MEMORANDUM

Date: February 2, 2016
To: Father Samer Youssef, Church of the Redeemer
From: Sarah Jampole and Matt Haynes, Fehr & Peers
Subject: Church of the Redeemer School – Focused Transportation Impact Analysis

Fehr & Peers has prepared a focused transportation impact analysis (TIA) and site plan review for a proposed expansion of the Antiochian Orthodox Church of the Redeemer, located at 380 Magdalena Avenue in unincorporated Santa Clara County, California. The purpose of a transportation impact analysis is to evaluate how a proposed project will affect transportation conditions on surrounding streets and intersections. This TIA evaluates how the proposed project will affect automobile, bicycle, pedestrian, and transit conditions. It also considers whether the project will have a significant adverse effect on the transportation system according to the criteria and thresholds consistent with the California Environmental Quality Act (CEQA).

The proposed project includes an expansion of the existing church facilities to accommodate planned church activities and a new school that will be used for kindergarten – eighth grade students.

PROJECT OVERVIEW

The Los Altos Antiochian Orthodox Church of the Redeemer is located on the south side of Magdalena Avenue, west of Foothill Expressway and adjacent to Interstate 280 (I-280). Existing church facilities consist of the church building and two buildings with uses such as a fellowship hall and administrative offices, as well as surface parking with 92 spaces. The proposed project proposes a new two-story, 17,634 square foot building at the Los Altos Antiochian Orthodox Church of the Redeemer in place of the existing two buildings being used as a fellowship hall and administrative offices. This new building will be used as a K-8 school with nine classrooms, administrative offices, a fellowship hall, and a kitchen. The school is assumed to have up to 80 students when operational. The existing surface parking will be maintained after construction of
the project. This building will be constructed adjacent to the existing church facilities. The site plan is shown in Figure 1.

**PROJECT TRIP ESTIMATES**

The automobile traffic generated by the proposed project, along with how it could potentially affect the surrounding transportation system, was estimated using a three-step process:

1. **Trip generation** – estimate the amount of new vehicle traffic created by the project
2. **Trip distribution** – define the origins and destinations of vehicles traveling to and from the project site
3. **Trip assignment** – assign project trips to specific street segment and intersection turning movements

The Santa Clara Valley Transportation Authority (VTA) is responsible for evaluating transportation impacts of land use decisions, such as development projects, in Santa Clara County. In October 2014, VTA adopted updated guidelines for transportation impact analyses (TIAs). The TIA Guidelines are commonly used and are adopted by all jurisdictions in Santa Clara County. These guidelines state that a full TIA is required for projects that will generate more than 100 vehicle trips during the peak hour of the surrounding roadways. Projects that do not meet this threshold, such as the proposed project, are not required to follow these guidelines.

Each of these steps is described in more detail below.

**TRIP GENERATION**

All new land uses would generate “trips” to and from the site. Some of the trips are made by car, and the methods of estimating these new trips are well documented using published research and manuals. For this project, trip generation focuses on AM and PM peak hour conditions since those reflect the period where traffic delays are highest. Because this project is a school, however, it is important to analyze midday conditions near the time of school dismissal to evaluate potential impacts of the project. While the analysis in this memorandum is centered on vehicle trips, new bicycle and walking trips would also likely be generated by the project.

Automobile trip generation for the proposed development was developed using appropriate rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 9th Edition* (2012). Trips generated by the proposed school for 80 students were estimated using trip generation rates for the “Private School (K-8)” land use (Code 534). These rates are consistent with
Figure 1

Site Plan

Site Plan Source: LPMD Architects
trip generation rates measured for other K-8 private schools in Santa Clara County, examples of which are provided in Attachment A of this memorandum. Equations to develop trip generation were available for the morning and afternoon peak hours to coincide with the peak travel periods associated with school traffic and are given below in Table 1. To be conservative, it was assumed that an equal number of trips would be generated during the evening peak hour as in the afternoon peak hour in order to identify any potential impacts during the evening peak hour when background vehicle volumes are generally at their highest.

**TABLE 1: TRIP GENERATION RATES**

<table>
<thead>
<tr>
<th>Trip Generation Equation</th>
<th>AM Peak Hour</th>
<th>Midday Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9*X+3.01</td>
<td>0.61*X-4.7</td>
<td>0.61*X-4.7</td>
<td></td>
</tr>
</tbody>
</table>


Notes:
1. X = number of students in K-8 school.

The trip generation table, showing the number of vehicle trips that the project would create, is presented below in Table 2.

**TABLE 2: PROJECT TRIP GENERATION**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Students</th>
<th>AM Peak Hour</th>
<th>Midday Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In</td>
<td>Out</td>
<td>Total</td>
<td>In</td>
</tr>
<tr>
<td>Private School (K-8)</td>
<td>80</td>
<td>41</td>
<td>34</td>
<td>75</td>
</tr>
</tbody>
</table>


The number of peak hour vehicle trips generated by the project would be less than the anticipated number of students and staff on site. This could occur for a variety of reasons, such as staff and student carpooling, absences of students from school, students walking or bicycling to school, and staggered arrival and departure times in the morning, afternoon and evening due to before-school activities, after-school care and other related activities.

**TRIP DISTRIBUTION**

Trip distribution shows the origins and/or destinations of vehicles that are traveling to the project site. Generally, trip distribution is presented as a percentage of total trips going to and from the site that use a particular route, and each route providing access to the project site is given a percentage of the trips. The directions of approach and departure for the project trips were
estimated based on existing travel patterns and the roadway network in the area surrounding the project site and are detailed in Figure 2. While trip distribution may vary, the project applicant provided information in June 2015 regarding the expected student residence locations of the type of school expected to occupy the site. The applicant anticipates that most students will live near the project site, while a portion would travel from further away. As such, 70 percent of the trips were assumed to use Foothill Expressway, Springer Street, or Magdalena Avenue from local neighborhoods, while 30 percent would come from I-280.

TRIP ASSIGNMENT

Trip assignment takes the trip generation and the trip distribution for a project and designates project volumes to turning movements at the study intersection (e.g., to the left turn at an intersection). Based on the trip distribution discussed in the section above and displayed in Figure 2, the new vehicle trips were assigned to the surrounding roadway network. The proposed distribution of project trips on the surrounding roadway network and study intersections is shown in Figure 3.

INTERSECTION EVALUATION

This section discusses the operation of the three study intersections that could be affected by the proposed project. The intersections considered in the analysis are:

1. Magdalena Avenue / I-280 Southbound Ramps – Eastbrook Avenue (all-way stop-controlled)
2. Magdalena Avenue / I-280 Northbound Ramps (side-street stop-controlled)
3. Magdalena Avenue / Site Driveway (side-street stop-controlled)
4. Magdalena Avenue / Foothill Expressway (signalized)

Intersections were selected for analysis after conducting the trip generation and assignment steps described previously. Minor intersections near the project site are generally not selected for analysis because the addition of through traffic generally does not affect intersection operations as greatly as intersections where turning vehicles will be added.

LEVEL OF SERVICE CALCULATIONS

Operations of the study intersections were evaluated using the method described in Chapter 16 of the 2000 Highway Capacity Manual (HCM) (Special Report 209, Transportation Research...
Figure 2

Project Trip Distribution

Legend:
- Project Site
- Study Intersection
- Project Trip Distribution
- City Boundary
Figure 3

Project Trip Assignment

Legend:
AM (Midday) PM
Board). The HCM provides techniques, such as equations, for analyzing operations of roadways and intersections, and is considered state-of-the-practice as it is widely used and adopted by agencies in the Bay Area. These techniques are applied in software packages used for intersection analysis. This method evaluates signalized intersection operations on the average vehicular delay, and unsignalized intersection operations on the approach with the most delay. The average delay for intersections is calculated using TRAFFIX 8.0 analysis software and is correlated to a level of service (LOS) designation. TRAFFIX software uses the methods given in the 2000 edition of the HCM, which is the methodology approved by VTA for use in Santa Clara County. LOS criteria are detailed below in Table 3.
### TABLE 3: INTERSECTION LOS CRITERIA

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Description</th>
<th>Signalized Intersection Delay (seconds)</th>
<th>Unsignalized Intersection Delay (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.</td>
<td>&lt; 10.0</td>
<td>&lt; 10.0</td>
</tr>
<tr>
<td>B</td>
<td>Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.</td>
<td>&gt; 10.0 to 20.0</td>
<td>&gt; 10.0 to 15.0</td>
</tr>
<tr>
<td>C</td>
<td>Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.</td>
<td>&gt; 20.0 to 35.0</td>
<td>&gt; 15.0 to 25.0</td>
</tr>
<tr>
<td>D</td>
<td>The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.</td>
<td>&gt; 35.0 to 55.0</td>
<td>&gt; 25.0 to 35.0</td>
</tr>
<tr>
<td>E</td>
<td>This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.</td>
<td>&gt; 55.0 to 80.0</td>
<td>&gt; 35.0 to 50.0</td>
</tr>
<tr>
<td>F</td>
<td>This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.</td>
<td>&gt; 80.0</td>
<td>&gt; 50.0</td>
</tr>
</tbody>
</table>


### SIGNIFICANCE CRITERIA

The impacts of the project were evaluated by comparing the results of the level of service calculations for the Background plus Project Conditions scenario to the Background Conditions scenario.

The project impacts for expressways were evaluated based on the LOS significance criteria established by the Santa Clara County Congestion Management Program. These criteria state the
The project would result in an impact at the signalized intersection of Magdalena Avenue and Foothill Expressway if the addition of project traffic causes one of the following:

- Intersection operations to deteriorate from LOS E to LOS F; or
- Exacerbate unacceptable operations (LOS F) by increasing the average critical delay by four seconds or more and increasing the critical volume-to-capacity (V/C) ratio by 0.01 or more.

For non-expressway intersections, which are all unsignalized, the project would result in an impact if the addition of project traffic causes the worst approach at a side-street stop-controlled unsignalized intersection, or the entire intersection for a four-way stop controlled intersection, to operate at LOS F.

DATA COLLECTION

Morning, afternoon, and evening peak period intersection turning movement counts were conducted on a typical weekday in September 2015 at the three study intersections, except at the Magdalena Avenue / Foothill Expressway intersection, where morning and evening intersection turning movement counts were provided by the County of Santa Clara. Data provided by the County of Santa Clara was collected in 2014 as part of the Expressway Plan 2040 project which is studying the operations of each expressway in Santa Clara County in order to identify projects to upgrade existing deficiencies for vehicles, pedestrians, and bicycles. Based on these turning movement counts, the peak hours were found to be approximately 7:45 AM to 8:45 AM in the morning, 3:00 PM to 4:00 PM in the afternoon, and 4:00 PM to 5:00 PM in the evening.

Physical characteristics of the study area, the surrounding roadway network, and adjacent land uses were also reviewed to confirm existing roadway cross-sections, intersection lane configurations, and traffic control devices. These observations are detailed below.

EXISTING CONDITIONS

Existing Conditions represent current roadway volumes and conditions. Field observations were performed in September 2015 on the same days that turning movement counts were collected.

Intersection Operations

Intersection operations at the three study intersections along Magdalena Avenue were observed during the peak hours. The intersections at the I-280 interchange operated with little delay on any
of the approaches. No excessive vehicle queues were observed, and vehicles did not suffer from long waits to turn on and off the freeways. The intersection of Magdalena Avenue and Foothill Expressway, however, was congested with queues of more than 20 vehicles observed on Foothill Expressway during the peak hours. In addition, vehicles waiting to turn right onto Foothill Expressway from Magdalena Avenue or Springer Street often were not able turn right on red due to long queues from through or left-turning vehicles. This resulted in more long queues for right-turning vehicles during the AM and PM peak hours.

**Bicycle and Pedestrian Observations**

Magdalena Avenue has striped bike lanes from the I-280 interchange east to Foothill Expressway. No bicycle facilities exist on the west side of I-280. On the east side of Foothill Expressway, Magdalena Avenue changes to Springer Road, which also has bike lanes north to El Camino Real. Foothill Expressway has shoulders that are not designated as bike lanes, but are frequently used by cyclists. Little bicycle activity was observed during the peak hours, with bicycle activity appearing to be through traffic along Magdalena Avenue and Foothill Expressway, rather than originating or ending in the study area.

