Volume (vph)	156	53	12	295	84	359	71	1345	103	225	876	118
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	156	53	12	295	84	359	71	1345	103	225	876	118
RTOR Reduction (vph)	0	9	0	0	0	199	0	5	0	0	9	0
Lane Group Flow (vph)	156	56	0	295	84	160	71	1443	0	225	985	0
Turn Type	Prot			Prot			Perm	Prot		Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	8											
Actuated Green, G (s)	9.1	12.7		11.2	14.8	14.8	5.7	36.9		13.2	44.4	
Effective Green, g (s)	9.1	12.7		11.2	14.8	14.8	5.7	37.4		13.2	44.9	
Actuated g/C Ratio	0.10	0.14		0.12	0.16	0.16	0.06	0.41		0.15	0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	178	254		219	305	259	111	1447		258	1725	
v/s Ratio Prot	0.09	0.03		c0.17	0.05		0.04	c0.41		c0.13	0.28	
v/s Ratio Perm	c0.10											
v/c Ratio	0.88	0.22		1.35	0.28	0.62	0.64	1.00		0.87	0.57	
Uniform Delay, d1	40.1	34.5		39.6	33.2	35.2	41.4	26.5		37.8	16.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	34.1	0.2		183.3	0.2	3.1	8.6	22.9		25.3	0.7	
Delay (s)	74.2	34.7		223.0	33.3	38.3	50.0	49.3		63.1	16.8	
Level of Service	E	C		F	C	D	D	D		E	B	
Approach Delay (s)	62.6			111.6				49.4			25.3	
Approach LOS	E			F				D			C	
<b>Intersection Summary</b>												
HCM Average Control Delay	54.6			HCM Level of Service				D				
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	90.5			Sum of lost time (s)				12.0				
Intersection Capacity Utilization	85.9%			ICU Level of Service				E				
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 8: Alvarado Niles Rd & Decoto Rd.


































6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	
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	0.97	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3381		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3381		3433	3539	1583	3433	3539	1583
Volume (vph)	336	1211	225	488	817	347	646	814	234	153	780	272
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	336	1211	225	488	817	347	646	814	234	153	780	272
RTOR Reduction (vph)	0	0	7	0	31	0	0	0	22	0	0	20
Lane Group Flow (vph)	336	1211	218	488	1133	0	646	814	212	153	780	252
Turn Type	Prot		pt+ov	Prot			Prot		pt+ov	Prot		pt+ov
Protected Phases	7	4	4 5	3	8		5	2	2 3	1	6	6 7
Permitted Phases												
Actuated Green, G (s)	18.4	47.4	77.4	23.1	52.1		25.4	43.0	70.7	11.2	28.8	51.8
Effective Green, g (s)	19.0	48.0	78.0	23.7	52.7		26.0	43.6	71.3	11.8	29.4	52.4
Actuated g/C Ratio	0.13	0.34	0.55	0.17	0.37		0.18	0.30	0.50	0.08	0.21	0.37
Clearance Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		5.0	5.0		2.5	2.5	
Lane Grp Cap (vph)	456	1187	863	569	1245		624	1078	789	283	727	580
v/s Ratio Prot	0.10	c0.34	0.14	c0.14	0.34		c0.19	0.23	0.13	0.04	c0.22	0.16
v/s Ratio Perm												
v/c Ratio	0.74	1.02	0.25	0.86	0.91		1.04	0.76	0.27	0.54	1.07	0.43
Uniform Delay, d1	59.6	47.5	17.2	58.1	42.9		58.5	44.9	20.8	63.0	56.8	34.2
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	5.3	31.3	0.1	11.8	9.9		45.4	3.6	0.4	1.7	54.7	0.4
Delay (s)	64.9	78.9	17.2	69.8	52.8		104.0	48.6	21.2	64.7	111.5	34.6
Level of Service	E	E	B	E	D		F	D	C	E	F	C
Approach Delay (s)		68.4			57.8			65.9			88.2	
Approach LOS		E			E			E			F	
<b>Intersection Summary</b>												
HCM Average Control Delay			68.7				HCM Level of Service			E		
HCM Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			143.1				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			100.7%				ICU Level of Service		G			
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis




























## 9: Mission Blvd. & East-West Connector

6/24/2010

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 	  	  	 			 	  		 		
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	0.95	0.88	0.97	0.95		0.95	0.95	0.88	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3539	2787	3433	3526		1681	1742	2787	1770	1863	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	3539	2787	3433	3526		1681	1742	2787	1770	1863	1583	
Volume (vph)	108	617	1067	769	1441	38	724	389	875	54	117	71	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	108	617	1067	769	1441	38	724	389	875	54	117	71	
RTOR Reduction (vph)	0	0	74	0	1	0	0	0	156	0	0	63	
Lane Group Flow (vph)	108	617	993	769	1478	0	542	571	719	54	117	8	
Turn Type	Prot		pt+ov	Prot			Split		pt+ov	Split		Perm	
Protected Phases	1	6	6 4	5	2		4	4	4 5	8	8		
Permitted Phases												8	
Actuated Green, G (s)	9.0	33.6	84.6	37.4	62.0		47.0	47.0	84.4	16.0	16.0	16.0	
Effective Green, g (s)	9.0	33.6	84.6	37.4	62.0		47.0	47.0	84.4	16.0	16.0	16.0	
Actuated g/C Ratio	0.06	0.22	0.56	0.25	0.41		0.31	0.31	0.56	0.11	0.11	0.11	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	106	793	1572	856	1457		527	546	1568	189	199	169	
v/s Ratio Prot	0.06	0.17	0.36	c0.22	c0.42		0.32	c0.33	0.26	0.03	c0.06		
v/s Ratio Perm												0.00	
v/c Ratio	1.02	0.78	0.63	0.90	1.01		1.03	1.05	0.46	0.29	0.59	0.04	
Uniform Delay, d1	70.5	54.7	22.2	54.5	44.0		51.5	51.5	19.3	61.7	63.9	60.1	
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	92.6	7.4	0.8	12.1	27.2		46.7	51.0	0.2	3.8	12.1	0.5	
Delay (s)	163.1	62.1	23.0	66.6	71.2		98.2	102.5	19.5	65.5	76.0	60.6	
Level of Service	F	E	C	E	E		F	F	B	E	E	E	
Approach Delay (s)		44.9			69.6			64.8			69.1		
Approach LOS		D			E			E			E		
<b>Intersection Summary</b>													
HCM Average Control Delay			61.0			HCM Level of Service							E
HCM Volume to Capacity ratio			0.98										
Actuated Cycle Length (s)			150.0			Sum of lost time (s)							16.0
Intersection Capacity Utilization			96.8%			ICU Level of Service							F
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
 10: 7th St. & East-West Connector

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 		 	 	
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	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1613		1770	1723		1770	3531		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1613		1770	1723		1770	3531		1770	3539	1583
Volume (vph)	146	30	248	30	30	30	57	1828	30	30	1505	258
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	146	30	248	30	30	30	57	1828	30	30	1505	258
RTOR Reduction (vph)	0	210	0	0	27	0	0	1	0	0	0	77
Lane Group Flow (vph)	146	68	0	30	33	0	57	1857	0	30	1505	181
Turn Type	Prot		Prot			Prot			Prot		Perm	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												8
Actuated Green, G (s)	7.3	14.0		2.8	9.5		5.0	55.1		2.8	52.9	52.9
Effective Green, g (s)	7.3	14.0		2.8	9.5		5.0	55.1		2.8	52.9	52.9
Actuated g/C Ratio	0.08	0.15		0.03	0.10		0.06	0.61		0.03	0.58	0.58
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	276	249		55	180		98	2145		55	2064	923
v/s Ratio Prot	c0.04	c0.04		0.02	0.02		c0.03	c0.53		0.02	0.43	
v/s Ratio Perm												0.11
v/c Ratio	0.53	0.27		0.55	0.18		0.58	0.87		0.55	0.73	0.20
Uniform Delay, d1	40.0	33.9		43.3	37.1		41.8	14.7		43.3	13.7	8.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.8	0.6		10.6	0.5		8.5	3.9		10.6	1.3	0.1
Delay (s)	41.9	34.5		53.9	37.6		50.3	18.7		53.9	15.0	9.0
Level of Service	D	C		D	D		D	B		D	B	A
Approach Delay (s)		37.0			43.0			19.6			14.8	
Approach LOS		D			D			B			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			19.8	HCM Level of Service				B				
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			90.7	Sum of lost time (s)				8.0				
Intersection Capacity Utilization			81.7%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 11: 11th St. & East-West Connector