Magdalena Avenue has sidewalks along the south side from the I-280 interchange east to Foothill Expressway. Along the north side, sidewalks are discontinuous, with gaps between I-280 and Hillview Road and in the vicinity of Gronwall Lane and Magdalena Court. Foothill Expressway lacks sidewalks near Magdalena Avenue. Signalized crosswalks are located at Summerhill Avenue and Foothill Expressway, while an unsignalized crosswalk is located at the I-280 Southbound Ramps – Eastbrook Avenue intersection. Little pedestrian activity was observed during the peak hours, with pedestrian activity centered near the signalized intersections to cross between the residential areas divided by Magdalena Avenue and Foothill Expressway.

**Transit Operations**

No fixed-route transit systems currently operate in the study area. No public transit vehicles were observed along Magdalena Avenue or Foothill Expressway near the project site.

**BACKGROUND CONDITIONS**

Background Conditions represent Existing Conditions plus traffic generated by approved (but not yet constructed or occupied) projects near the project site. Evaluating background conditions is important to assess conditions with and without the project in a scenario where approved projects in the area of the project site are constructed. These projects would add vehicles to the
roadways being studied; therefore, background conditions represent the combined effect of future development and roadway projects on the study area. Project lists were solicited from the County of Santa Clara, the Town of Los Altos Hills, and the City of Los Altos. No approved or unoccupied projects that would substantially affect traffic conditions were located in the immediate vicinity of the proposed project site. In addition, no roadway improvements are planned and funded in the study area. Based on growth rates for jobs and population, a 1.6 percent growth rate per year over three years was applied to the northbound and southbound through volumes on Foothill Expressway, as this roadway carries a substantial amount of regional traffic. Other than on Foothill Expressway, background conditions are assumed to be equal to existing conditions as of September 2015.

Existing intersection lane configuration, signal timings, and peak hour turning movement volumes were used to calculate the LOS for the intersection during each peak hour. The peak hour traffic volumes and lane configurations are shown in Figure 4.

BACKGROUND PLUS PROJECT CONDITIONS

Background plus Project Conditions represent Background Conditions plus project automobile trips calculated using the trip generation and distribution discussed earlier in this memorandum. No geometric changes at the study intersections were assumed with the addition of the project. The Background plus Project turning movement volumes were used to calculate the delay and LOS for Background plus Project conditions. The peak hour traffic volumes and lane configurations for Background plus Project Conditions are shown in Figure 5. LOS calculations are given below in Table 4.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Control</th>
<th>Peak Hour</th>
<th>Existing/ Background</th>
<th>Background plus Project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Delay</td>
<td>LOS</td>
</tr>
<tr>
<td>1. Magdalena Avenue / I-280 Southbound Ramps – Eastbrook Avenue</td>
<td>AWSC</td>
<td>AM</td>
<td>14.3</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Afternoon</td>
<td>10.8</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>12.4</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14.6</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10.9</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12.5</td>
<td>B</td>
</tr>
<tr>
<td>2. Magdalena Avenue / I-280 Northbound Ramps</td>
<td>SSSC</td>
<td>AM</td>
<td>15.4</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Afternoon</td>
<td>11.4</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>11.1</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15.6</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>11.4</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>11.1</td>
<td>B</td>
</tr>
<tr>
<td>3. Magdalena Avenue / Site Driveway</td>
<td>SSSC</td>
<td>AM</td>
<td>N/A</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Afternoon</td>
<td>16.6</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>12.6</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12.0</td>
<td>B</td>
</tr>
</tbody>
</table>

TABLE 4: LEVEL OF SERVICE CALCULATIONS
### Peak Hour Traffic Volumes and Lane Configurations - Background Conditions

<table>
<thead>
<tr>
<th>Location</th>
<th>AM (Midday) (PM)</th>
<th>PM (AM) (PM)</th>
<th>PM (AM) (AM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I-280 Southbound/Magdalena Avenue</td>
<td>33 [89] (29)</td>
<td>212 [335] (482)</td>
<td>75 [103] (116)</td>
</tr>
<tr>
<td>2. I-280 Northbound/Magdalena Avenue</td>
<td>50 [22] (21)</td>
<td>94 [80] (53)</td>
<td>503 [329] (207)</td>
</tr>
<tr>
<td>3. Church Driveway/Magdalena Avenue</td>
<td>146 [140] (158)</td>
<td>416 [342] (396)</td>
<td>285 [346] (595)</td>
</tr>
<tr>
<td>4. Foothill Expressway/Magdalena Avenue</td>
<td>142 [123] (91)</td>
<td>701 [688] (991)</td>
<td>0 [0] (0)</td>
</tr>
</tbody>
</table>

**Legend:**
- AM (Midday) (PM)
- PM (AM) (PM)
- PM (AM) (AM)

*Figure 4*
Figure 5
Peak Hour Traffic Volumes and Lane Configurations - Background plus Project Conditions
Notes:
1. SSSC = side-street stop-controlled. AWSC = all-way stop-controlled.
2. AM = morning peak hour, afternoon = midday peak hour, PM = evening peak hour.
3. Whole intersection weighted average control delay expressed in seconds per vehicle calculated using methods described in the 2000 Highway Capacity Manual, with adjusted saturation flow rates to reflect Santa Clara County Conditions for signalized intersections. For side-street stop-controlled intersections, values reported are for the worst approach.
4. LOS = level of service. LOS calculations conducted using the TRAFFIX analysis software package, which applies the methods described in the 2000 Highway Capacity Manual.
5. Existing church driveway has low activity during the weekday peak periods.

As detailed above in Table 4, all intersections operate acceptably under Background and Background plus Project conditions. These level of service calculations match the observed levels of service, described in the Existing Conditions section of this memorandum. As such, the proposed project of a K-8 school at the Antiochian Church of the Redeemer will not negatively impact intersection operations in the surrounding area.

Impacts to Bicycles and Pedestrians

The project would not construct any physical changes to the public right-of-way that would negatively impact bicycles or pedestrians. Existing bicycle lanes and sidewalks to access the project site would be maintained with construction of the project.

SITE PLAN AND PARKING REVIEW

Fehr & Peers also reviewed the current site plan (received by Fehr & Peers in May 2015) for the project to determine if there are any site access/circulation or parking deficiencies associated with the project.

SITE ACCESS AND CIRCULATION

The proposed site plan is in Figure 1. Vehicles accessing the Church of the Redeemer site will do so using the northernmost driveway onto Magdalena Avenue. Based on the proposed site plan, we recommend several changes be considered to ensure for efficient access and circulation of automobiles, as well as bicycle and pedestrians, on the site. Potential changes to consider include:
The site plan should incorporate a dedicated student drop-off and pick-up area where vehicles can pull up directly to a curb. This drop-off and pick-up area should be located near the school entrance for students to avoid having students walking through the parking lot. In addition, the site plan could convert five of the parking spaces near the school entrance to short term (10 minute) parking spaces to accommodate parents who need to exit their vehicle during drop-off or pick-up times. The applicant indicated these changes will be made in a future revision of the site plan.

The site plan should provide bicycle parking spaces for students or staff. The County of Santa Clara does not have bicycle parking requirements in their zoning ordinance. VTA Guidelines recommend one bicycle parking space per 12 students, and one bicycle parking space per 30 employees. This would amount to approximately eight bicycle parking spaces.

The site plan should stripe crosswalks across the existing vehicle entry driveways to the project site that will remain with the project, as there is existing sidewalk along the project frontage. Work within the County right-of-way may require an encroachment permit.

PARKING REVIEW

We also performed a review of the projects proposed parking supply and expected demand. The project will provide 88 parking spaces and four accessible parking spaces, including one space specifically reserved for accessible vans, for a total of 92 spaces. The ITE Parking Generation Manual, 4th Edition (2010) estimates that peak period parking demand for schools is approximately 0.17 vehicles per student. This would result in a peak period parking demand of 14 vehicles for a school with 80 students. 74 spaces would remain for use during school hours by people using the other church facilities or visitors to the school. These excess spaces would also be available for pick-up and drop-off traffic, which the ITE rates do not account for. In addition, the parking demand would likely be slightly higher than 0.17 vehicles per student, as ITE rates assume some level of bus service to the school, while no bus service is proposed for this project.

Per their zoning ordinance, the County of Santa Clara requires one parking space per staff member, and one parking space per four seats. Assuming 80 students with 22 staff members, the site would require 42 parking spaces. The project would provide 92 parking spaces; therefore, the project has sufficient parking per the County Zoning Ordinance, with 50 spaces remaining for any additional parking needs.
SPECIAL EVENTS AND SUNDAY TRIP GENERATION

A qualitative review of special events and the change in Sunday vehicle traffic around the Church of the Redeemer is given in the following section.

SPECIAL EVENTS

The project applicant indicated that special events that use church facilities, such as a wedding or funeral, would not take place during school hours or during periods of peak travel on the adjacent roadways. This would not change with the construction of the proposed school building. As such, there would typically continue to be sufficient parking for these events, and these events would not negatively affect peak hour travel in a way that differs from current conditions.

SUNDAY TRIP GENERATION

The proposed project provides facilities to existing church members and activities. It is not expected that these facilities would result in an increase in traffic on Sundays, therefore, vehicle traffic patterns on Sundays are anticipated to be the same with the proposed project.
ATTACHMENT A: LOCAL TRIP GENERATION SURVEYS
<table>
<thead>
<tr>
<th>Location</th>
<th>Trip Generation Rate (Trips per Student)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Morning</td>
</tr>
<tr>
<td>South Santa Clara County</td>
<td>1.19</td>
</tr>
<tr>
<td>South Santa Clara County</td>
<td>1.23</td>
</tr>
<tr>
<td>North Santa Clara County</td>
<td>0.85</td>
</tr>
<tr>
<td>North Santa Clara County</td>
<td>0.91</td>
</tr>
<tr>
<td>South Santa Clara County</td>
<td>0.87</td>
</tr>
<tr>
<td>South Santa Clara County</td>
<td>0.83</td>
</tr>
<tr>
<td>ITE Land Use Code 534 (Private School K-8)</td>
<td>0.90</td>
</tr>
</tbody>
</table>
ATTACHMENT B: INTERSECTION AND ROADWAY COUNTS
URS Model 2040 Expressways Study
Foothill Expressway
Existing AM

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5220 FOOTHILL/MAGDALENA

Cycle (sec): 150  Critical Vol./Cap.(X): 0.715
Loss Time (sec): 12  Average Delay (sec/veh): 57.2
Optimal Cycle: 171  Level Of Service: E+

Street Name: FOOTHILL EXPWY  MAGDALENA AVE
Approach: North Bound  South Bound  East Bound  West Bound
Movement: L  T  R  L  T  R  L  T  R  L  T  R
---|---|---|---|---|
Control: Protected  Protected  Split Phase  Split Phase
Min. Green: 32 68 68 19 55 55 38 38 38 34 34 34
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 1 0 2 0 1 1 0 2 0 1 1 1 1 0 1
---|---|---|---|---|
Volume Module: >> Count Date: 26 Sep 2013 << 8 : 00 - 9 : 00
Base Vol: 146 926 124 120 259 101 142 476 152 227 532 153
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 146 926 124 120 259 101 142 476 152 227 532 153
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 146 926 124 120 259 101 142 476 152 227 532 153
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 146 926 124 120 259 101 142 476 152 227 532 153
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 146 926 124 120 259 101 142 476 152 227 532 153
---|---|---|---|---|
Saturation Flow Module:
Sat/Lane: 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Adjustment: 0.92 1.00 0.92 1.00 0.92 1.00 0.92 0.92 0.92 0.75 0.92 0.92
Lanes: 1.00 2.00 1.00 2.00 1.00 2.00 1.00 2.00 1.00 2.00 1.00 2.00
Final Sat.: 1750 3800 1750 1750 3800 1750 856 2870 1750 1750 2850 1750
---|---|---|---|---|
Capacity Analysis Module:
Vol/Sat: 0.08 0.24 0.07 0.07 0.07 0.06 0.17 0.17 0.09 0.13 0.19 0.09
Crit Moves: ****  ****  ****  ****  ****  ****  ****  ****  ****  ****  ****  ****
Green Time: 28.1 59.6 89.5 16.7 48.2 81.6 33.3 33.3 61.4 29.8 29.8 46.5
Volume/Cap: 0.45 0.61 0.12 0.62 0.21 0.11 0.75 0.75 0.21 0.65 0.94 0.28
Delay/Veh: 62.7 47.3 20.9 78.4 45.6 24.6 65.7 65.7 32.8 64.4 85.9 44.9
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 62.7 47.3 20.9 78.4 45.6 24.6 65.7 65.7 32.8 64.4 85.9 44.9
LOS by Move: E  D  C+  E-  D  C+  E  C+  E  F  D
HCM2kAvgQ: 8  21  4  7  5  4  15  15  5  12  17  6

Note: Queue reported is the number of cars per lane.

Traffic 8.0.0.715 (c) 2008 Dowling Assoc. Licensed to SANTA CLARA COUNTY
### Groups Printed - Vehicles

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#### Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1

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Grand Total: 196 747 173 3 1119

### Traffic Data Service

Campbell, CA
(408) 377-2988
tdsbay@cs.com

File Name: 1PM FINAL
Site Code: 00000001
Start Date: 9/24/2015
Page No: 1
Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5220 FOOTHILL/MAGDALENA

Cycle (sec): 190  Critical Vol./Cap. (X): 0.750
Loss Time (sec): 12  Average Delay (sec/veh): 73.3
Optimal Cycle: 202  Level Of Service: E

Street Name: FOOTHILL EXPWY  MAGDALENA AVE
Approach: North Bound  South Bound  East Bound  West Bound
Movement: L  -  T  -  R  L  -  T  -  R  L  -  T  -  R  L  -  T  -  R
---------|--------||--------||--------||--------|
Control: Protected  Protected  Split Phase  Split Phase
---------|--------||--------||--------||--------|
Min. Green: 27 75 75 24 72 72 43 43 43 48 48 48
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 1 0 2 0 1 1 0 2 0 1 0 1 0 1 1 1 0 1
---------|--------||--------||--------||--------|
Volume Module: >> Count Date: 23 Sep 2014 << 4:45-5:45PM
Base Vol: 158 455 100 158 1351 193 91 199 148 214 516 74
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 158 455 100 158 1351 193 91 199 148 214 516 74
Reduced Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 158 455 100 158 1351 193 91 199 148 214 516 74
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Final Volume: 158 455 100 158 1351 193 91 199 148 214 516 74
---------|--------||--------||--------||--------|
Saturation Flow Module:
Sat/Lane: 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Adjustment: 0.92 1.00 0.92 1.00 0.92 1.00 0.92 0.92 0.92 0.92 0.92 0.75 0.92
Lanes: 1.00 2.00 1.00 2.00 1.00 1.00 0.66 1.34 1.00 1.00 2.00 1.00
Final Sat.: 1750 3800 1750 1750 3800 1750 1161 2539 1750 1750 2850 1750
---------|--------||--------||--------||--------|
Capacity Analysis Module:
Vol/Sat: 0.09 0.12 0.06 0.09 0.36 0.11 0.08 0.08 0.08 0.12 0.18 0.04
Crit Moves: ****  ****  ****
Green Time: 25.4 70.5 115.7 22.6 67.7 108.2 40.4 40.4 65.8 45.1 45.1 67.7
Volume/Cap: 0.68 0.32 0.09 0.76 1.00 0.19 0.37 0.37 0.24 0.51 0.76 0.12
Delay/Veh: 91.0 42.0 9.1 101.2 95.3 28.3 68.2 68.2 47.3 67.2 75.3 43.8
User Del/Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Adj Del/Veh: 91.0 42.0 9.1 101.2 95.3 28.3 68.2 68.2 47.3 67.2 75.3 43.8
LOS by Move: F  D  A  F  F  C  E  E  D  E  D  E
HCM2kAvgQ: 11 8 1 12 47 8 7 7 7 12 16 3
---------|--------||--------||--------||--------|
Note: Queue reported is the number of cars per lane.

Traffix 8.0.0715 (c) 2008 Dowling Assoc. Licensed to SANTA CLARA COUNTY
### Traffic Data Service

**Campbell, CA**

*(408) 377-2988*

**tdsbay@cs.com**

---

**File Name:** 2AM FINAL  
**Site Code:** 00000002  
**Start Date:** 9/24/2015  
**Page No:** 1

---

**Groups Printed- Vehicles**

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<th>Start Time</th>
<th>I-280 NB ON-RAMP Southbound</th>
<th>MAGDALENA AVE Westbound</th>
<th>I-280 NB OFF-RAMP Northbound</th>
<th>MAGDALENA AVE Eastbound</th>
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<th>MAGDALENA AVE Westbound</th>
<th>I-280 NB OFF-RAMP Northbound</th>
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<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
<tr>
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<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
<tr>
<td>08:30 AM</td>
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<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
<tr>
<td>08:45 AM</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
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<td>0 0 0 0</td>
</tr>
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**Grand Total**

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**Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1**

**Peak Hour for Entire Intersection Begins at 07:45 AM**

---

**Traffic Data Service**

**Campbell, CA**

*(408) 377-2988*

**tdsbay@cs.com**
Peak Hour Data

North

Peak Hour Begins at 07:45 AM

Traffic Data Service
Campbell, CA
(408) 377-2988
tdsbay@cs.com
### Traffic Data Service
Campbell, CA
(408) 377-2988
tdsbay@cs.com

**File Name**: 2PM FINAL  
**Site Code**: 00000002  
**Start Date**: 9/24/2015  
**Page No**: 1

---

**Peaks**

- **Start Time**: 02:00 PM
  - **Volume**: 23.9
  - **Left**: 0
  - **Peds**: 0.9
  - **App. Total**: 34.9

- **Start Time**: 02:15 PM
  - **Volume**: 49.7
  - **Left**: 0
  - **Peds**: 0
  - **App. Total**: 50.7

- **Start Time**: 02:30 PM
  - **Volume**: 94.1
  - **Left**: 0
  - **Peds**: 100
  - **App. Total**: 94.1

- **Start Time**: 02:45 PM
  - **Volume**: 0
  - **Left**: 0
  - **Peds**: 0
  - **App. Total**: 0

- **Start Time**: 03:00 PM
  - **Volume**: 0
  - **Left**: 0
  - **Peds**: 0
  - **App. Total**: 0

- **Start Time**: 03:15 PM
  - **Volume**: 0
  - **Left**: 0
  - **Peds**: 0
  - **App. Total**: 0

- **Start Time**: 03:30 PM
  - **Volume**: 0
  - **Left**: 0
  - **Peds**: 0
  - **App. Total**: 0

- **Start Time**: 03:45 PM
  - **Volume**: 0
  - **Left**: 0
  - **Peds**: 0
  - **App. Total**: 0

---

**Grand Total**: 1320

**Approach %**

- **Southbound**: 41.9
- **Westbound**: 11.1
- **Northbound**: 15.1
- **Eastbound**: 52.6

---

**Total Volume**: 342

**% App. Total**: 0.00

### Groups Printed - Vehicles

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**Total**

- **Southbound**: 346
- **Westbound**: 380
- **Northbound**: 380
- **Eastbound**: 380

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**Grand Total**: 1320

**Approach %**

- **Southbound**: 41.9
- **Westbound**: 11.1
- **Northbound**: 15.1
- **Eastbound**: 52.6

---

**Total Volume**: 342

**% App. Total**: 0.00

---

**PHF**: .000

---

**Total Volume**: 342

**% App. Total**: 0.00

---

**PHF**: .000

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**Total Volume**: 342

**% App. Total**: 0.00
Peak Hour Data

Peak Hour Begins at 02:30 PM

#### I-280 NB ON-RAMP

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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Thru</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Left</td>
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|       | 402 | 0   | 402   |

#### I-280 NB OFF-RAMP

|       | 0   | 226 | 226   |

| Left  | 0   | 54  | 54    |
| Thru  | 0   | 0   | 0     |
| Right | 172 | 0   | 172   |

| Out   | 0   | 226 | 226   |

|       | 0   | 226 | 226   |

|       | 0   | 172 | 172   |

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

<table>
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<tr>
<th>Time</th>
<th>Out</th>
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<th>Total</th>
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<th>In</th>
<th>Total</th>
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<tbody>
<tr>
<td>04:00 PM</td>
<td>98</td>
<td>138</td>
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<td>236</td>
<td>0</td>
<td>236</td>
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<tr>
<td>04:15 PM</td>
<td>103</td>
<td>140</td>
<td>0</td>
<td>243</td>
<td>0</td>
<td>243</td>
</tr>
<tr>
<td>04:30 PM</td>
<td>105</td>
<td>157</td>
<td>0</td>
<td>262</td>
<td>1</td>
<td>263</td>
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<td>90</td>
<td>160</td>
<td>0</td>
<td>250</td>
<td>3</td>
<td>253</td>
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</table>

| Total Volume | 396 | 595 | 991 | 1412 |
| % App. Total | 68.9 | 0.6 | 30.4 | 20.4 |

| PHF | .000 | .000 | .000 | .000 | .943 | .930 | .000 | .946 | .841 | .250 | .721 | .856 | .000 | .750 | .828 | .823 | .983 |

Traffic Data Service
Campbell, CA
(408) 377-2988
tdsbay@cs.com
**Traffic Data Service**
Campbell, CA  
(408) 377-2988  
tdsbay@cs.com

<table>
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### Peak Hour Data

#### I-280 NB ON-RAMP

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<td>Right</td>
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<td>0</td>
</tr>
<tr>
<td>Thru</td>
<td>0</td>
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<tr>
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#### I-280 NB OFF-RAMP

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<td>Right</td>
<td>0</td>
<td>161</td>
</tr>
<tr>
<td>Thru</td>
<td>11</td>
<td>991</td>
</tr>
<tr>
<td>Left</td>
<td>49</td>
<td>161</td>
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<tr>
<td>Total</td>
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Peak Hour Begins at 04:00 PM
Vehicles

---

MAGDALENA AVE

---

Traffic Data Service  
Campbell, CA  
(408) 377-2988  
tdsbay@cs.com
### Groups Printed- Vehicles

<table>
<thead>
<tr>
<th>Start Time</th>
<th>I-280 SB RAMPS</th>
<th>MAGDALENA AVE</th>
<th>EASTBROOK AVE</th>
<th>MAGDALENA AVE</th>
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</thead>
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<td></td>
<td>Southbound</td>
<td>Westbound</td>
<td>Northbound</td>
<td>Eastbound</td>
</tr>
<tr>
<td>07:00 AM</td>
<td>Right</td>
<td>Thru</td>
<td>Left</td>
<td>Peds</td>
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<tr>
<td>07:15 AM</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>07:30 AM</td>
<td>4</td>
<td>3</td>
<td>96</td>
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<td>07:45 AM</td>
<td>8</td>
<td>6</td>
<td>81</td>
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<td>Total</td>
<td>16</td>
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| 08:00 AM   | 10    | 11   | 74   | 2    | 97       | 41    | 22   | 33   | 0    | 96      | 18    | 14   | 0    | 0    | 32      | 0     | 49   | 8    | 0    | 57      | 282   |
| 08:15 AM   | 4     | 10   | 95   | 2    | 111     | 58    | 17   | 24   | 2    | 101     | 35    | 15   | 0    | 0    | 50      | 0     | 38   | 8    | 0    | 46      | 308   |
| 08:30 AM   | 4     | 2    | 77   | 0    | 83       | 69    | 25   | 15   | 0    | 109     | 26    | 13   | 0    | 0    | 39      | 0     | 28   | 11   | 0    | 39      | 270   |
| 08:45 AM   | 4     | 4    | 105  | 0    | 113     | 54    | 21   | 7    | 0    | 82      | 17    | 9    | 0    | 0    | 26      | 0     | 33   | 5    | 0    | 38      | 259   |
| Total      | 22    | 27   | 351  | 4    | 404      | 222   | 85   | 79   | 2    | 388     | 96    | 51   | 0    | 0    | 147     | 0     | 148  | 32   | 0    | 180     | 1119  |

### Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

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<tr>
<th>Start Time</th>
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<th>MAGDALENA AVE</th>
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<td>Eastbound</td>
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<tr>
<td>08:00 AM</td>
<td>10</td>
<td>11</td>
<td>74</td>
<td>2</td>
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<tr>
<td>08:15 AM</td>
<td>4</td>
<td>10</td>
<td>95</td>
<td>2</td>
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<tr>
<td>08:30 AM</td>
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<td>2</td>
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<td>08:45 AM</td>
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<td>4</td>
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<tr>
<td>Total</td>
<td>22</td>
<td>27</td>
<td>351</td>
<td>4</td>
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| Grand Total| 38    | 40   | 758  | 6    | 842      | 361   | 129  | 108  | 4    | 602     | 360   | 76   | 1    | 0    | 233     | 3     | 284  | 60   | 0    | 347     | 2024  |
| Apprch %   | 4.5   | 4.8  | 90   | 0.7  | 607      | 60    | 21   | 17   | 9.7  | 586     | 60    | 21   | 17   | 9.7  | 586     | 0.9   | 81.8 | 17.3 | 0    | 37      | 2004  |
| Total %    | 1.9   | 2    | 37.5 | 0.3  | 41.6     | 17.8  | 6.4  | 5.3  | 0.2  | 29.7    | 7.7   | 3.8  | 0    | 0.7  | 11.5    | 0.1   | 14   | 3    | 0    | 17.1    | 329   |