6/24/2010



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
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	0.88	0.97	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	2787	3433	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	2787	3433	3539	3539	1583
Volume (vph)	265	573	566	1620	1606	148
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	265	573	566	1620	1606	148
RTOR Reduction (vph)	0	7	0	0	0	4
Lane Group Flow (vph)	265	566	566	1620	1606	144
Turn Type		pm+ov	Prot		pm+ov	
Protected Phases	6	7	7	4	8	6
Permitted Phases		6				8
Actuated Green, G (s)	17.0	30.0	13.0	50.0	33.0	50.0
Effective Green, g (s)	17.0	30.0	13.0	50.0	33.0	50.0
Actuated g/C Ratio	0.23	0.40	0.17	0.67	0.44	0.67
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	401	1263	595	2359	1557	1140
v/s Ratio Prot	c0.15	0.08	c0.16	0.46	c0.45	0.03
v/s Ratio Perm		0.13				0.06
v/c Ratio	0.66	0.45	0.95	0.69	1.03	0.13
Uniform Delay, d1	26.4	16.4	30.7	7.7	21.0	4.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.3	0.3	25.3	0.8	31.3	0.1
Delay (s)	34.7	16.7	55.9	8.5	52.3	4.6
Level of Service	C	B	E	A	D	A
Approach Delay (s)	22.4			20.8	48.3	
Approach LOS	C			C	D	

Intersection Summary

HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

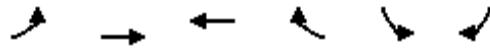
HCM Signalized Intersection Capacity Analysis  
 12: Alvarado Niles Rd & East-West Connector

6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
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	4.0	
Lane Util. Factor	0.97	0.95	0.88	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	2787	3433	1863	1583	3433	3539	1583	3433	3539	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	3539	2787	3433	1863	1583	3433	3539	1583	3433	3539	1583	
Volume (vph)	580	381	621	277	261	480	515	1125	532	200	1630	350	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	580	381	621	277	261	480	515	1125	532	200	1630	350	
RTOR Reduction (vph)	0	0	21	0	0	10	0	0	86	0	0	21	
Lane Group Flow (vph)	580	381	600	277	261	470	515	1125	446	200	1630	329	
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1	
Permitted Phases			6			2			4			8	
Actuated Green, G (s)	19.0	22.0	39.0	14.0	17.0	37.4	17.0	47.6	61.6	20.4	51.0	70.0	
Effective Green, g (s)	19.0	22.0	39.0	14.0	17.0	37.4	17.0	47.6	61.6	20.4	51.0	70.0	
Actuated g/C Ratio	0.16	0.18	0.32	0.12	0.14	0.31	0.14	0.40	0.51	0.17	0.42	0.58	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	544	649	999	401	264	546	486	1404	865	584	1504	976	
v/s Ratio Prot	c0.17	0.11	0.09	0.08	c0.14	c0.15	0.15	0.32	0.06	0.06	c0.46	0.05	
v/s Ratio Perm			0.13			0.15			0.22			0.15	
v/c Ratio	1.07	0.59	0.60	0.69	0.99	0.86	1.06	0.80	0.52	0.34	1.08	0.34	
Uniform Delay, d1	50.5	44.8	34.0	50.9	51.4	38.8	51.5	32.0	19.3	43.9	34.5	13.0	
Progression Factor	1.00	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	57.4	1.4	1.0	5.1	51.7	13.0	57.5	3.4	0.5	0.4	49.5	0.2	
Delay (s)	107.9	46.2	35.0	56.0	103.1	51.9	109.0	35.4	19.9	44.2	84.0	13.2	
Level of Service	F	D	C	E	F	D	F	D	B	D	F	B	
Approach Delay (s)		64.4			66.1			49.1			69.0		
Approach LOS		E			E			D			E		
<b>Intersection Summary</b>													
HCM Average Control Delay			61.3			HCM Level of Service							E
HCM Volume to Capacity ratio			1.02										
Actuated Cycle Length (s)			120.0			Sum of lost time (s)							12.0
Intersection Capacity Utilization			103.4%			ICU Level of Service							G
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis  
 13: Alvarado Niles Rd & Linda Dr. North

6/24/2010





























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↙	↘
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	20	992	1025	11	9	23
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	992	1025	11	9	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		1053				
pX, platoon unblocked					0.85	
vC, conflicting volume	1036				2062	1030
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1036				2253	1030
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				76	92
cM capacity (veh/h)	671				38	283

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	20	992	1036	9	23
Volume Left	20	0	0	9	0
Volume Right	0	0	11	0	23
cSH	671	1700	1700	38	283
Volume to Capacity	0.03	0.58	0.61	0.24	0.08
Queue Length 95th (ft)	2	0	0	19	7
Control Delay (s)	10.5	0.0	0.0	128.9	18.8
Lane LOS	B			F	C
Approach Delay (s)	0.2		0.0	49.8	
Approach LOS				E	

Intersection Summary					
Average Delay			0.9		
Intersection Capacity Utilization		64.6%		ICU Level of Service	C
Analysis Period (min)		15			

HCM Signalized Intersection Capacity Analysis  
 14: Paseo Padre & Isherwood Way

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 			 			 	 
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	0.91		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96			0.96	1.00
Satd. Flow (prot)	1770	5047		1770	3539	1583		1773			1794	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96			0.96	1.00
Satd. Flow (perm)	1770	5047		1770	3539	1583		1773			1794	1583
Volume (vph)	124	1406	75	334	864	455	613	35	24	298	93	63
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	1406	75	334	864	455	613	35	24	298	93	63
RTOR Reduction (vph)	0	4	0	0	0	228	0	1	0	0	0	37
Lane Group Flow (vph)	124	1477	0	334	864	227	0	671	0	0	391	26
Turn Type	Prot			Prot		pt+ov	Split			Split		pt+ov
Protected Phases	1	6		5	2	2 8	4	4		8	8	8 1
Permitted Phases												
Actuated Green, G (s)	13.3	39.0		22.0	47.7	74.7		46.0			27.0	44.3
Effective Green, g (s)	13.3	39.0		22.0	47.7	74.7		46.0			27.0	44.3
Actuated g/C Ratio	0.09	0.26		0.15	0.32	0.50		0.31			0.18	0.30
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	157	1312		260	1125	788		544			323	468
v/s Ratio Prot	0.07	c0.29		c0.19	0.24	0.14		c0.38			c0.22	0.02
v/s Ratio Perm												
v/c Ratio	0.79	1.13		1.28	0.77	0.29		1.23			1.21	0.06
Uniform Delay, d1	67.0	55.5		64.0	46.2	22.1		52.0			61.5	37.9
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	22.7	67.1		154.1	3.2	0.2		120.6			120.0	0.1
Delay (s)	89.6	122.6		218.1	49.4	22.3		172.6			181.5	37.9
Level of Service	F	F		F	D	C		F			F	D
Approach Delay (s)		120.0			76.0			172.6			161.6	
Approach LOS		F			E			F			F	
<b>Intersection Summary</b>												
HCM Average Control Delay			115.8				HCM Level of Service				F	
HCM Volume to Capacity ratio			1.21									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			101.3%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 15: Paseo Padre & Decoto Rd.













6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
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	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	1.00	0.95	0.88	0.97	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	4990	3539	1583	1770	3539	2787	3433	3539	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	4990	3539	1583	1770	3539	2787	3433	3539	1583	
Volume (vph)	467	637	114	670	822	126	298	1390	1056	149	908	436	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	467	637	114	670	822	126	298	1390	1056	149	908	436	
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	11	0	0	28	
Lane Group Flow (vph)	467	637	109	670	822	119	298	1390	1045	149	908	408	
Turn Type	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	
Protected Phases	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7	
Permitted Phases													
Actuated Green, G (s)	13.0	19.0	39.0	15.0	21.0	29.0	16.0	36.0	55.0	4.0	24.0	41.0	
Effective Green, g (s)	13.0	19.0	39.0	15.0	21.0	29.0	16.0	36.0	55.0	4.0	24.0	41.0	
Actuated g/C Ratio	0.14	0.21	0.43	0.17	0.23	0.32	0.18	0.40	0.61	0.04	0.27	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	496	747	686	832	826	510	315	1416	1703	153	944	721	
v/s Ratio Prot	c0.14	0.18	0.07	0.13	c0.23	0.08	c0.17	c0.39	0.37	0.04	0.26	0.26	
v/s Ratio Perm													
v/c Ratio	0.94	0.85	0.16	0.81	1.00	0.23	0.95	0.98	0.61	0.97	0.96	0.57	
Uniform Delay, d1	38.1	34.2	15.5	36.1	34.4	22.4	36.6	26.7	10.9	42.9	32.5	18.0	
Progression Factor	1.00	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	26.4	9.3	0.1	5.7	29.9	0.2	36.3	19.9	0.7	64.4	21.4	1.0	
Delay (s)	64.5	43.5	15.6	41.8	64.4	22.6	72.9	46.6	11.5	107.4	54.0	19.0	
Level of Service	E	D	B	D	E	C	E	D	B	F	D	B	
Approach Delay (s)		48.9			51.8			36.0			49.1		
Approach LOS		D			D			D			D		
<b>Intersection Summary</b>													
HCM Average Control Delay			44.6									HCM Level of Service	D
HCM Volume to Capacity ratio			0.91										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	8.0
Intersection Capacity Utilization			92.1%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