### Traffic Data Service

Campbell, CA  
(408) 377-2988  
tdsbay@cs.com  

File Name: 3AM FINAL  
Site Code: 00000003  
Start Date: 9/24/2015  
Page No: 1
### Traffic Data Service

Campbell, CA  
(408) 377-2988  
tdsbay@cs.com

File Name : 3PM FINAL  
Site Code : 00000003  
Start Date : 9/24/2015  
Page No : 1

---

#### Groups Printed- Vehicles

<table>
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<tr>
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<td>Northbound</td>
<td>Eastbound</td>
</tr>
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<td>02:00 PM</td>
<td>7 5 27 1 40 35 23 12 0 70 6 1 1 0 8</td>
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<td>7 6 61 0 74 34 22 8 0 64 9 4 0 0 13</td>
<td>2 12 11 0 25 176</td>
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<td>02:30 PM</td>
<td>2 5 54 0 61 58 10 10 0 87 14 2 1 0 17</td>
<td>0 25 5 0 30 195</td>
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<td>02:45 PM</td>
<td>7 5 71 0 83 36 34 11 0 81 14 9 0 0 23</td>
<td>0 24 6 0 30 217</td>
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<tr>
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<td>23 21 213 1 258 163 98 41 0 302</td>
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<td>1 27 14 0 42 218</td>
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<td>8 2 47 0 57 84 28 14 0 126 21 7 0 0 28</td>
<td>1 15 9 0 25 236</td>
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<td>03:30 PM</td>
<td>9 3 36 0 48 89 28 10 0 127 12 8 0 0 20</td>
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<td>4 3 37 0 44 94 27 12 0 174 9 4 1 0 14</td>
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<td>04:30 PM</td>
<td>6 3 21 0 30 123 28 9 0 160 13 8 0 0 21</td>
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<td>3 3 34 0 40 134 28 12 0 174 9 4 1 0 14</td>
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<td>26 25 119 0 170 482 116 49 0 647</td>
<td>42 21 2 0 65 5 98 29 0 132 1014</td>
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<tr>
<td>05:15 PM</td>
<td>10 6 30 0 46 145 24 11 0 180 15 5 1 0 21</td>
<td>0 14 9 0 23 270</td>
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<td>05:30 PM</td>
<td>5 4 55 0 64 95 29 19 0 143 10 11 0 0 21</td>
<td>0 10 7 0 17 245</td>
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<td>05:45 PM</td>
<td>6 3 50 0 59 108 25 10 0 143 20 8 1 0 29</td>
<td>0 21 1 0 22 253</td>
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<tr>
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<td>69.6 20.8 9.6</td>
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<td>64.2 32.8 2.7</td>
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#### Traffic Data Service

Campbell, CA  
(408) 377-2988  
tdsbay@cs.com

File Name : 3PM FINAL  
Site Code : 00000003  
Start Date : 9/24/2015  
Page No : 1

---

#### Peak Hour Analysis

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<th>Start Time</th>
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<th>EASTBROOK AVE</th>
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<td>Right Thru Left Peds App. Total</td>
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<td>11 3 52 66 68 19 10 97 7 5 1 13</td>
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<tr>
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<td>8 2 47 57 84 28 14 126 21 7 0 28</td>
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<td>32 11 172 215 335 102 46 483</td>
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Peak Hour Data

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

<table>
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<th>Total</th>
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<td>28</td>
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</tbody>
</table>

Total Volume: 266

% App. Total: 1014

PHF: .722

Traffic Data Service
Campbell, CA
(408) 377-2988
tdsbay@cs.com
Traffic Data Service
Campbell, CA
(408) 377-2988
tdsbay@cs.com

Peak Hour Data

Peak Hour Begins at 04:00 PM
Vehicles

Out 530
In 170
Total 700

Out 482
In 116
Total 598

Out 79
In 65
Total 144

Out 26
In 25
Total 51

Right 26
Thru 25
Left 119

Right 482
Thru 116
Left 49

Right 42
Thru 42
Left 2

Right 29
Thru 98
Left 5

Out 259
In 647
Total 906

Out 259
In 647
Total 906

Out 259
In 647
Total 906

Out 259
In 647
Total 906
## Event Counts

### Datasets:
- **Site:** [1EB] MAGDALENA AVE BETWEEN SUMMERHILL AVE AND MAGDALENA CT
- **Input A:** 2 - East bound. - Lane= 0, Added to totals. (/2.000)
- **Input B:** 0 - Unused or unknown. - Lane= 0, Excluded from totals.
- **Data type:** Axle sensors - Separate (Count)

### Profile:
- **Name:** Default Profile
- **Scheme:** Count events divided by setup divisor
- **Units:** Non metric (ft, mi, ft/s, mph, lb, ton)

### Traffic Data Service -- Campbell, CA

#### Wednesday, September 23, 2015 = 2705 (Incomplete), 15 minute drops

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<th>0400</th>
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#### Thursday, September 24, 2015 = 6609, 15 minute drops

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#### Friday, September 25, 2015 = 977 (Incomplete), 15 minute drops

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**Traffic Data Service -- Campbell, CA**

### Event Counts

**Datasets:**
- **[1WB] MAGDALENA AVE BETWEEN SUMMERHILL AVE AND MAGDALENA CT**

**Input A:**
- 4 - West bound. - Lane= 0, Added to totals. (/2.000)

**Input B:**
- 0 - Unused or unknown. - Lane= 0, Excluded from totals.

**Data type:**
- Axle sensors - Separate (Count)

**Profile:**
- **Name:** Default Profile
- **Scheme:** Count events divided by setup divisor
- **Units:** Non metric (ft, mi, ft/s, mph, lb, ton)

#### * Wednesday, September 23, 2015=3799 (Incomplete) , 15 minute drops

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AM Peak 0800 - 0900 (737), AM PHF=0.81

#### * Thursday, September 24, 2015=7658, 15 minute drops

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AM Peak 0745 - 0845 (649), AM PHF=0.81

#### * Friday, September 25, 2015=3268 (Incomplete) , 15 minute drops

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AM Peak 0745 - 0845 (649), AM PHF=0.81
ATTACHMENT C: INTERSECTION ANALYSIS SHEETS
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<td>#1 Magdalena Avenue / I-280 Southbound Ramps-Eastbrook</td>
<td>B 14.3 0.641 14.3</td>
<td>B 14.6 0.655 + 0.014 14.6 + 0.3</td>
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<td>C 15.4 0.369 3.9</td>
<td>C 15.6 0.379 + 0.010 3.9 + 0.0</td>
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<td>A 0.0 0.000 0.0</td>
<td>C 16.6 0.067 + 0.067 0.5 + 0.5</td>
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<td>#4 Magdalena Avenue / Foothill Expressway</td>
<td>E+ 55.1 0.729 63.5</td>
<td>E+ 55.6 0.735 + 0.006 64.4 + 0.9</td>
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Intersection #1: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue

Street Name: I-280 Southbound Ramps Magdalena Avenue
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Min. Green: 7 10 10 7 10 10 7 10 10

Volume Module:
Base Vol: 1 50 97 327 29 26 33 174 2 87 75 212
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 1 50 97 327 29 26 33 174 2 87 75 212
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 1 50 97 327 29 26 33 174 2 87 75 212
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 1 50 97 327 29 26 33 174 2 87 75 212
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 1 50 97 327 29 26 33 174 2 87 75 212
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Final Volume: 1 50 97 327 29 26 33 174 2 87 75 212

Saturation Flow Module:
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 0.01 0.34 0.65 1.00 1.00 1.00 0.99 0.01 0.47 0.53 1.00
Final Sat.: 4 175 340 510 543 607 471 501 6 238 274 591

Capacity Analysis Module:
Vol/Sat: 0.29 0.29 0.29 0.64 0.05 0.04 0.07 0.35 0.35 0.37 0.27 0.36
Crit Moves: **** **** **** ****
Delay/Veh: 11.8 11.8 11.8 20.3 9.4 8.6 10.4 12.6 12.6 12.3 12.3 11.5
Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 11.8 11.8 11.8 20.3 9.4 8.6 10.4 12.6 12.6 12.3 12.3 11.5
LOS by Move: B B B C A A B B B B B
ApproachDel: 11.8 18.7 12.3 11.9
Delay Adj: 1.00 1.00 1.00 1.00
ApprAdjDel: 11.8 18.7 12.3 11.9
LOS by Appr: B C B B
AllWayAvgQ: 0.3 0.3 0.3 1.5 0.1 0.0 0.1 0.5 0.5 0.4 0.5 0.5
Note: Queue reported is the number of cars per lane.
**Intersection #1: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue**

**Street Name:** I-280 Southbound Ramps        Magdalena Avenue

**Approach:** North Bound        South Bound        East Bound        West Bound

**Movement:** L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R

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**Volume Module:**

- Base Vol: 1 50 97 327 29 26 33 174 2 87 75 212
- Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- Initial Bse: 1 50 97 327 29 26 33 174 2 87 75 212
- Added Vol: 0 0 0 6 0 0 0 2 0 0 2 5
- PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
- Initial Fut: 1 50 97 333 29 26 33 176 2 87 77 217
- User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- PHF Volume: 1 50 97 333 29 26 33 176 2 87 77 217
- Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
- Reduced Vol: 1 50 97 333 29 26 33 176 2 87 77 217
- PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- FinalVolume: 1 50 97 333 29 26 33 176 2 87 77 217

**Saturation Flow Module:**

- Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- Final Sat.: 3 174 337 508 541 604 468 497 6 233 277 587

**Capacity Analysis Module:**

- Vol/Sat: 0.29 0.29 0.29 0.66 0.05 0.04 0.07 0.35 0.35 0.37 0.28 0.37
- Crit Moves: **** **** **** ****
- Delay/Veh: 11.9 11.9 11.9 21.0 9.5 8.6 10.5 12.8 12.8 12.5 12.5 11.7
- Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- AdjDel/Veh: 11.9 11.9 11.9 21.0 9.5 8.6 10.5 12.8 12.8 12.5 12.5 11.7
- LOS by Move: B B B C A A B B B B B
- ApproachDel: 11.9 19.3 12.4 12.0
- Delay Adj: 1.00 1.00 1.00 1.00
- ApprAdjDel: 11.9 19.3 12.4 12.0
- LOS by Appr: B C B B
- AllWayAvgQ: 0.3 0.3 0.3 1.6 0.1 0.0 0.1 0.5 0.5 0.4 0.5 0.5

Note: Queue reported is the number of cars per lane.
## Church of the Redeemer School TIA
Santa Clara County, California

### Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background AM

#### Intersection #2: Magdalena Avenue / I-280 Northbound Ramps

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<th>Signal=Stop/Rights=Include</th>
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**Street Name:** I-280 Northbound Ramps  
**Magdalena Avenue**

**Approach:** North Bound  
South Bound  
East Bound  
West Bound

**Movement:**  
L - T - R  
L - T - R  
L - T - R  
L - T - R

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<td>278</td>
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<td>A</td>
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Note: Queue reported is the number of cars per lane.
### Level Of Service Computation Report

2000 HCM Unsignalized (Future Volume Alternative)
Background PP AM

**Intersection #2: Magdalena Avenue / I-280 Northbound Ramps**

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Note: Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background AM

Intersection #3: Magdalena Avenue / Site Driveway

Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Volume Module:
Base Vol: 0 0 0 0 0 0 0 781 0 0 701 0
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 0 0 0 0 0 0 0 781 0 0 701 0
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 0 0 0 0 0 0 0 781 0 0 701 0
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 0 0 0 0 0 0 0 781 0 0 701 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 0 0 0 0 0 0 0 781 0 0 701 0

Critical Gap Module:
Critical Gp: 6.8 xxxx 6.9 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
FollowUpTim: 3.5 xxxx 3.3 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx

Capacity Module:
Cnflict Vol: 1132 xxxx 391 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Potent Cap.: 200 xxxx 614 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Move Cap.: 200 xxxx 614 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Volume/Cap: 0.00 xxxx 0.00 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx

2Way95thQ: xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Control Del:xxxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx

LOS by Move: * * * * * * * * * * * * * * * * A *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
SharedQueue:xxxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx 0.0 xxxx xxxx
Shrd ConDel:xxxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx 7.2 xxxx xxxx
Shared LOS: * * * * * * * * * * A * *
ApproachDel: xxxxxx xxxxxx xxxxxx xxxxxx
ApproachLOS: * * * *