# HCM Signalized Intersection Capacity Analysis





















## 1: Mission Blvd. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑↑	↑↑↑		↑↑		↑			
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Frt		0.94		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4777		3433	5085		3433		1583			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4777		3433	5085		3433		1583			
Volume (vph)	0	1832	1243	419	1317	0	560	0	249	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1832	1243	419	1317	0	560	0	249	0	0	0
RTOR Reduction (vph)	0	102	0	0	0	0	0	0	13	0	0	0
Lane Group Flow (vph)	0	2973	0	419	1317	0	560	0	236	0	0	0
Turn Type				Prot			Prot		custom			
Protected Phases		4		3	8		5		3	5		
Permitted Phases												
Actuated Green, G (s)		74.0		14.0	92.0		20.0		38.0			
Effective Green, g (s)		74.0		14.0	92.0		20.0		38.0			
Actuated g/C Ratio		0.62		0.12	0.77		0.17		0.32			
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0					
Lane Grp Cap (vph)		2946		401	3899		572		501			
v/s Ratio Prot		c0.62		c0.12	0.26		c0.16		0.15			
v/s Ratio Perm												
v/c Ratio		1.14dr		1.04	0.34		0.98		0.47			
Uniform Delay, d1		23.0		53.0	4.4		49.8		32.9			
Progression Factor		1.00		1.00	1.00		1.00		1.00			
Incremental Delay, d2		18.8		57.1	0.1		31.9		0.7			
Delay (s)		41.8		110.1	4.5		81.7		33.6			
Level of Service		D		F	A		F		C			
Approach Delay (s)		41.8			30.0			66.9			0.0	
Approach LOS		D			C			E			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			41.8			HCM Level of Service			D			
HCM Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			101.2%			ICU Level of Service			G			
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												



















HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95	1.00	1.00	0.95	
Frt		0.99			1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1785			1804		1770	3539	1583	1770	3538	
Flt Permitted		0.71			0.75		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1305			1390		1770	3539	1583	1770	3538	
Volume (vph)	120	50	14	115	75	4	20	708	140	70	1588	4
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	50	14	115	75	4	20	708	140	70	1588	4
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	63	0	0	0
Lane Group Flow (vph)	0	179	0	0	193	0	20	708	77	70	1592	0
Turn Type		Perm		Perm		Prot		Perm		Prot		
Protected Phases		4		8		5		2		1		6
Permitted Phases		4		8				2				
Actuated Green, G (s)		11.7			11.7		1.0	34.5	34.5	4.2		37.7
Effective Green, g (s)		12.3			12.3		1.6	35.1	35.1	4.8		38.3
Actuated g/C Ratio		0.19			0.19		0.02	0.55	0.55	0.07		0.60
Clearance Time (s)		4.6			4.6		4.6	4.6	4.6	4.6		4.6
Vehicle Extension (s)		0.5			3.0		2.0	5.0	5.0	2.0		2.0
Lane Grp Cap (vph)		250			266		44	1935	865	132		2111
v/s Ratio Prot							0.01	0.20		c0.04		c0.45
v/s Ratio Perm		0.14			c0.14				0.05			
v/c Ratio		0.72			0.73		0.45	0.37	0.09	0.53		0.75
Uniform Delay, d1		24.3			24.4		30.9	8.2	6.9	28.6		9.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		7.9			9.5		2.7	0.2	0.1	2.0		1.4
Delay (s)		32.2			33.8		33.6	8.5	7.0	30.7		10.9
Level of Service		C			C		C	A	A	C		B
Approach Delay (s)		32.2			33.8			8.8				11.7
Approach LOS		C			C			A				B
<b>Intersection Summary</b>												
HCM Average Control Delay			13.6			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			64.2			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			70.0%			ICU Level of Service				C		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
3: 7th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.95			0.96		1.00	0.98		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1748			1748		1770	3451		1770	3530	
Flt Permitted		0.88			0.59		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1547			1049		1770	3451		1770	3530	
Volume (vph)	57	156	143	193	101	122	154	678	135	421	1204	21
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	156	143	193	101	122	154	678	135	421	1204	21
RTOR Reduction (vph)	0	19	0	0	11	0	0	13	0	0	1	0
Lane Group Flow (vph)	0	337	0	0	405	0	154	800	0	421	1224	0
Turn Type	Perm		Perm			Prot		Prot				
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		48.6			48.6		11.6	31.6		30.0	50.0	
Effective Green, g (s)		49.2			49.2		12.2	32.2		30.6	50.6	
Actuated g/C Ratio		0.40			0.40		0.10	0.26		0.25	0.41	
Clearance Time (s)		4.6			4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0			2.0		1.0	4.0		1.0	4.0	
Lane Grp Cap (vph)		614			416		174	896		437	1440	
v/s Ratio Prot							0.09	0.23		c0.24	c0.35	
v/s Ratio Perm		0.22			c0.39							
v/c Ratio		0.55			0.97		0.89	0.89		0.96	0.85	
Uniform Delay, d1		28.8			36.7		55.2	44.2		46.1	33.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5			36.6		36.6	11.5		33.3	5.1	
Delay (s)		29.4			73.3		91.8	55.7		79.4	38.4	
Level of Service		C			E		F	E		E	D	
Approach Delay (s)		29.4			73.3			61.5			48.9	
Approach LOS		C			E			E			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			53.4				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			124.0				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			103.3%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 4: Railroad Ave & Decoto Rd.

6/24/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↗			↕↗
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	174	842	195	0	1478
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	174	842	195	0	1478
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			497			972
pX, platoon unblocked	0.80	0.76			0.76	
vC, conflicting volume	1678	518			1037	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	711	56			736	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	77			100	
cM capacity (veh/h)	295	761			659	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	174	561	476	739	739	
Volume Left	0	0	0	0	0	
Volume Right	174	0	195	0	0	
cSH	761	1700	1700	1700	1700	
Volume to Capacity	0.23	0.33	0.28	0.43	0.43	
Queue Length 95th (ft)	22	0	0	0	0	
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.1	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		0.7				
Intersection Capacity Utilization		46.9%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis  
5: 11th St. & Decoto Rd.

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↔		↖	↕		↖	↕	
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	0.95	0.95		1.00	0.95		1.00	0.95	
Frt		1.00	0.85	1.00	0.91		1.00	0.94		1.00	0.98	
Flt Protected		0.97	1.00	0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1813	1583	1681	1580		1770	3327		1770	3482	
Flt Permitted		0.97	1.00	0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1813	1583	1681	1580		1770	3327		1770	3482	
Volume (vph)	72	58	273	387	18	186	35	779	520	595	788	95
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	58	273	387	18	186	35	779	520	595	788	95
RTOR Reduction (vph)	0	0	131	0	61	0	0	101	0	0	8	0
Lane Group Flow (vph)	0	130	142	289	241	0	35	1198	0	595	875	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)		13.7	13.7	17.4	17.4		2.2	29.3		5.6	32.7	
Effective Green, g (s)		14.3	14.3	18.0	18.0		2.8	29.9		6.2	33.3	
Actuated g/C Ratio		0.17	0.17	0.21	0.21		0.03	0.35		0.07	0.39	
Clearance Time (s)		4.6	4.6	4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		307	268	359	337		59	1179		130	1374	
v/s Ratio Prot		0.07		c0.17	0.15		0.02	c0.36		c0.34	c0.25	
v/s Ratio Perm			c0.09									
v/c Ratio		0.42	0.53	0.81	0.71		0.59	1.02		4.58	0.64	
Uniform Delay, d1		31.4	32.0	31.5	30.8		40.2	27.3		39.1	20.7	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3	0.9	11.7	5.9		10.2	30.4		1627.1	1.1	
Delay (s)		31.7	32.8	43.2	36.7		50.4	57.6		1666.2	21.8	
Level of Service		C	C	D	D		D	E		F	C	
Approach Delay (s)		32.5			39.9			57.4			683.8	
Approach LOS		C			D			E			F	

Intersection Summary

HCM Average Control Delay	295.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	84.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	108.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis  
6: BART & Decoto Rd.

6/24/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3525		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3525		1770	3539
Volume (vph)	131	98	1234	35	195	1253
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	131	98	1234	35	195	1253
RTOR Reduction (vph)	0	86	2	0	0	0
Lane Group Flow (vph)	131	12	1267	0	195	1253
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	12.6	12.6	54.6		20.8	79.4
Effective Green, g (s)	12.6	12.6	54.6		20.8	79.4
Actuated g/C Ratio	0.13	0.13	0.55		0.21	0.79
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	223	199	1925		368	2810
v/s Ratio Prot	c0.07		c0.36		c0.11	0.35
v/s Ratio Perm		0.01				
v/c Ratio	0.59	0.06	0.66		0.53	0.45
Uniform Delay, d1	41.2	38.5	16.1		35.2	3.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.9	0.1	1.8		1.4	0.5
Delay (s)	45.2	38.6	17.9		36.6	3.8
Level of Service	D	D	B		D	A
Approach Delay (s)	42.4		17.9			8.2
Approach LOS	D		B			A

Intersection Summary

HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 7: Meyers Dr & Decoto Rd.
































6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1726		1770	1863	1583	1770	3462		1770	3502	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1726		1770	1863	1583	1770	3462		1770	3502	
Volume (vph)	100	24	23	340	108	261	52	907	154	417	909	69
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	24	23	340	108	261	52	907	154	417	909	69
RTOR Reduction (vph)	0	21	0	0	0	210	0	12	0	0	4	0
Lane Group Flow (vph)	100	26	0	340	108	51	52	1049	0	417	974	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	7.0	9.4		15.0	17.4	17.4	2.8	31.0		17.3	45.5	
Effective Green, g (s)	7.0	9.4		15.0	17.4	17.4	2.8	31.5		17.3	46.0	
Actuated g/C Ratio	0.08	0.11		0.17	0.20	0.20	0.03	0.35		0.19	0.52	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	139	182		298	363	309	56	1223		343	1806	
v/s Ratio Prot	0.06	0.02		c0.19	c0.06		0.03	c0.30		c0.24	0.28	
v/s Ratio Perm						0.03						
v/c Ratio	0.72	0.15		1.14	0.30	0.16	0.93	0.86		1.22	0.54	
Uniform Delay, d1	40.1	36.2		37.1	30.7	29.9	43.1	26.8		36.0	14.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.8	0.1		95.8	0.2	0.1	92.4	6.7		120.8	0.6	
Delay (s)	53.9	36.4		132.9	30.8	29.9	135.5	33.5		156.8	15.1	
Level of Service	D	D		F	C	C	F	C		F	B	
Approach Delay (s)		48.3			79.5			38.3			57.4	
Approach LOS		D			E			D			E	
<b>Intersection Summary</b>												
HCM Average Control Delay			55.3				HCM Level of Service				E	
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			89.2				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												

# HCM Signalized Intersection Capacity Analysis

## 8: Alvarado Niles Rd & Decoto Rd.

































6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	 
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	0.97	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3501		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3501		3433	3539	1583	3433	3539	1583
Volume (vph)	491	684	960	109	701	55	550	577	343	188	854	209
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	491	684	960	109	701	55	550	577	343	188	854	209
RTOR Reduction (vph)	0	0	89	0	4	0	0	0	51	0	0	20
Lane Group Flow (vph)	491	684	871	109	752	0	550	577	292	188	854	189
Turn Type	Prot		pt+ov	Prot			Prot		pt+ov	Prot		pt+ov
Protected Phases	7	4	4 5	3	8		5	2	2 3	1	6	6 7
Permitted Phases												
Actuated Green, G (s)	21.9	49.2	79.2	10.3	37.6		25.4	42.2	57.1	12.0	28.8	55.3
Effective Green, g (s)	22.5	49.8	79.8	10.9	38.2		26.0	42.8	57.7	12.6	29.4	55.9
Actuated g/C Ratio	0.17	0.38	0.60	0.08	0.29		0.20	0.32	0.44	0.10	0.22	0.42
Clearance Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		5.0	5.0		2.5	2.5	
Lane Grp Cap (vph)	585	1334	956	283	1012		676	1147	691	327	788	670
v/s Ratio Prot	c0.14	0.19	c0.55	0.03	0.21		0.16	0.16	0.18	0.05	c0.24	0.12
v/s Ratio Perm												
v/c Ratio	0.84	0.51	0.91	0.39	0.74		0.81	0.50	0.42	0.57	1.08	0.28
Uniform Delay, d1	53.1	31.8	23.0	57.4	42.5		50.7	36.1	25.7	57.2	51.3	25.0
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	9.8	0.1	12.3	0.3	2.6		8.4	0.7	0.9	2.0	57.2	0.2
Delay (s)	62.9	31.9	35.3	57.7	45.1		59.1	36.8	26.6	59.2	108.5	25.1
Level of Service	E	C	D	E	D		E	D	C	E	F	C
Approach Delay (s)		40.6			46.7			42.8			87.2	
Approach LOS		D			D			D			F	
<b>Intersection Summary</b>												
HCM Average Control Delay			52.2				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			132.1				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			101.4%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis




























## 9: Mission Blvd. & East-West Connector

6/24/2010

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 	  	  	 			 	  				
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	0.95	0.88	0.97	0.95		0.95	0.95	0.88	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3539	2787	3433	3532		1681	1705	2787	1770	1863	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	3539	2787	3433	3532		1681	1705	2787	1770	1863	1583	
Volume (vph)	61	1054	1251	743	823	12	787	114	986	85	281	145	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	61	1054	1251	743	823	12	787	114	986	85	281	145	
RTOR Reduction (vph)	0	0	28	0	1	0	0	0	159	0	0	125	
Lane Group Flow (vph)	61	1054	1223	743	834	0	439	462	827	85	281	20	
Turn Type	Prot		pt+ov	Prot			Split		pt+ov	Split		Perm	
Protected Phases	1	6	6 4	5	2		4	4	4 5	8	8		
Permitted Phases												8	
Actuated Green, G (s)	8.3	44.8	86.8	31.0	67.5		38.0	38.0	69.0	21.0	21.0	21.0	
Effective Green, g (s)	8.3	44.8	86.8	31.0	67.5		38.0	38.0	69.0	21.0	21.0	21.0	
Actuated g/C Ratio	0.06	0.30	0.58	0.21	0.45		0.25	0.25	0.46	0.14	0.14	0.14	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	97	1051	1604	706	1581		424	430	1275	246	259	220	
v/s Ratio Prot	0.03	c0.30	0.44	c0.22	0.24		0.26	c0.27	0.30	0.05	c0.15		
v/s Ratio Perm												0.01	
v/c Ratio	0.63	1.00	0.76	1.05	0.53		1.04	1.07	0.65	0.35	1.08	0.09	
Uniform Delay, d1	69.7	53.0	24.2	59.9	30.1		56.4	56.4	31.6	58.7	64.9	56.6	
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	12.1	28.5	2.2	48.5	1.3		53.1	64.7	1.1	3.8	80.4	0.8	
Delay (s)	81.8	81.5	26.4	108.4	31.4		109.5	121.1	32.7	62.5	145.3	57.4	
Level of Service	F	F	C	F	C		F	F	C	E	F	E	
Approach Delay (s)		52.4			67.6			72.2			106.6		
Approach LOS		D			E			E			F		
<b>Intersection Summary</b>													
HCM Average Control Delay			66.4			HCM Level of Service							E
HCM Volume to Capacity ratio			1.05										
Actuated Cycle Length (s)			150.8			Sum of lost time (s)							16.0
Intersection Capacity Utilization			103.2%			ICU Level of Service							G
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
 10: 7th St. & East-West Connector

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 		 	 	
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	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.93		1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1741		1770	1723		1770	3528		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1741		1770	1723		1770	3528		1770	3539	1583
Volume (vph)	446	30	23	30	30	30	277	1411	30	30	1635	155
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	446	30	23	30	30	30	277	1411	30	30	1635	155
RTOR Reduction (vph)	0	19	0	0	28	0	0	1	0	0	0	51
Lane Group Flow (vph)	446	34	0	30	32	0	277	1440	0	30	1635	104
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												8
Actuated Green, G (s)	17.0	22.9		3.6	9.5		20.0	78.1		3.6	61.7	61.7
Effective Green, g (s)	17.0	22.9		3.6	9.5		20.0	78.1		3.6	61.7	61.7
Actuated g/C Ratio	0.14	0.18		0.03	0.08		0.16	0.63		0.03	0.50	0.50
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	470	321		51	132		285	2218		51	1758	786
v/s Ratio Prot	c0.13	0.02		0.02	c0.02		c0.16	0.41		0.02	c0.46	
v/s Ratio Perm												0.07
v/c Ratio	0.95	0.11		0.59	0.24		0.97	0.65		0.59	0.93	0.13
Uniform Delay, d1	53.2	42.1		59.6	54.0		51.8	14.5		59.6	29.2	16.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	28.6	0.1		16.1	1.0		45.4	0.7		16.1	9.3	0.1
Delay (s)	81.8	42.3		75.7	54.9		97.2	15.1		75.7	38.6	16.9
Level of Service	F	D		E	D		F	B		E	D	B
Approach Delay (s)		77.6			61.9			28.4			37.3	
Approach LOS		E			E			C			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			39.0				HCM Level of Service					D
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			124.2				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			89.9%				ICU Level of Service				E	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 11: 11th St. & East-West Connector