Note: Queue reported is the number of cars per lane.
Intersection #3: Magdalena Avenue / Site Driveway

**Level Of Service Computation Report**
2000 HCM Unsignalized (Future Volume Alternative)
Background PP AM

**Approach Del**: 16.6
**Approach LOS**: C
**Note**: Queue reported is the number of cars per lane.
### Intersection #4: Magdalena Avenue / Foothill Expressway

#### Final Vol:

- **Signal=Protect/Rights=Overlap**
  - Lanes: 1 0 2 0 1
  - Final Vol: 101

- **Signal=Split**
  - Rights=Overlap
  - Final Vol: 197

- **Signal=Split**
  - Rights=Overlap
  - Final Vol: 146

- **Signal=Split**
  - Rights=Overlap
  - Final Vol: 197

#### Street Name:

- **Foothill Expressway**
- **Magdalena Avenue**

#### Approach:

- **North Bound**
- **South Bound**
- **East Bound**
- **West Bound**

#### Movement:

- **Min. Green:**
  - 32 68 68 19 55 55 38 38 38 34 34 34
  - **Y+R:**
    - 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0

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<tr>
<th>Volume Module</th>
<th>Base Vol</th>
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<th>Initial Bse</th>
<th>Added Vol</th>
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<th>User Adj</th>
<th>PHF Adj</th>
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#### Satisfaction Flow Module:

- **Sat./Lane:**
  - 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
  - **Adjustment:**
    - 0.92 1.00 0.92 0.92 1.00 0.92 0.95 0.98 0.92 0.92 0.75 0.92
  - **Lanes:**
    - 1.00 2.00 1.00 2.00 1.00 2.00 1.00 2.00 1.00 1.00 2.00 1.00
  - **Final Sat.:**
    - 1750 3800 1750 1750 3800 1750 850 2849 1750 1750 2850 1750

#### Capacity Analysis Module:

- **Vol./Sat.:**
  - 0.08 0.26 0.07 0.07 0.07 0.06 0.17 0.17 0.09 0.13 0.19 0.09

- **Crit Moves:**
  - E D B E D B E E C E F D

- **HCM2kAvgQ:**
  - 7 20 3 7 5 3 17 17 5 12 17 6

Note: Queue reported is the number of cars per lane.
### Intersection #4: Magdalena Avenue / Foothill Expressway

#### Final Vol:
- **Lanes:** 1 0 2 0 1
- **Vol Cnt Date:** n/a
- **Critical V/C:** 0.735
- **Avg Crit Del (sec/veh):** 64.4
- **Avg Delay (sec/veh):** 55.6
- **LOS:** E+

#### Street Name: Foothill Expressway
- **Approach:** North Bound
  - **Movement:** L - T - R
  - **Min. Green:** 32 68 68 19 55 55 38 38 38 34 34 34
  - **Y+R:** 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
- **Volume Module:**
  - **Base Vol:** 146 926 124 120 259 101 142 476 152 227 532 153
  - **Growth Adj:** 1.00 1.05 1.00 1.00 1.05 1.00 1.00 1.00 1.00 1.00 1.00 1.00
  - **Initial Bse:** 146 970 124 120 271 101 142 476 152 227 532 153
  - **Added Vol:** 10 0 0 0 0 0 9 5 9 0 6 0
  - **PasserByVol:** 0 0 0 0 0 0 0 0 0 0 0 0
  - **Initial Fut:** 156 970 124 120 271 111 151 481 161 227 532 153
- **User Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **PHF Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **PHF Volume:** 156 970 124 120 271 111 151 481 161 227 532 153
- **Reduced Vol:** 156 970 124 120 271 111 151 481 161 227 532 153
- **PCE Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **MLF Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **FinalVolume:** 156 970 124 120 271 111 151 481 161 227 532 153

#### Street Name: Magdalena Avenue
- **Approach:** South Bound
  - **Movement:** L - T - R
  - **Min. Green:** 32 68 68 19 55 55 38 38 38 34 34 34
  - **Y+R:** 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
  - **Volume Module:**
  - **Base Vol:** 146 926 124 120 259 101 142 476 152 227 532 153
  - **Growth Adj:** 1.00 1.05 1.00 1.00 1.05 1.00 1.00 1.00 1.00 1.00 1.00 1.00
  - **Initial Bse:** 146 970 124 120 271 101 142 476 152 227 532 153
  - **Added Vol:** 10 0 0 0 0 0 9 5 9 0 6 0
  - **PasserByVol:** 0 0 0 0 0 0 0 0 0 0 0 0
  - **Initial Fut:** 156 970 124 120 271 111 151 481 161 227 532 153
- **User Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **PHF Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **PHF Volume:** 156 970 124 120 271 111 151 481 161 227 532 153
- **Reduced Vol:** 156 970 124 120 271 111 151 481 161 227 532 153
- **PCE Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **MLF Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **FinalVolume:** 156 970 124 120 271 111 151 481 161 227 532 153

#### Saturation Flow Module:
- **Sat/Lane:** 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
- **Adjustment:** 0.92 1.00 0.92 0.92 1.00 0.92 0.95 0.98 0.92 0.92 0.75 0.92
- **Lanes:** 1.00 2.00 1.00 1.00 2.00 1.00 1.00 2.00 1.00 1.00 2.00 1.00
- **Final Sat.:** 1750 3800 1750 1750 3800 1750 884 2815 1750 1750 2850 1750

#### Capacity Analysis Module:
- **Vol/Sat:** 0.09 0.26 0.07 0.07 0.07 0.06 0.17 0.17 0.09 0.13 0.19 0.09
- **Crit Moves:** **** **** **** ****
- **Green Time:** 28.1 59.6 89.5 16.7 48.2 81.6 33.3 33.3 61.4 29.8 29.8 46.5
- **Volume/Cap:** 0.48 0.64 0.12 0.62 0.22 0.12 0.77 0.77 0.22 0.65 0.95 0.28
- **Delay/Veh:** 63.1 42.6 15.0 78.4 42.5 19.0 66.8 66.8 33.0 64.4 88.0 44.9
- **User DelAdj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **AdjDel/Veh:** 63.1 42.6 15.0 78.4 42.5 19.0 66.8 66.8 33.0 64.4 88.0 44.9
- **LOS by Move:** E D B E- B- E E C- E F D
- **HCM2kAvgQ:** 8 20 3 7 5 3 17 17 6 12 18 6

Note: Queue reported is the number of cars per lane.
## Summary Scenario Comparison Report (With Average Critical Delay)

**Future Volume Alternative**

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Background Midday</th>
<th>Background PP Midday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg Del (sec)</td>
<td>Crit Del (sec)</td>
</tr>
<tr>
<td></td>
<td>LOS V/C</td>
<td></td>
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<tr>
<td>#1 Magdalena Avenue / I-280 Southbound Ramps-Eastbrook</td>
<td>B 10.8</td>
<td>0.465</td>
</tr>
<tr>
<td>#2 Magdalena Avenue / I-280 Northbound Ramps</td>
<td>B 11.4</td>
<td>0.199</td>
</tr>
<tr>
<td>#3 Magdalena Avenue / Site Driveway</td>
<td>A 0.0</td>
<td>0.000</td>
</tr>
<tr>
<td>#4 Magdalena Avenue / Foothill Expressway</td>
<td>E+ 58.7</td>
<td>0.582</td>
</tr>
</tbody>
</table>
# Level Of Service Computation Report

**2000 HCM 4-Way Stop (Future Volume Alternative)**

**Background Midday**

## Intersection #1: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue

- **Final Vol:**
  - Lanes: 1
  - Signal=Stop: 32
  - Rights=Include: 22

- **Vol Cnt Date:**
  - Cycle Time (sec): 100

- **Loss Time (sec):**
  - Critical V/C: 0.465

- **Critical V/C:**
  - 0.465

- **Avg Crit Del (sec/veh):**
  - 10.8

- **Avg Delay (sec/veh):**
  - 10.8

- **LOS:**
  - B

### Street Name: I-280 Southbound Ramps

#### Approach:
- **North Bound:**
  - L  -  T  -  R
  - Min. Green: 7
  - Base Vol: 1
  - Growth Adj: 1.00
  - Initial Bse: 1
  - Added Vol: 0
  - User Adj: 1.00
  - PHF Volume: 1
  - Reduct Vol: 0
  - Reduced Vol: 1
  - PCE Adj: 1.00
  - FinalVolume: 1

- **South Bound:**
  - L  -  T  -  R
  - Min. Green: 10
  - Base Vol: 29
  - Growth Adj: 1.00
  - Initial Bse: 29
  - Added Vol: 0
  - User Adj: 1.00
  - PHF Volume: 29
  - Reduct Vol: 0
  - Reduced Vol: 1
  - PCE Adj: 1.00
  - FinalVolume: 29

- **East Bound:**
  - L  -  T  -  R
  - Min. Green: 10
  - Base Vol: 50
  - Growth Adj: 1.00
  - Initial Bse: 50
  - Added Vol: 0
  - User Adj: 1.00
  - PHF Volume: 50
  - Reduct Vol: 0
  - Reduced Vol: 1
  - PCE Adj: 1.00
  - FinalVolume: 50

- **West Bound:**
  - L  -  T  -  R
  - Min. Green: 10
  - Base Vol: 172
  - Growth Adj: 1.00
  - Initial Bse: 172
  - Added Vol: 0
  - User Adj: 1.00
  - PHF Volume: 172
  - Reduct Vol: 0
  - Reduced Vol: 1
  - PCE Adj: 1.00
  - FinalVolume: 172

### Saturation Flow Module:
- **Adjustment:** 1.00
- **Lanes:** 0.01
- **Final Sat.:** 7 205 354 522 560 628 535 563 18 118 502 721

### Capacity Analysis Module:
- **Vol/Sat:** 0.14 0.14 0.14 0.33 0.02 0.05 0.07 0.16 0.16 0.39 0.20 0.46
- **Crit Moves:** **** **** **** ****
- **Delay/Veh:** 9.8 9.8 9.8 12.2 8.9 8.3 9.6 9.7 9.7 10.0 10.0 11.5
- **Delay Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **AdjDel/Veh:** 9.8 9.8 9.8 12.2 8.9 8.3 9.6 9.7 9.7 10.0 10.0 11.5
- **LOS by Move:** A A A B A A A A A B B
- **ApproachDel:** 9.8 11.5 9.6 11.0
- **Delay Adj:** 1.00 1.00 1.00 1.00
- **ApprAdjDel:** 9.8 11.5 9.6 11.0
- **LOS by Appr:** A B A B

Note: Queue reported is the number of cars per lane.
### Street Name: I-280 Southbound Ramps  
Magdalena Avenue  

### Approach: North Bound  
South Bound  
East Bound  
West Bound  

<table>
<thead>
<tr>
<th>Movement</th>
<th>L - T - R</th>
<th>L - T - R</th>
<th>L - T - R</th>
<th>L - T - R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. Green:</td>
<td>7 10 10</td>
<td>7 10 10</td>
<td>7 10 10</td>
<td>7 10 10</td>
</tr>
</tbody>
</table>

#### Volume Module:
- **Base Vol:** 1 29 50 172 11 32 38 92 3 46 102 335
- **Growth Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **Initial Bse:** 1 29 50 172 11 32 38 92 3 46 102 335
- **Added Vol:** 0 0 0 0 0 0 0 0 0 0 0 0
- **PasserByVol:** 0 0 0 0 0 0 0 0 0 0 0 0
- **Initial Fut:** 1 29 50 175 11 32 38 93 3 46 103 338
- **User Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **PHF Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **PHF Volume:** 1 29 50 175 11 32 38 93 3 46 103 338
- **Reduct Vol:** 0 0 0 0 0 0 0 0 0 0 0 0
- **Reduced Vol:** 1 29 50 175 11 32 38 93 3 46 103 338
- **PCE Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **MLF Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **FinalVolume:** 1 29 50 175 11 32 38 93 3 46 103 338

#### Saturation Flow Module:
- **Adjustment:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **Lanes:** 0.01 0.36 0.63 1.00 1.00 1.00 1.00 0.97 0.03 0.19 0.81 1.00
- **Final Sat.:** 7 204 352 521 558 626 533 561 18 117 502 719