6/24/2010



































Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
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	0.88	0.97	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	2787	3433	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	2787	3433	3539	3539	1583
Volume (vph)	258	848	515	1429	1478	180
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	258	848	515	1429	1478	180
RTOR Reduction (vph)	0	11	0	0	0	6
Lane Group Flow (vph)	258	837	515	1429	1478	174
Turn Type		pm+ov	Prot		pm+ov	
Protected Phases	6	7	7	4	8	6
Permitted Phases		6				8
Actuated Green, G (s)	17.0	30.0	13.0	50.0	33.0	50.0
Effective Green, g (s)	17.0	30.0	13.0	50.0	33.0	50.0
Actuated g/C Ratio	0.23	0.40	0.17	0.67	0.44	0.67
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	401	1263	595	2359	1557	1140
v/s Ratio Prot	0.15	c0.11	c0.15	0.40	c0.42	0.03
v/s Ratio Perm		0.19				0.08
v/c Ratio	0.64	0.66	0.87	0.61	0.95	0.15
Uniform Delay, d1	26.3	18.4	30.2	7.0	20.2	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.7	1.3	12.5	0.4	12.6	0.1
Delay (s)	34.0	19.7	42.7	7.4	32.8	4.7
Level of Service	C	B	D	A	C	A
Approach Delay (s)	23.0			16.8	29.7	
Approach LOS	C			B	C	

Intersection Summary

HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

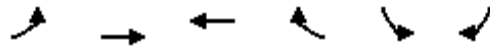
HCM Signalized Intersection Capacity Analysis  
 12: Alvarado Niles Rd & East-West Connector

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 	 	 			 	 		 	 	
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	4.0
Lane Util. Factor	0.97	0.95	0.88	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	1863	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	3433	1863	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	381	283	760	540	236	94	366	1469	180	384	1463	479
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	381	283	760	540	236	94	366	1469	180	384	1463	479
RTOR Reduction (vph)	0	0	16	0	0	6	0	0	9	0	0	60
Lane Group Flow (vph)	381	283	744	540	236	88	366	1469	171	384	1463	419
Turn Type	Prot	pm+ov		Prot	pm+ov		Prot	pm+ov		Prot	pm+ov	
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases		6			2			4			8	
Actuated Green, G (s)	10.0	9.8	19.8	16.5	16.3	26.3	10.0	37.0	53.5	10.0	37.0	47.0
Effective Green, g (s)	10.0	9.8	19.8	16.5	16.3	26.3	10.0	37.0	53.5	10.0	37.0	47.0
Actuated g/C Ratio	0.11	0.11	0.22	0.18	0.18	0.29	0.11	0.41	0.60	0.11	0.41	0.53
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	384	388	743	634	340	537	384	1466	1019	384	1466	904
v/s Ratio Prot	c0.11	0.08	c0.11	c0.16	0.13	0.02	0.11	c0.42	0.03	0.11	0.41	0.05
v/s Ratio Perm			0.15			0.04			0.08			0.21
v/c Ratio	0.99	0.73	1.00	0.85	0.69	0.16	0.95	1.00	0.17	1.00	1.00	0.46
Uniform Delay, d1	39.6	38.5	34.8	35.2	34.2	23.4	39.4	26.1	8.0	39.6	26.1	13.3
Progression Factor	1.00	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	43.7	6.7	33.2	10.7	6.0	0.1	33.7	24.0	0.1	45.9	22.8	0.4
Delay (s)	83.3	45.2	68.0	45.9	40.2	23.5	73.2	50.1	8.1	85.6	48.9	13.6
Level of Service	F	D	E	D	D	C	E	D	A	F	D	B
Approach Delay (s)		67.5			41.9			50.6			47.7	
Approach LOS		E			D			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			52.1			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			89.3			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			92.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 13: Alvarado Niles Rd & Linda Dr. North

6/24/2010



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	912	1376	5	8	19
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	912	1376	5	8	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		1053				
pX, platoon unblocked					0.89	
vC, conflicting volume	1381				2290	1378
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1381				2457	1378
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				73	89
cM capacity (veh/h)	496				30	177

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	0	912	1381	8	19
Volume Left	0	0	0	8	0
Volume Right	0	0	5	0	19
cSH	1700	1700	1700	30	177
Volume to Capacity	0.00	0.54	0.81	0.27	0.11
Queue Length 95th (ft)	0	0	0	21	9
Control Delay (s)	0.0	0.0	0.0	164.4	27.8
Lane LOS				F	D
Approach Delay (s)	0.0		0.0	68.2	
Approach LOS				F	

Intersection Summary					
Average Delay			0.8		
Intersection Capacity Utilization		82.7%		ICU Level of Service	E
Analysis Period (min)			15		

# HCM Signalized Intersection Capacity Analysis


































## 14: Paseo Padre & Isherwood Way

6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.91		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85		0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1770	4919		1770	3539	1583		1695			1783	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (perm)	1770	4919		1770	3539	1583		1695			1783	1583
Volume (vph)	57	1426	398	32	1439	331	120	66	250	505	56	68
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	1426	398	32	1439	331	120	66	250	505	56	68
RTOR Reduction (vph)	0	33	0	0	0	112	0	33	0	0	0	32
Lane Group Flow (vph)	57	1791	0	32	1439	219	0	403	0	0	561	36
Turn Type	Prot			Prot		pt+ov	Split			Split		pt+ov
Protected Phases	1	6		5	2	2 8	4	4		8	8	8 1
Permitted Phases												
Actuated Green, G (s)	4.0	58.6		3.2	57.8	99.8		31.0			42.0	50.0
Effective Green, g (s)	4.0	58.6		3.2	57.8	99.8		31.0			42.0	50.0
Actuated g/C Ratio	0.03	0.39		0.02	0.38	0.66		0.21			0.28	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	47	1911		38	1356	1048		348			497	525
v/s Ratio Prot	c0.03	0.36		0.02	c0.41	0.14		c0.24			c0.31	0.02
v/s Ratio Perm												
v/c Ratio	1.21	0.94		0.84	1.06	0.21		1.16			1.13	0.07
Uniform Delay, d1	73.4	44.3		73.5	46.5	10.0		59.9			54.4	34.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	200.2	10.3		85.4	42.5	0.1		98.9			80.7	0.1
Delay (s)	273.6	54.6		158.9	89.0	10.1		158.8			135.1	34.5
Level of Service	F	D		F	F	B		F			F	C
Approach Delay (s)		61.3			75.7			158.8			124.3	
Approach LOS		E			E			F			F	
<b>Intersection Summary</b>												
HCM Average Control Delay			84.1				HCM Level of Service				F	
HCM Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			150.8				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			112.8%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 15: Paseo Padre & Decoto Rd.













6/24/2010

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 		  	 			 	 	 	 		
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	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	1.00	0.95	0.88	0.97	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	4990	3539	1583	1770	3539	2787	3433	3539	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	4990	3539	1583	1770	3539	2787	3433	3539	1583	
Volume (vph)	207	986	611	794	1314	141	78	1039	845	186	1229	199	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	207	986	611	794	1314	141	78	1039	845	186	1229	199	
RTOR Reduction (vph)	0	0	4	0	0	8	0	0	7	0	0	11	
Lane Group Flow (vph)	207	986	607	794	1314	133	78	1039	838	186	1229	188	
Turn Type	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	
Protected Phases	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7	
Permitted Phases													
Actuated Green, G (s)	6.0	25.0	33.0	14.0	33.0	42.0	4.0	30.0	48.0	5.0	31.0	41.0	
Effective Green, g (s)	6.0	25.0	33.0	14.0	33.0	42.0	4.0	30.0	48.0	5.0	31.0	41.0	
Actuated g/C Ratio	0.07	0.28	0.37	0.16	0.37	0.47	0.04	0.33	0.53	0.06	0.34	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	229	983	580	776	1298	739	79	1180	1486	191	1219	721	
v/s Ratio Prot	0.06	0.28	c0.38	c0.16	c0.37	0.08	0.04	0.29	0.30	0.05	c0.35	0.12	
v/s Ratio Perm													
v/c Ratio	0.90	1.00	1.05	1.02	1.01	0.18	0.99	0.88	0.56	0.97	1.01	0.26	
Uniform Delay, d1	41.7	32.5	28.5	38.0	28.5	14.0	43.0	28.3	14.0	42.4	29.5	15.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	34.5	29.4	50.2	38.3	28.1	0.1	96.2	9.5	0.5	57.1	27.8	0.2	
Delay (s)	76.2	61.9	78.7	76.3	56.6	14.1	139.2	37.9	14.5	99.5	57.3	15.3	
Level of Service	E	E	E	E	E	B	F	D	B	F	E	B	
Approach Delay (s)		69.3			60.9			31.8			57.0		
Approach LOS		E			E			C			E		
<b>Intersection Summary</b>													
HCM Average Control Delay			54.6									HCM Level of Service	D
HCM Volume to Capacity ratio			0.93										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	4.0
Intersection Capacity Utilization			96.9%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

# HCM Signalized Intersection Capacity Analysis





















## 1: Mission Blvd. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑		↑↑	↑↑↑		↑↑		↑			
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			
Lane Util. Factor		0.91		0.97	0.91		0.97		1.00			
Frt		0.96		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4896		3433	5085		3433		1583			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4896		3433	5085		3433		1583			
Volume (vph)	0	1352	445	290	1858	0	1214	0	360	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1352	445	290	1858	0	1214	0	360	0	0	0
RTOR Reduction (vph)	0	74	0	0	0	0	0	0	4	0	0	0
Lane Group Flow (vph)	0	1723	0	290	1858	0	1214	0	356	0	0	0
Turn Type				Prot			Prot		custom			
Protected Phases		4		3	8		5		3	5		
Permitted Phases												
Actuated Green, G (s)		30.0		7.0	41.0		30.6		41.6			
Effective Green, g (s)		30.0		7.0	41.0		30.6		41.6			
Actuated g/C Ratio		0.38		0.09	0.52		0.38		0.52			
Clearance Time (s)		4.0		4.0	4.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		1845		302	2619		1320		827			
v/s Ratio Prot		c0.35		c0.08	0.37		c0.35		0.22			
v/s Ratio Perm												
v/c Ratio		0.93		0.96	0.71		0.92		0.43			
Uniform Delay, d1		23.8		36.2	14.7		23.3		11.7			
Progression Factor		1.00		1.00	1.00		1.00		1.00			
Incremental Delay, d2		9.3		41.0	0.9		10.4		0.4			
Delay (s)		33.2		77.1	15.6		33.7		12.1			
Level of Service		C		E	B		C		B			
Approach Delay (s)		33.2			23.9			28.8			0.0	
Approach LOS		C			C			C			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			28.3			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			79.6			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			89.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis  
2: 5th St. & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.95	1.00	1.00	0.95	
Frt		0.94			0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1710			1740		1770	3539	1583	1770	3532	
Flt Permitted		0.88			0.92		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1537			1629		1770	3539	1583	1770	3532	
Volume (vph)	25	2	20	4	3	4	59	1593	7	6	719	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	2	20	4	3	4	59	1593	7	6	719	10
RTOR Reduction (vph)	0	19	0	0	4	0	0	0	2	0	1	0
Lane Group Flow (vph)	0	28	0	0	7	0	59	1593	5	6	728	0
Turn Type		Perm		Perm		Prot		Perm		Prot		
Protected Phases		4		8		5		2		1		6
Permitted Phases		4		8				2				
Actuated Green, G (s)		2.9		2.9		3.2	53.0	53.0	1.2	51.0		
Effective Green, g (s)		3.5		3.5		3.8	53.6	53.6	1.8	51.6		
Actuated g/C Ratio		0.05		0.05		0.05	0.76	0.76	0.03	0.73		
Clearance Time (s)		4.6		4.6		4.6	4.6	4.6	4.6	4.6		
Vehicle Extension (s)		0.5		3.0		2.0	5.0	5.0	2.0	2.0		
Lane Grp Cap (vph)		76		80		95	2675	1197	45	2571		
v/s Ratio Prot						c0.03	c0.45		0.00	0.21		
v/s Ratio Perm		c0.02		0.00				0.00				
v/c Ratio		0.37		0.09		0.62	0.60	0.00	0.13	0.28		
Uniform Delay, d1		32.6		32.2		32.8	3.8	2.1	33.8	3.3		
Progression Factor		1.00		1.00		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.1		0.5		8.7	0.5	0.0	0.5	0.0		
Delay (s)		33.7		32.7		41.6	4.4	2.1	34.3	3.3		
Level of Service		C		C		D	A	A	C	A		
Approach Delay (s)		33.7		32.7		5.7			3.6			
Approach LOS		C		C		A			A			
<b>Intersection Summary</b>												
HCM Average Control Delay			5.7			HCM Level of Service			A			
HCM Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			70.9			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			59.9%			ICU Level of Service			B			
Analysis Period (min)			15									
c	Critical Lane Group											

# HCM Signalized Intersection Capacity Analysis

3: 7th St. & Decoto Rd.

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	↗
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	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.93			0.95		1.00	0.98		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1723			1734		1770	3470		1770	3528	
Flt Permitted		0.89			0.68		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1551			1197		1770	3470		1770	3528	
Volume (vph)	31	96	134	246	158	248	259	1380	208	59	716	16
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	96	134	246	158	248	259	1380	208	59	716	16
RTOR Reduction (vph)	0	38	0	0	22	0	0	12	0	0	1	0
Lane Group Flow (vph)	0	223	0	0	630	0	259	1576	0	59	731	0
Turn Type	Perm		Perm			Prot		Prot				
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		32.6			32.6		16.5	47.4		3.4	34.3	
Effective Green, g (s)		33.2			33.2		17.1	48.0		4.0	34.9	
Actuated g/C Ratio		0.34			0.34		0.18	0.49		0.04	0.36	
Clearance Time (s)		4.6			4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0			2.0		1.0	4.0		1.0	4.0	
Lane Grp Cap (vph)		530			409		311	1714		73	1267	
v/s Ratio Prot							c0.15	c0.45		0.03	0.21	
v/s Ratio Perm		0.14			c0.53							
v/c Ratio		0.42			1.54		0.83	0.92		0.81	0.58	
Uniform Delay, d1		24.6			32.0		38.7	22.8		46.2	25.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			255.4		16.4	8.5		44.0	0.8	
Delay (s)		24.8			287.4		55.1	31.3		90.3	25.9	
Level of Service		C			F		E	C		F	C	
Approach Delay (s)		24.8			287.4			34.6			30.7	
Approach LOS		C			F			C			C	

## Intersection Summary

HCM Average Control Delay	79.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	97.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
4: Railroad Ave & Decoto Rd.

6/24/2010



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↖		↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	484	1336	57	0	1126
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	484	1336	57	0	1126
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			497			972
pX, platoon unblocked	0.76	0.69			0.69	
vC, conflicting volume	1928	696			1393	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1331	98			1114	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	25			100	
cM capacity (veh/h)	111	643			427	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	484	891	502	563	563	
Volume Left	0	0	0	0	0	
Volume Right	484	0	57	0	0	
cSH	643	1700	1700	1700	1700	
Volume to Capacity	0.75	0.52	0.30	0.33	0.33	
Queue Length 95th (ft)	170	0	0	0	0	
Control Delay (s)	25.6	0.0	0.0	0.0	0.0	
Lane LOS	D					
Approach Delay (s)	25.6	0.0		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utilization			75.4%		ICU Level of Service	D
Analysis Period (min)			15			

# HCM Signalized Intersection Capacity Analysis

## 5: 11th St. & Decoto Rd.

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↔		↖	↕		↖	↕	
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	0.95	0.95		1.00	0.95		1.00	0.95	
Frt		1.00	0.85	1.00	0.94		1.00	0.97		1.00	0.99	
Flt Protected		0.96	1.00	0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1790	1583	1681	1621		1770	3433		1770	3515	
Flt Permitted		0.96	1.00	0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1790	1583	1681	1621		1770	3433		1770	3515	
Volume (vph)	51	12	159	521	27	136	455	1206	300	455	639	31
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	51	12	159	521	27	136	455	1206	300	455	639	31
RTOR Reduction (vph)	0	0	132	0	25	0	0	20	0	0	3	0
Lane Group Flow (vph)	0	63	27	346	313	0	455	1486	0	455	667	0
Turn Type	Split		Perm	Split			Prot			Prot		
Protected Phases	8	8		7	7		1	6		5	2	
Permitted Phases			8									
Actuated Green, G (s)		12.3	12.3	19.7	19.7		5.6	26.9		5.6	26.9	
Effective Green, g (s)		12.9	12.9	20.3	20.3		6.2	27.5		6.2	27.5	
Actuated g/C Ratio		0.16	0.16	0.24	0.24		0.07	0.33		0.07	0.33	
Clearance Time (s)		4.6	4.6	4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0	2.0	2.0	2.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		279	246	412	397		132	1139		132	1166	
v/s Ratio Prot		c0.04		c0.21	0.19		c0.26	c0.43		0.26	0.19	
v/s Ratio Perm			0.02									
v/c Ratio		0.23	0.11	0.84	0.79		3.45	1.30		3.45	0.57	
Uniform Delay, d1		30.6	30.1	29.8	29.3		38.4	27.7		38.4	22.8	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2	0.1	13.4	9.2		1120.0	143.5		1120.0	0.8	
Delay (s)		30.8	30.1	43.2	38.5		1158.4	171.2		1158.4	23.7	
Level of Service		C	C	D	D		F	F		F	C	
Approach Delay (s)		30.3			40.9			400.3			482.6	
Approach LOS		C			D			F			F	














### Intersection Summary

HCM Average Control Delay	341.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	82.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 6: BART & Decoto Rd.