#### Capacity Analysis Module:
- **Vol/Sat:** 0.14 0.14 0.14 0.34 0.02 0.05 0.07 0.17 0.17 0.39 0.21 0.47
- **Crit Moves:** **** **** **** ****
- **Delay/Veh:** 9.8 9.8 9.8 12.3 8.9 8.3 9.6 9.7 9.7 10.1 10.1 11.6
- **Delay Adj:** 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- **AdjDel/Veh:** 9.8 9.8 9.8 12.3 8.9 8.3 9.6 9.7 9.7 10.1 10.1 11.6
- **LOS by Move:** A A A A A A A B B B B
- **ApproachDel:** 9.8 11.6 9.7 11.1
- **Delay Adj:** 1.00 1.00 1.00 1.00
- **ApprAdjDel:** 9.8 11.6 9.7 11.1
- **LOS by Appr:** A A A B B
- **AllWayAvgQ:** 0.1 0.1 0.1 0.4 0.0 0.0 0.1 0.2 0.2 0.3 0.8 0.8

*Note: Queue reported is the number of cars per lane.*
Intersection #2: Magdalena Avenue / I-280 Northbound Ramps

Street Name: I-280 Northbound Ramps Magdalena Avenue
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Volume Module:
Base Vol: 54 0 172 0 0 0 60 320 0 0 346 342
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 54 0 172 0 0 0 60 320 0 0 346 342
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 54 0 172 0 0 0 60 320 0 0 346 342
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 54 0 172 0 0 0 60 320 0 0 346 342
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 54 0 172 0 0 0 60 320 0 0 346 342

Critical Gap Module:
Critical Gp: 6.8 6.5 6.9 xxxxx xxxx xxxx 4.1 xxxx xxxx xxxx xxxx xxxx
FollowUpTim: 3.5 4.0 3.3 xxxx xxxx xxxx 2.2 xxxx xxxx xxxx xxxx xxxx

Capacity Module:
Cnflct Vol: 613 786 160 xxxx xxxx xxxx 346 xxxx xxxx xxxx xxxx xxxx
Potent Cap.: 429 326 863 xxxx xxxx xxxx 1224 xxxx xxxx xxxx xxxx xxxx
Move Cap.: 412 310 863 xxxx xxxx xxxx 1224 xxxx xxxx xxxx xxxx xxxx
Volume/Cap: 0.13 0.00 0.20 xxxx xxxx xxxx 0.05 xxxx xxxx xxxx xxxx xxxx

Level Of Service Module:
2Way95thQ: xxxx xxxx 0.7 xxxx xxxx xxxx 0.2 xxxx xxxx xxxx xxxx xxxx
Control Del:xxxxxx xxxx 10.2 xxxx xxxx xxxx 8.1 xxxx xxxx xxxx xxxx xxxx
LOS by Move: * * * B * * * A * * * * Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: 412 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
SharedQueue: 0.4 xxxx xxxx xxxx xxxx xxxx 0.2 xxxx xxxx xxxx xxxx xxxx
Shrd ConDel: 15.0 xxxx xxxx xxxx xxxx xxxx 8.1 xxxx xxxx xxxx xxxx xxxx
Shared LOS: C * * * A * * * * ApproachDel: 11.4 xxxxxxx xxxxxxx xxxxxxx
ApproachLOS: B * * *

Note: Queue reported is the number of cars per lane.
**Intersection #2: Magdalena Avenue / I-280 Northbound Ramps**

**Final Vol:**

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<tr>
<th>Lanes:</th>
<th>Signal=Stop/Rights=Include</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
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<tbody>
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<td>1</td>
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<tr>
<td>324</td>
<td></td>
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<td>0</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Street Name:** I-280 Northbound Ramps  Magdalena Avenue

**Approach:**

<table>
<thead>
<tr>
<th>Movement:</th>
<th>North Bound</th>
<th>South Bound</th>
<th>East Bound</th>
<th>West Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>L - T - R</td>
<td>L - T - R</td>
<td>L - T - R</td>
<td>L - T - R</td>
<td></td>
</tr>
</tbody>
</table>

**Volume Module:**

| Base Vol: | 54 | 0 | 172 | 0 | 0 | 0 | 0 | 60 | 320 | 0 | 0 | 346 | 342 |
| Growth Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initial Bse: | 54 | 0 | 172 | 0 | 0 | 0 | 0 | 60 | 320 | 0 | 0 | 346 | 342 |
| Added Vol: | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 5 | 3 |
| PasserByVol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Initial Fut: | 54 | 0 | 175 | 0 | 0 | 0 | 0 | 60 | 324 | 0 | 0 | 351 | 345 |
| User Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PHF Volume: | 54 | 0 | 175 | 0 | 0 | 0 | 0 | 60 | 324 | 0 | 0 | 351 | 345 |
| Reduct Vol: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FinalVolume: | 54 | 0 | 175 | 0 | 0 | 0 | 0 | 60 | 324 | 0 | 0 | 351 | 345 |

**Critical Gap Module:**

| Critical Gp: | 6.8 | 6.5 | 6.9 | 4.1 | 3.5 | 4.0 | 3.3 | 2.2 |
| FollowUpTim: | 3.5 | 4.0 | 3.3 | 2.2 |

**Capacity Module:**

| Cnflict Vol: | 620 | 795 | 162 | 351 | 620 | 795 | 162 | 351 |
| Potent Cap.: | 425 | 323 | 861 | 1219 | 425 | 323 | 861 | 1219 |
| Move Cap.: | 408 | 306 | 861 | 1219 | 408 | 306 | 861 | 1219 |
| Volume/Cap: | 0.13 | 0.00 | 0.20 | 0.05 |

**Level Of Service Module:**

| 2Way95thQ: | xxxxx | xxxxx | 0.2 | 0.8 |
| Control Del: | xxxxx | xxxxx | 10.2 | 8.1 |
| LOS by Move: | * | * | B | A |
| Movement: | LT - LTR - RT | LT - LTR - RT | LT - LTR - RT | LT - LTR - RT |
| Shared Cap.: | 408 | xxxxx | xxxxx | xxxxx | xxxxx | xxxxx | xxxxx | xxxxx | xxxxx | xxxxx | xxxxx | xxxxx |
| Shared LOS: | C | * | * | A |
| ApproachDel: | 11.4 | xxxxx | xxxxx | xxxxx |

Note: Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background Midday

Intersection #3: Magdalena Avenue / Site Driveway

Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R

Volume Module:
Base Vol:       0    0     0     0    0     0     0  492     0     0  688     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     0    0     0     0  492     0     0  688     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     0  492     0     0  688     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0     0    0     0     0  492     0     0  688     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     0    0     0     0  492     0     0  688     0

Capacity Module:
Cnflict Vol:  836 xxxx   246  xxxx xxxx xxxx  xxxx xxxx xxxx  xxxx xxxx xxxx
Potent Cap.:  310 xxxx   760  xxxx xxxx xxxx  xxxx xxxx xxxx  xxxx xxxx xxxx
Move Cap.:    310 xxxx   760  xxxx xxxx xxxx  xxxx xxxx xxxx  xxxx xxxx xxxx
Volume/Cap:  0.00 xxxx  0.00  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx

Level Of Service Module:
2Way95thQ:   xxxxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx
Control Del:xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx
LOS by Move:    *    *    *    *    *    *    *    *    *    *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  1.00 xxxx   1.00  xxxx xxxx xxxx  xxxx xxxx xxxx  xxxx xxxx xxxx
SharedQueue:xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx 1.00 xxxxxxx
Shrd ConDel:xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx 7.2 xxxxxxx
Shared LOS:    *    *    *    *    *    *    *    *    *    A    *    *
ApproachDel:   xxxxxxx xxxxxxx xxxxxxx xxxxxxx
ApproachLOS:    *    *    *    *

Note: Queue reported is the number of cars per lane.
Level Of Service Computation Report

2000 HCM Unsignalized (Future Volume Alternative)
Background PP Midday

Intersection #3: Magdalena Avenue / Site Driveway

Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Volume Module:
Base Vol: 0 0 0 0 0 0 0 492 0 0 688 0
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 0 0 0 0 0 0 0 492 0 0 688 0
Added Vol: 8 0 15 0 0 0 0 0 0 0 7 14 0 0
Initial Fut: 8 0 15 0 0 0 0 0 492 7 14 688 0
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 8 0 15 0 0 0 0 0 492 7 14 688 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 8 0 15 0 0 0 0 0 492 7 14 688 0

Critical Gap Module:
Critical Gp: 6.8 xxxx 6.9 xxxx xxxx xxxx xxxx xxxx xxxx 4.1 xxxx xxxx
FollowUpTim: 3.5 xxxx 3.3 xxxx xxxx xxxx xxxx xxxx xxxx 2.2 xxxx xxxx

Capacity Module:
Conflict Vol: 868 xxxx 250 xxxx xxxx xxxx xxxx xxxx xxxx 499 xxxx xxxx
Potent Cap.: 296 xxxx 757 xxxx xxxx xxxx xxxx xxxx xxxx 1075 xxxx xxxx
Move Cap.: 293 xxxx 757 xxxx xxxx xxxx xxxx xxxx xxxx 1075 xxxx xxxx
Volume/Cap: 0.03 xxxx 0.02 xxxx xxxx xxxx xxxx xxxx xxxx 0.01 xxxx xxxx

Level Of Service Module:
2Way95thQ: 0.1 xxxx 0.1 xxxx xxxx xxxx xxxx xxxx xxxx xxxx 0.0 xxxx xxxx
Control Del: 17.6 xxxx 9.9 xxxx xxxx xxxx xxxx xxxx xxxx xxxx 8.4 xxxx xxxx
LOS by Move: C * A * * * * * * * * A * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
SharedQueue: 0.0 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Shared ConDel: 8.4 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Shared LOS: * * * * * * * * * * * * A *
ApproachDel: 12.6 xxxx xxxx xxxx xxxx
ApproachLOS: B *

Note: Queue reported is the number of cars per lane.
**Level Of Service Computation Report**

2000 HCM Operations (Future Volume Alternative)
Background Midday

**Intersection #4: Magdalena Avenue / Foothill Expressway**

**Street Name:**
- Foothill Expressway
- Magdalena Avenue

**Approach:**
- North Bound
- South Bound
- East Bound
- West Bound

**Movement:**
- L - T - R

**Min. Green:**
- 27 75 75 24 72 72 43 43 43 48 48 48

**Y+R:**
- 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0

**Volume Module:**
- Base Vol: 140 461 88 173 783 196 123 265 109 167 445 112
- Growth Adj: 1.00 1.05 1.00 1.00 1.05 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- Initial Bse: 140 461 88 173 783 196 123 265 109 167 445 112
- Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
- PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
- Initial Fut: 140 461 88 173 783 196 123 265 109 167 445 112
- User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- PHF Volume: 140 461 88 173 783 196 123 265 109 167 445 112
- Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
- Reduced Vol: 140 461 88 173 783 196 123 265 109 167 445 112
- PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- MLP Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- FinalVolume: 140 461 88 173 783 196 123 265 109 167 445 112

**Saturation Flow Module:**
- Sat/Lane: 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
- Adjustment: 0.92 1.00 0.92 0.92 1.00 0.92 0.95 0.99 0.92 0.92 0.75 0.92
- Lanes: 1.00 2.00 1.00 1.00 2.00 1.00 0.65 1.35 1.00 1.00 2.00 1.00
- Final Sat.: 1750 3800 1750 1750 3800 1750 1173 2526 1750 1750 2850 1750

**Capacity Analysis Module:**
- Vol/Sat: 0.08 0.12 0.05 0.10 0.21 0.11 0.10 0.10 0.06 0.10 0.16 0.06
- Crit Moves: **** ***** **** ****
- Green Time: 25.4 70.5 115.7 22.6 67.7 108.2 40.4 40.4 65.8 45.1 45.1 67.7
- Volume/Cap: 0.60 0.33 0.08 0.83 0.58 0.20 0.49 0.49 0.18 0.40 0.66 0.18
- Uniform Del: 82.4 45.4 16.3 87.0 52.7 21.1 69.9 69.9 46.0 64.9 69.6 44.7
- IncremntDel: 4.2 0.1 0.0 23.8 0.6 0.1 0.5 0.5 0.1 0.2 1.7 0.1
- InitQueueDel: 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
- Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- Delay/Veh: 86.6 45.6 16.3 110.9 53.3 21.2 70.4 70.4 46.1 65.1 71.3 44.8
- User Del Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- AdjDel/Veh: 86.6 45.6 16.3 110.9 53.3 21.2 70.4 70.4 46.1 65.1 71.3 44.8
- LOS by Move: F D B F D- C+ E E D E D

**Note:** Queue reported is the number of cars per lane.
Intersection #4: Magdalena Avenue / Foothill Expressway

Street Name: Foothill Expressway       Magdalena Avenue

Approach:  
North Bound          South Bound       East Bound          West Bound