6/24/2010

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3521		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3521		1770	3539
Volume (vph)	10	164	1802	64	196	1124
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	164	1802	64	196	1124
RTOR Reduction (vph)	0	152	3	0	0	0
Lane Group Flow (vph)	10	12	1863	0	196	1124
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.4	7.4	61.7		18.9	84.6
Effective Green, g (s)	7.4	7.4	61.7		18.9	84.6
Actuated g/C Ratio	0.07	0.07	0.62		0.19	0.85
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	131	117	2172		335	2994
v/s Ratio Prot	0.01		c0.53		c0.11	0.32
v/s Ratio Perm		c0.01				
v/c Ratio	0.08	0.10	0.86		0.59	0.38
Uniform Delay, d1	43.1	43.2	15.6		37.0	1.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.4	4.7		2.6	0.4
Delay (s)	43.4	43.6	20.2		39.6	2.1
Level of Service	D	D	C		D	A
Approach Delay (s)	43.6		20.2			7.7
Approach LOS	D		C			A
<b>Intersection Summary</b>						
HCM Average Control Delay			16.5		HCM Level of Service	B
HCM Volume to Capacity ratio			0.74			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			76.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

# HCM Signalized Intersection Capacity Analysis

## 7: Meyers Dr & Decoto Rd.

6/24/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖	↖	↗		↖	↗	
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	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1811		1770	1863	1583	1770	3502		1770	3470	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1811		1770	1863	1583	1770	3502		1770	3470	
Volume (vph)	156	53	12	295	84	359	71	1349	103	225	791	118
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	156	53	12	295	84	359	71	1349	103	225	791	118
RTOR Reduction (vph)	0	9	0	0	0	199	0	5	0	0	10	0
Lane Group Flow (vph)	156	56	0	295	84	160	71	1447	0	225	899	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	9.1	12.7		11.2	14.8	14.8	5.7	36.9		13.2	44.4	
Effective Green, g (s)	9.1	12.7		11.2	14.8	14.8	5.7	37.4		13.2	44.9	
Actuated g/C Ratio	0.10	0.14		0.12	0.16	0.16	0.06	0.41		0.15	0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	5.0		1.0	5.0	
Lane Grp Cap (vph)	178	254		219	305	259	111	1447		258	1722	
v/s Ratio Prot	0.09	0.03		c0.17	0.05		0.04	c0.41		c0.13	0.26	
v/s Ratio Perm						c0.10						
v/c Ratio	0.88	0.22		1.35	0.28	0.62	0.64	1.00		0.87	0.52	
Uniform Delay, d1	40.1	34.5		39.6	33.2	35.2	41.4	26.5		37.8	15.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	34.1	0.2		183.3	0.2	3.1	8.6	23.5		25.3	0.5	
Delay (s)	74.2	34.7		223.0	33.3	38.3	50.0	50.0		63.1	16.1	
Level of Service	E	C		F	C	D	D	D		E	B	
Approach Delay (s)		62.6			111.6			50.0			25.4	
Approach LOS		E			F			D			C	
































### Intersection Summary

HCM Average Control Delay	55.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 8: Alvarado Niles Rd & Decoto Rd.

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 		 	 		 	 	
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	0.97	0.95		0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3381		3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3381		3433	3539	1583	3433	3539	1583
Volume (vph)	349	1211	225	488	817	347	646	805	234	153	707	261
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	349	1211	225	488	817	347	646	805	234	153	707	261
RTOR Reduction (vph)	0	0	8	0	31	0	0	0	22	0	0	20
Lane Group Flow (vph)	349	1211	217	488	1133	0	646	805	212	153	707	241
Turn Type	Prot		pt+ov	Prot			Prot		pt+ov	Prot		pt+ov
Protected Phases	7	4	4 5	3	8		5	2	2 3	1	6	6 7
Permitted Phases												
Actuated Green, G (s)	18.8	47.4	77.4	23.1	51.7		25.4	43.0	70.7	11.2	28.8	52.2
Effective Green, g (s)	19.4	48.0	78.0	23.7	52.3		26.0	43.6	71.3	11.8	29.4	52.8
Actuated g/C Ratio	0.14	0.34	0.55	0.17	0.37		0.18	0.30	0.50	0.08	0.21	0.37
Clearance Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		5.0	5.0		2.5	2.5	
Lane Grp Cap (vph)	465	1187	863	569	1236		624	1078	789	283	727	584
v/s Ratio Prot	0.10	c0.34	0.14	c0.14	0.34		c0.19	0.23	0.13	0.04	c0.20	0.15
v/s Ratio Perm												
v/c Ratio	0.75	1.02	0.25	0.86	0.92		1.04	0.75	0.27	0.54	0.97	0.41
Uniform Delay, d1	59.5	47.5	17.2	58.1	43.3		58.5	44.8	20.8	63.0	56.4	33.6
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	6.0	31.3	0.1	11.8	10.5		45.4	3.4	0.4	1.7	26.5	0.3
Delay (s)	65.5	78.9	17.2	69.8	53.8		104.0	48.2	21.2	64.7	83.0	33.9
Level of Service	E	E	B	E	D		F	D	C	E	F	C
Approach Delay (s)		68.5			58.5			65.8			69.1	
Approach LOS		E			E			E			E	
<b>Intersection Summary</b>												
HCM Average Control Delay			65.2			HCM Level of Service				E		
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			143.1			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			98.7%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis



























## 9: Mission Blvd. & East-West Connector

6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
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	0.95	0.88	0.97	0.95		0.95	0.95	0.88	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3539	2787	3433	3526		1681	1742	2787	1770	1863	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	3539	2787	3433	3526		1681	1742	2787	1770	1863	1583	
Volume (vph)	108	617	1067	775	1441	38	724	389	880	54	117	71	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	108	617	1067	775	1441	38	724	389	880	54	117	71	
RTOR Reduction (vph)	0	0	73	0	1	0	0	0	156	0	0	63	
Lane Group Flow (vph)	108	617	994	775	1478	0	542	571	724	54	117	8	
Turn Type	Prot		pt+ov	Prot			Split		pt+ov	Split		Perm	
Protected Phases	1	6	6 4	5	2		4	4	4 5	8	8		
Permitted Phases												8	
Actuated Green, G (s)	9.0	33.5	84.5	37.5	62.0		47.0	47.0	84.5	16.0	16.0	16.0	
Effective Green, g (s)	9.0	33.5	84.5	37.5	62.0		47.0	47.0	84.5	16.0	16.0	16.0	
Actuated g/C Ratio	0.06	0.22	0.56	0.25	0.41		0.31	0.31	0.56	0.11	0.11	0.11	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	106	790	1570	858	1457		527	546	1570	189	199	169	
v/s Ratio Prot	0.06	0.17	0.36	c0.23	c0.42		0.32	c0.33	0.26	0.03	c0.06		
v/s Ratio Perm												0.00	
v/c Ratio	1.02	0.78	0.63	0.90	1.01		1.03	1.05	0.46	0.29	0.59	0.04	
Uniform Delay, d1	70.5	54.8	22.2	54.5	44.0		51.5	51.5	19.3	61.7	63.9	60.1	
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	92.6	7.5	0.8	12.7	27.2		46.7	51.0	0.2	3.8	12.1	0.5	
Delay (s)	163.1	62.3	23.1	67.2	71.2		98.2	102.5	19.5	65.5	76.0	60.6	
Level of Service	F	E	C	E	E		F	F	B	E	E	E	
Approach Delay (s)		45.0			69.8			64.7			69.1		
Approach LOS		D			E			E			E		
<b>Intersection Summary</b>													
HCM Average Control Delay			61.1			HCM Level of Service							E
HCM Volume to Capacity ratio			0.98										
Actuated Cycle Length (s)			150.0			Sum of lost time (s)							16.0
Intersection Capacity Utilization			96.8%			ICU Level of Service							F
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
 10: 7th St. & East-West Connector

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 			 	
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	0.97	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1613		1770	1723		1770	3531		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1613		1770	1723		1770	3531		1770	3539	1583
Volume (vph)	146	30	248	30	30	30	57	1833	30	30	1511	258
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	146	30	248	30	30	30	57	1833	30	30	1511	258
RTOR Reduction (vph)	0	210	0	0	27	0	0	1	0	0	0	76
Lane Group Flow (vph)	146	68	0	30	33	0	57	1862	0	30	1511	182
Turn Type	Prot		Prot			Prot			Prot		Perm	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												8
Actuated Green, G (s)	7.3	14.0		2.8	9.5		5.0	55.5		2.8	53.3	53.3
Effective Green, g (s)	7.3	14.0		2.8	9.5		5.0	55.5		2.8	53.3	53.3
Actuated g/C Ratio	0.08	0.15		0.03	0.10		0.05	0.61		0.03	0.59	0.59
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	275	248		54	180		97	2151		54	2071	926
v/s Ratio Prot	c0.04	c0.04		0.02	0.02		c0.03	c0.53		0.02	0.43	
v/s Ratio Perm												0.11
v/c Ratio	0.53	0.27		0.56	0.18		0.59	0.87		0.56	0.73	0.20
Uniform Delay, d1	40.3	34.1		43.5	37.3		42.0	14.7		43.5	13.7	8.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.0	0.6		11.8	0.5		8.8	3.9		11.8	1.3	0.1
Delay (s)	42.2	34.7		55.3	37.8		50.8	18.7		55.3	15.0	9.0
Level of Service	D	C		E	D		D	B		E	B	A
Approach Delay (s)		37.3			43.6			19.6			14.8	
Approach LOS		D			D			B			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			19.8			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			91.1			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			81.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
 11: 11th St. & East-West Connector