Movement:  
L - T - R          L - T - R          L - T - R          L - T - R

Min. Green:  
27  75  75  24  72  72  43  43  43  48  48  48  48  48

Y+R:  
4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0  4.0

Volume Module:

Base Vol:  
140  440  88  173  747  196  123  265  109  167  445  112

Growth Adj:  
1.00  1.05  1.00  1.00  1.05  1.00  1.00  1.00  1.00  1.00  1.00  1.00

Initial Bse:  
140  440  88  173  783  196  123  265  109  167  448  112

Added Vol:  
5  0  0  0  0  5  6  3  6  0  3  0

PasserByVol:  
0  0  0  0  0  0  0  0  0  0  0  0

Initial Fut:  
145  461  88  173  783  201  129  268  115  167  448  112

User Adj:  
1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00

PHF Adj:  
1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00

PHF Volume:  
145  461  88  173  783  201  129  268  115  167  448  112

Reduced Vol:  
0  0  0  0  0  0  0  0  0  0  0  0

Reduced Vol:  
145  461  88  173  783  201  129  268  115  167  448  112

PCE Adj:  
1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00

MLF Adj:  
1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00

FinalVolume:  
145  461  88  173  783  201  129  268  115  167  448  112

Saturation Flow Module:

Sat/Lane:  
1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900

Adjustment:  
0.92  1.00  0.92  1.00  0.92  0.95  0.99  0.92  0.92  0.75  0.92

Lanes:  
1.00  2.00  1.00  1.00  2.00  1.00  0.67  1.33  1.00  1.00  2.00  1.00

Final Sat.:  
1750 3800 1750 1750 3800 1750 1202 2497 1750 1750 2850 1750

Capacity Analysis Module:

Vol/Sat:  
0.08  0.12  0.05  0.10  0.21  0.11  0.11  0.11  0.07  0.10  0.16  0.06

Crit Moves:  
****  ****  ****  ****

Green Time:  
25.4  70.5  115.7  22.6  67.7  108.2  40.4  40.4  65.8  45.1  45.1  67.7

Volume/Cap:  
0.62  0.33  0.08  0.83  0.58  0.20  0.50  0.50  0.19  0.40  0.66  0.18

Uniform Del:  
82.7  45.4  16.3  87.0  52.7  21.2  70.1  70.1  46.2  64.9  69.7  44.7

IncremntDel:  
5.0  0.1  0.0  23.8  0.6  0.1  0.5  0.5  0.2  0.2  1.8  0.1

InitQueueDel:  
0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0

Delay Adj:  
1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00

Delay/Veh:  
87.7  45.6  16.3  110.9  53.3  21.3  70.6  70.6  46.3  65.1  71.4  44.8

User DelAdj:  
1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00

AdjDel/Veh:  
87.7  45.6  16.3  110.9  53.3  21.3  70.6  70.6  46.3  65.1  71.4  44.8

LOS by Move:  
E+  E+  E+  E+  E+  E+  E+  E+  E+  E+  E+  E+  E+  E+

HCM2kAvgQ:  
10  10  2  13  19  6  12  12  7  10  14  6

Note: Queue reported is the number of cars per lane.
## Summary Scenario Comparison Report (With Average Critical Delay)
### Future Volume Alternative

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Background PM</th>
<th>Background PP PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg Del (sec)</td>
<td>Avg Crit Del (sec)</td>
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<tr>
<td></td>
<td>LOS V/C</td>
<td></td>
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<tr>
<td>#1 Magdalena Avenue / I-280 Southbound Ramps</td>
<td>B 12.4</td>
<td>0.637</td>
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<tr>
<td>#2 Magdalena Avenue / I-280 Northbound Ramps</td>
<td>B 11.1</td>
<td>0.119</td>
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<tr>
<td>#3 Magdalena Avenue / Site Driveway</td>
<td>A 0.0</td>
<td>0.0</td>
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<td>#4 Magdalena Avenue / Foothill Expressway</td>
<td>E- 76.3</td>
<td>0.768</td>
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### Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background PM

**Intersection #1: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue**

#### Final Volume and Signal Phasing

<table>
<thead>
<tr>
<th>Lanes</th>
<th>Signal=Stop/Rights=Include</th>
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<tbody>
<tr>
<td>26</td>
<td>Signal=Stop/Rights=Include</td>
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<tr>
<td>25</td>
<td>Loss Time (sec): 0</td>
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<tr>
<td>25</td>
<td>Critical V/C: 0.637</td>
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<tr>
<td>119***</td>
<td>Avg Crit Del (sec/veh): 12.4</td>
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<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>98</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>119***</td>
<td>Avg Delay (sec/veh): 12.4</td>
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<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
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**Street Name:** I-280 Southbound Ramps  
**Magdalena Avenue**

**Approach:**  
- North Bound  
- South Bound  
- East Bound  
- West Bound

**Movement:**

<table>
<thead>
<tr>
<th></th>
<th>L - T - R</th>
<th>L - T - R</th>
<th>L - T - R</th>
<th>L - T - R</th>
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<td>Movement</td>
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<tr>
<td>----------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Min. Green</td>
<td>7 10 10</td>
<td>7 10 10</td>
<td>7 10 10</td>
<td>7 10 10</td>
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<tr>
<td>Min. Green</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Base Vol</td>
<td>2 21 42</td>
<td>119 25</td>
<td>26 29 98</td>
<td>5 49 116</td>
</tr>
<tr>
<td>Growth Adj</td>
<td>1.00 1.00</td>
<td>1.00 1.00</td>
<td>1.00 1.00</td>
<td>1.00 1.00</td>
</tr>
<tr>
<td>Initial Bse</td>
<td>2 21 42</td>
<td>119 25</td>
<td>26 29 98</td>
<td>5 49 116</td>
</tr>
<tr>
<td>Added Vol</td>
<td>0 0 0</td>
<td>0 0 0</td>
<td>0 0 0</td>
<td>0 0 0</td>
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<tr>
<td>PasserbyVol</td>
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<td>0 0 0</td>
<td>0 0 0</td>
<td>0 0 0</td>
</tr>
<tr>
<td>Initial Fut</td>
<td>2 21 42</td>
<td>119 25</td>
<td>26 29 98</td>
<td>5 49 116</td>
</tr>
<tr>
<td>User Adj</td>
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<td>1.00 1.00</td>
<td>1.00 1.00</td>
<td>1.00 1.00</td>
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<tr>
<td>PHF Adj</td>
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<td>1.00 1.00</td>
<td>1.00 1.00</td>
<td>1.00 1.00</td>
</tr>
<tr>
<td>PHF Volume</td>
<td>2 21 42</td>
<td>119 25</td>
<td>26 29 98</td>
<td>5 49 116</td>
</tr>
<tr>
<td>Reduct Vol</td>
<td>0 0 0</td>
<td>0 0 0</td>
<td>0 0 0</td>
<td>0 0 0</td>
</tr>
<tr>
<td>Reduced Vol</td>
<td>2 21 42</td>
<td>119 25</td>
<td>26 29 98</td>
<td>5 49 116</td>
</tr>
<tr>
<td>PCE Adj</td>
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<td>1.00 1.00</td>
<td>1.00 1.00</td>
<td>1.00 1.00</td>
</tr>
<tr>
<td>MLF Adj</td>
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<td>1.00 1.00</td>
<td>1.00 1.00</td>
<td>1.00 1.00</td>
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<tr>
<td>FinalVolume</td>
<td>2 21 42</td>
<td>119 25</td>
<td>26 29 98</td>
<td>5 49 116</td>
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**Saturation Flow Module**

<table>
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<tr>
<th>Lanes</th>
<th>0.03 0.32 0.65 1.00 1.00 1.00 0.95 0.05 0.15 0.85 1.00</th>
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</thead>
<tbody>
<tr>
<td>Sat.:</td>
<td>17 176 353 496 531 592 540 561 29 98 549 756</td>
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**Capacity Analysis Module**

<table>
<thead>
<tr>
<th>Vol/Sat</th>
<th>0.12 0.12 0.12 0.24 0.05 0.04 0.05 0.17 0.17 0.50 0.21 0.64</th>
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<tr>
<td>Crit Moves</td>
<td>*** **** **** **** ****</td>
</tr>
<tr>
<td>Delay/Veh:</td>
<td>9.8 9.8 9.8 11.5 9.3 8.6 9.4 9.7 9.7 10.0 10.0 14.9</td>
</tr>
<tr>
<td>Delay Adj:</td>
<td>1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00</td>
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<tr>
<td>Adj Del/Veh:</td>
<td>9.8 9.8 9.8 11.5 9.3 8.6 9.4 9.7 9.7 10.0 10.0 14.9</td>
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<tr>
<td>LOS by Move:</td>
<td>A A B A A A A A B A B A B</td>
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<tr>
<td>Approach Del:</td>
<td>9.8 10.7 9.7 13.7</td>
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<td>1.00 1.00 1.00</td>
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<td>9.8 10.7 9.7 13.7</td>
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<td>LOS by Appr:</td>
<td>A B A B A B</td>
</tr>
<tr>
<td>All Way Avg Q:</td>
<td>0.1 0.1 0.1 0.3 0.0 0.0 0.1 0.2 0.2 0.3 1.6 1.6</td>
</tr>
</tbody>
</table>

**Note:** Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background PP PIM

Intersection #1: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue

Street Name:      I-280 Southbound Ramps               Magdalena Avenue
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
--------------|---------------||---------------||---------------||---------------|
Min. Green:    7 10 10 10                  7 10 10 10
--------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       2 21   42 119 25 26 29 98 5    49 116 482
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 2 21   42 119 25 26 29 98 5    49 116 482
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 2 21   42 122 25 26 29 99 5    49 117 485
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 2 21   42 122 25 26 29 99 5    49 117 485
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 2 21   42 122 25 26 29 99 5    49 117 485
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Final Volume: 2 21   42 122 25 26 29 99 5    49 117 485
--------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 0.03 0.32 0.65 1.00 1.00 1.00 1.00 0.95 0.05 0.15 0.85 1.00
Final Sat.: 17 176 351 495 529 590 539 559 28 97 548 754
--------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat: 0.12 0.12 0.12 0.25 0.05 0.04 0.05 0.18 0.18 0.50 0.21 0.64
Crit Moves: **** **** **** ****
Delay/Veh: 9.8 9.8 9.8 11.6 9.3 8.6 9.4 9.8 9.8 10.0 10.0 15.1
Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 9.8 9.8 9.8 11.6 9.3 8.6 9.4 9.8 9.8 10.0 10.0 15.1
LOS by Move: A A A B A A A A A B B C
ApproachDel: 9.8 10.8 9.7 13.8
Delay Adj: 1.00 1.00 1.00 1.00
ApprAdjDel: 9.8 10.8 9.7 13.8
LOS by Appr: A B A B
AllWayAvgQ: 0.1 0.1 0.1 0.3 0.0 0.0 0.1 0.2 0.2 0.3 1.6 1.6
Note: Queue reported is the number of cars per lane.
Church of the Redeemer School TIA  
Santa Clara County, California

Level Of Service Computation Report  
2000 HCM Unsignalized (Future Volume Alternative)  
Background PM

**Intersection #2: Magdalena Avenue / I-280 Northbound Ramps**

**Street Name:** I-280 Northbound Ramps, Magdalena Avenue

**Approach:** North Bound, South Bound, East Bound, West Bound

**Movement:**
- LT - LTR - RT
- LT - LTR - RT
- LT - LTR - RT
- LT - LTR - RT

**Volume Module:**
- Base Vol: 49 1 111 0 0 0 53 207 0 0 595 396
- Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- Initial Bse: 49 1 111 0 0 0 53 207 0 0 595 396
- Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
- PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
- Initial Fut: 49 1 111 0 0 0 53 207 0 0 595 396
- User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
- PHF Volume: 49 1 111 0 0 0 53 207 0 0 595 396
- Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
- Final Volume: 49 1 111 0 0 0 53 207 0 0 595 396

**Critical Gap Module:**
- Critical Gp: 6.8 6.5 6.9 xxxxx xxxxx xxxxx 4.1 xxxxx xxxxx xxxxx xxxxx
- FollowUpTim: 3.5 4.0 3.3 xxxxx xxxxx xxxxx 2.2 xxxxx xxxxx xxxxx xxxxx