6/24/2010




































Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
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	0.88	0.97	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	2787	3433	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	2787	3433	3539	3539	1583
Volume (vph)	270	596	594	1620	1606	154
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	596	594	1620	1606	154
RTOR Reduction (vph)	0	7	0	0	0	3
Lane Group Flow (vph)	270	589	594	1620	1606	151
Turn Type		pm+ov	Prot			pm+ov
Protected Phases	6	7	7	4	8	6
Permitted Phases		6				8
Actuated Green, G (s)	17.0	30.0	13.0	50.0	33.0	50.0
Effective Green, g (s)	17.0	30.0	13.0	50.0	33.0	50.0
Actuated g/C Ratio	0.23	0.40	0.17	0.67	0.44	0.67
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	401	1263	595	2359	1557	1140
v/s Ratio Prot	c0.15	0.08	c0.17	0.46	c0.45	0.03
v/s Ratio Perm		0.13				0.07
v/c Ratio	0.67	0.47	1.00	0.69	1.03	0.13
Uniform Delay, d1	26.5	16.6	31.0	7.7	21.0	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.7	0.3	36.2	0.8	31.3	0.1
Delay (s)	35.2	16.9	67.2	8.5	52.3	4.6
Level of Service	D	B	E	A	D	A
Approach Delay (s)	22.6			24.3	48.1	
Approach LOS	C			C	D	

Intersection Summary

HCM Average Control Delay	32.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

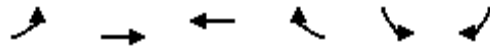
HCM Signalized Intersection Capacity Analysis  
 12: Alvarado Niles Rd & East-West Connector

6/24/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 	  	 		 	 	 	 	 		
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	4.0
Lane Util. Factor	0.97	0.95	0.88	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	1863	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	3433	1863	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	580	342	621	277	248	486	515	1146	532	205	1647	350
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	580	342	621	277	248	486	515	1146	532	205	1647	350
RTOR Reduction (vph)	0	0	21	0	0	10	0	0	88	0	0	24
Lane Group Flow (vph)	580	342	600	277	248	476	515	1146	444	205	1647	326
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases			6			2			4			8
Actuated Green, G (s)	19.0	22.0	39.0	14.0	17.0	37.6	17.0	47.4	61.4	20.6	51.0	70.0
Effective Green, g (s)	19.0	22.0	39.0	14.0	17.0	37.6	17.0	47.4	61.4	20.6	51.0	70.0
Actuated g/C Ratio	0.16	0.18	0.32	0.12	0.14	0.31	0.14	0.39	0.51	0.17	0.42	0.58
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	544	649	999	401	264	549	486	1398	863	589	1504	976
v/s Ratio Prot	c0.17	0.10	0.09	0.08	0.13	c0.15	0.15	0.32	0.06	0.06	c0.47	0.05
v/s Ratio Perm			0.13			0.15			0.22			0.15
v/c Ratio	1.07	0.53	0.60	0.69	0.94	0.87	1.06	0.82	0.51	0.35	1.10	0.33
Uniform Delay, d1	50.5	44.3	34.0	50.9	51.0	38.9	51.5	32.5	19.4	43.8	34.5	12.9
Progression Factor	1.00	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	57.4	0.8	1.0	5.1	38.8	13.6	57.5	3.9	0.5	0.4	53.8	0.2
Delay (s)	107.9	45.1	35.0	56.0	89.7	52.4	109.0	36.4	19.9	44.1	88.3	13.1
Level of Service	F	D	C	E	F	D	F	D	B	D	F	B
Approach Delay (s)		64.6			62.6			49.4			72.2	
Approach LOS		E			E			D			E	
<b>Intersection Summary</b>												
HCM Average Control Delay			61.9			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			103.2%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
 13: Alvarado Niles Rd & Linda Dr. North

6/24/2010



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↘	↖
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1150	1082	11	9	23
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1150	1082	11	9	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		1053				
pX, platoon unblocked					0.85	
vC, conflicting volume	1093				2238	1088
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1093				2454	1088
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				69	91
cM capacity (veh/h)	638				29	262

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	0	1150	1093	9	23
Volume Left	0	0	0	9	0
Volume Right	0	0	11	0	23
cSH	1700	1700	1700	29	262
Volume to Capacity	0.00	0.68	0.64	0.31	0.09
Queue Length 95th (ft)	0	0	0	24	7
Control Delay (s)	0.0	0.0	0.0	178.6	20.0
Lane LOS				F	C
Approach Delay (s)	0.0		0.0	64.6	
Approach LOS				F	

Intersection Summary					
Average Delay			0.9		
Intersection Capacity Utilization		70.5%		ICU Level of Service	C
Analysis Period (min)		15			

HCM Signalized Intersection Capacity Analysis  
 14: Paseo Padre & Isherwood Way

6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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	0.91		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96			0.96	1.00
Satd. Flow (prot)	1770	5047		1770	3539	1583		1773			1794	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96			0.96	1.00
Satd. Flow (perm)	1770	5047		1770	3539	1583		1773			1794	1583
Volume (vph)	124	1406	75	334	864	455	613	35	24	298	93	63
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	1406	75	334	864	455	613	35	24	298	93	63
RTOR Reduction (vph)	0	4	0	0	0	228	0	1	0	0	0	37
Lane Group Flow (vph)	124	1477	0	334	864	227	0	671	0	0	391	26
Turn Type	Prot			Prot		pt+ov	Split			Split		pt+ov
Protected Phases	1	6		5	2	2 8	4	4		8	8	8 1
Permitted Phases												
Actuated Green, G (s)	13.3	39.0		22.0	47.7	74.7		46.0			27.0	44.3
Effective Green, g (s)	13.3	39.0		22.0	47.7	74.7		46.0			27.0	44.3
Actuated g/C Ratio	0.09	0.26		0.15	0.32	0.50		0.31			0.18	0.30
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	157	1312		260	1125	788		544			323	468
v/s Ratio Prot	0.07	c0.29		c0.19	0.24	0.14		c0.38			c0.22	0.02
v/s Ratio Perm												
v/c Ratio	0.79	1.13		1.28	0.77	0.29		1.23			1.21	0.06
Uniform Delay, d1	67.0	55.5		64.0	46.2	22.1		52.0			61.5	37.9
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	22.7	67.1		154.1	3.2	0.2		120.6			120.0	0.1
Delay (s)	89.6	122.6		218.1	49.4	22.3		172.6			181.5	37.9
Level of Service	F	F		F	D	C		F			F	D
Approach Delay (s)		120.0			76.0			172.6			161.6	
Approach LOS		F			E			F			F	
<b>Intersection Summary</b>												
HCM Average Control Delay			115.8				HCM Level of Service				F	
HCM Volume to Capacity ratio			1.21									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			101.3%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 15: Paseo Padre & Decoto Rd.

6/24/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
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	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	1.00	0.95	0.88	0.97	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	3539	1583	4990	3539	1583	1770	3539	2787	3433	3539	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	3539	1583	4990	3539	1583	1770	3539	2787	3433	3539	1583	
Volume (vph)	467	637	114	687	822	126	298	1381	1077	149	835	436	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	467	637	114	687	822	126	298	1381	1077	149	835	436	
RTOR Reduction (vph)	0	0	6	0	0	7	0	0	11	0	0	28	
Lane Group Flow (vph)	467	637	108	687	822	119	298	1381	1066	149	835	408	
Turn Type	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	Prot		pt+ov	
Protected Phases	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7	
Permitted Phases													
Actuated Green, G (s)	13.0	19.0	39.0	15.0	21.0	29.0	16.0	36.0	55.0	4.0	24.0	41.0	
Effective Green, g (s)	13.0	19.0	39.0	15.0	21.0	29.0	16.0	36.0	55.0	4.0	24.0	41.0	
Actuated g/C Ratio	0.14	0.21	0.43	0.17	0.23	0.32	0.18	0.40	0.61	0.04	0.27	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	496	747	686	832	826	510	315	1416	1703	153	944	721	
v/s Ratio Prot	c0.14	0.18	0.07	0.14	c0.23	0.08	c0.17	c0.39	0.38	0.04	0.24	0.26	
v/s Ratio Perm													
v/c Ratio	0.94	0.85	0.16	0.83	1.00	0.23	0.95	0.98	0.63	0.97	0.88	0.57	
Uniform Delay, d1	38.1	34.2	15.5	36.2	34.4	22.4	36.6	26.6	11.0	42.9	31.7	18.0	
Progression Factor	1.00	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	26.4	9.3	0.1	6.7	29.9	0.2	36.3	18.7	0.7	64.4	11.9	1.0	
Delay (s)	64.5	43.5	15.6	43.0	64.4	22.6	72.9	45.3	11.7	107.4	43.6	19.0	
Level of Service	E	D	B	D	E	C	E	D	B	F	D	B	
Approach Delay (s)		48.9			52.2			35.2			42.7		
Approach LOS		D			D			D			D		
<b>Intersection Summary</b>													
HCM Average Control Delay			43.0									HCM Level of Service	D
HCM Volume to Capacity ratio			0.90										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	8.0
Intersection Capacity Utilization			91.8%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													