**Capacity Module:**
- Cnflict Vol: 611 908 104 xxxxx xxxxx xxxxx 595 xxxxx xxxxx xxxxx xxxxx
- Potent Cap.: 430 277 938 xxxxx xxxxx xxxxx 991 xxxxx xxxxx xxxxx xxxxx
- Move Cap.: 412 262 938 xxxxx xxxxx xxxxx 991 xxxxx xxxxx xxxxx xxxxx
- Volume/Cap: 0.12 0.00 0.12 xxxxx xxxxx xxxxx 0.05 xxxxx xxxxx xxxxx xxxxx

**Level Of Service Module:**
- 2Way95thQ: xxxxx xxxxx 0.4 xxxxx xxxxx xxxxx 0.2 xxxxx xxxxx xxxxx xxxxx
- Control Del: 9.4 xxxxx xxxxx xxxxx 8.8 xxxxx xxxxx xxxxx xxxxx
- LOS by Move: * * * A * * * A * * * * * *

**Note:** Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PP PM

Intersection #2: Magdalena Avenue / I-280 Northbound Ramps

Final Vol: 53 0 0 0 0 0
Lanes: 0 0 0 0 0 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0

Critical V/C: 0.122
Avg Cnt Del (sec/veh): 1.6
Avg Delay (sec/veh): 1.6

Final Vol: 211 1 0 0 0 0
Lanes: 1 0 0 0 0 0

Final Vol: 0 0 0 0 0 0
Lanes: 0 0 0 0 0 0

Street Name: I-280 Northbound Ramps Magdalena Avenue
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Volume Module:
Base Vol: 49 1 111 0 0 0 53 207 0 0 595 396
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 49 1 111 0 0 0 53 207 0 0 595 396
Added Vol: 0 0 0 0 0 0 4 0 0 5 3
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 49 1 114 0 0 0 53 211 0 0 600 399
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 49 1 114 0 0 0 53 211 0 0 600 399
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Final Volume: 49 1 114 0 0 0 53 211 0 0 600 399

Critical Gap Module:
Critical Gp: 6.8 6.5 6.9 xxxx xxxx xxxx 4.1 xxxx xxxx xxxx 2.2 xxxx xxxx xxxx
FollowUpTim: 3.5 4.0 3.3 xxxx xxxx xxxx 2.2 xxxx xxxx xxxx

Capacity Module:
Cnflict Vol: 617 917 106 xxxx xxxx xxxx 600 xxxx xxxx xxxx 2.2 xxxx xxxx xxxx
Potent Cap.: 426 274 935 987 xxxx xxxx xxxx 987 xxxx xxxx xxxx
Move Cap.: 408 259 935 987 xxxx xxxx xxxx 987 xxxx xxxx xxxx
Volume/Cap: 0.12 0.00 0.12 0.00 0.05 0.00 0.05 0.00

Level Of Service Module:
2Way95thQ: xxxx xxxx 0.4 xxxx xxxx xxxx 0.2 xxxx xxxx xxxx 0.2 xxxx xxxx xxxx
Control Del:xxxx xxxx 9.4 xxxx xxxx xxxx 8.9 xxxx xxxx xxxx 8.9 xxxx xxxx xxxx
LOS by Move: * * A * * * * A * * * * * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: 404 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
SharedQueue: 0.4 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Shrd ConDel: 15.2 xxxx xxxx xxxx xxxx xxxx 8.9 xxxx xxxx xxxx xxxx xxxx
Shared LOS: C * * * * A * * * * * *
Approach Del: 11.1 xxxx xxxx xxxx xxxx xxxx
Approach LOS: B * * *

Note: Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PM

Intersection #3: Magdalena Avenue / Site Driveway

Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Volume Module:
Base Vol: 0 0 0 0 0 318 0 0 991 0
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 0 0 0 0 0 318 0 0 991 0
Added Vol: 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0
Initial Fut: 0 0 0 0 0 318 0 0 991 0
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 0 0 0 0 0 318 0 0 991 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0
FinalVolume: 0 0 0 0 0 318 0 0 991 0

Critical Gap Module:
Critical Gp: 6.8 xxxx 6.9 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
FollowUpTim: 3.5 xxxx 3.3 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx

Capacity Module:
Cnflict Vol: 814 xxxx 159 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Potent Cap.: 320 xxxx 864 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Move Cap.: 320 xxxx 864 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Volume/Cap: 0.00 xxxx 0.00 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx

Level Of Service Module:
2Way95thQ: xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Control Del:xxxxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx

LOS by Move: * * * * * * * * * * * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
SharedQueue:xxxxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx 0.0 xxxx xxxx
Shrd ConDel:xxxxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxxx 7.2 xxxx xxxx
Shared LOS: * * * * * * * * * A * *
ApproachDel: xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
ApproachLOS: * * *

Note: Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PP PPM

Intersection #3: Magdalena Avenue / Site Driveway

Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Volume Module:
Base Vol: 0 0 0 0 0 0 0 318 0 0 991 0
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 0 0 0 0 0 0 0 318 0 0 991 0
Added Vol: 8 0 15 0 0 0 0 0 0 7 14 0 0
Initial Fut: 8 0 15 0 0 0 0 0 0 7 14 991 0
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 8 0 15 0 0 0 0 0 0 7 14 991 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 8 0 15 0 0 0 0 0 0 7 14 991 0

Critical Gap Module:
Critical Gp: 6.8 xxxx 6.9 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx 4.1 xxxx xxxx
FollowUpTim: 3.5 xxxx 3.3 xxxx xxxx xxxx xxxx xxxx xxxx xxxx 2.2 xxxx xxxx

Capacity Module:
Cnflict Vol: 845 xxxx 163 xxxx xxxx xxxx xxxx xxxx xxxx 325 xxxx xxxx
Potent Cap.: 306 xxxx 860 xxxx xxxx xxxx xxxx xxxx xxxx 1246 xxxx xxxx
Move Cap.: 303 xxxx 860 xxxx xxxx xxxx xxxx xxxx xxxx 1246 xxxx xxxx
Volume/Cap: 0.03 xxxx 0.02 xxxx xxxx xxxx xxxx xxxx xxxx 0.01 xxxx xxxx

Level Of Service Module:
2Way95thQ: 0.1 xxxx 0.1 xxxx xxxx xxxx xxxx xxxx xxxx 0.0 xxxx xxxx
Control Del: 17.2 xxxx 9.3 xxxx xxxx xxxx xxxx xxxx xxxx 7.9 xxxx xxxx

Note: Queue reported is the number of cars per lane.
**Level Of Service Computation Report**

2000 HCM Operations (Future Volume Alternative)

Background PM

### Intersection #4: Magdalena Avenue / Foothill Expressway

**Final Vol:**

<table>
<thead>
<tr>
<th>Lanes</th>
<th>Final Vol</th>
<th>Lanes</th>
<th>Final Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>193</td>
<td>2</td>
<td>1415***</td>
</tr>
<tr>
<td>0</td>
<td>158</td>
<td>1</td>
<td>91***</td>
</tr>
<tr>
<td>2</td>
<td>1415***</td>
<td>0</td>
<td>199</td>
</tr>
<tr>
<td>0</td>
<td>158</td>
<td>1</td>
<td>148</td>
</tr>
<tr>
<td>1</td>
<td>74</td>
<td>1</td>
<td>214</td>
</tr>
</tbody>
</table>

**Street Name:** Foothill Expressway / Magdalena Avenue

**Approach:** North Bound / South Bound / East Bound / West Bound

**Movement:** L - T - R / L - T - R / L - T - R / L - T - R

- **Min. Green:** 27 75 75 24 72 72 43 43 43 48 48 48
- **Y+R:** 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0

**Saturation Flow Module:**

<table>
<thead>
<tr>
<th>Lanes</th>
<th>Sat/Lane</th>
<th>Adjustmen</th>
<th>Lanes</th>
<th>Sat/Lane</th>
<th>Adjustmen</th>
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<tbody>
<tr>
<td>1</td>
<td>1900</td>
<td>1.00</td>
<td>1.00</td>
<td>1900</td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td>3800</td>
<td>1.00</td>
<td>1.00</td>
<td>214</td>
<td>1.00</td>
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<td>1161</td>
<td>1.00</td>
<td>1.00</td>
<td>2850</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**Capacity Analysis Module:**

| Vol/Sat | 0.09 0.13 0.06 0.09 0.37 0.11 0.08 0.08 0.08 0.12 0.18 0.04 |
|         | 0.09 0.37 0.11 0.08 0.08 0.08 0.12 0.18 0.04               |

**Note:** Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PP/PIM

Intersection #4: Magdalena Avenue / Foothill Expressway

Street Name: Foothill Expressway Magdalena Avenue
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Min. Green:
27 75 75 24 72 72 43 43 43 48 48 48
Y+R:
4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0

Volume Module:
Base Vol: 158 455 100 158 1415 193 91 199 148 214 516 74
Growth Adj: 1.00 1.05 1.00 1.00 1.05 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 158 477 100 158 1415 193 91 199 148 214 516 74
Added Vol: 5 0 0 0 0 5 6 3 6 0 3 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 163 477 100 158 1415 198 97 202 154 214 519 74
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 163 477 100 158 1415 198 97 202 154 214 519 74
Reduced Vol: 163 477 100 158 1415 198 97 202 154 214 519 74
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 163 477 100 158 1415 198 97 202 154 214 519 74

Saturation Flow Module:
Sat/Lane: 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Adjustment: 0.92 1.00 0.92 1.00 0.92 0.95 0.99 0.92 0.92 0.75 0.92
Lanes: 1.00 2.00 1.00 1.00 2.00 1.00 0.67 1.33 1.00 2.00 2.00 1.00
Final Sat.: 1750 3800 1750 1750 3800 1750 1200 2499 1750 1750 2850 1750

Capacity Analysis Module:
Vol/Sat: 0.09 0.13 0.06 0.09 0.37 0.11 0.08 0.08 0.09 0.12 0.18 0.04
Crit Moves: **** **** **** ****
Green Time: 25.4 70.5 115.7 22.6 67.7 108.2 40.4 40.4 65.8 45.1 45.1 67.7
Volume/Cap: 0.70 0.34 0.09 0.76 1.05 0.20 0.38 0.38 0.25 0.51 0.77 0.12
Uniform Del: 83.6 45.6 16.4 86.2 65.0 21.1 68.1 68.1 47.3 66.9 71.8 43.7
IncremntDel: 8.9 0.1 0.0 15.0 37.1 0.1 0.3 0.3 0.2 0.3 0.8 0.1
InitQueueDel: 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Delay/Veh: 92.5 45.8 16.4 101.2 102 21.2 68.4 68.4 47.5 67.2 75.5 43.8
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 92.5 45.8 16.4 101.2 102 21.2 68.4 68.4 47.5 67.2 75.5 43.8
LOS by Move: F D B F F C+ E E D E- D
HCM2kAvgQ: 11 10 3 12 51 6 9 9 9 14 17 4

Note: Queue reported is the number of cars per lane.
City of Los Altos

12/17/15

Three intersections were chosen to be analyzed: 1) Foothill Expressway/Maple Grove 2) 2-180 N/S/Magdalena Ave 3) 1-280 S/Magdalena Ave. The signalized intersection of Spring/Flomont Avenue is very close to the intersection of Foothill Expressway/Magdalena and often runs coordinated/traffic responsive with it and is maintained by the County. Therefore we request that Spring/Flomont Avenue be included in the TIA. Based on the expected distribution of vehicle trips, the project would add a maximum of 5 northbound trips and 6 southbound trips during the AM peak hour to the Spring/Flomont intersection. This number is estimated based on the added trips at the Foothill Expressway/Magdalena intersection. Because the number of new trips is less than the typical Santa Clara County threshold of 10 trips per hour per lane, this intersection does not meet the criteria for inclusion as a study intersection. Additionally, there are no impacts of the project at any of the selected study intersections, so it is not anticipated that the project would impact intersections that are farther away from the project site.

City of Los Altos

12/17/15

The intersection of Berry Ave/Springer is a 4-way stop controlled intersection that also provides access to Loyola Elementary School. We request that this intersection also be included to understand additional impacts since school start times can be similar. Based on the expected distribution of vehicle trips, the project would add a maximum of 5 northbound trips and 6 southbound trips during the AM peak hour to the Springer/Berry intersection. This number is estimated based on the added trips at the Foothill Expressway/Magdalena intersection. Because the number of new trips is less than the typical Santa Clara County threshold of 10 trips per hour per lane, this intersection does not meet the criteria for inclusion as a study intersection. Additionally, there are no impacts of the project at any of the selected study intersections, so it is not anticipated that the project would impact intersections that are farther away from the project site.

County Planning

12/17/15

is traffic accommodated for in the analysis? - Proposed 22 staff members. It appears that the trip generation accommodated for 80 students only.

County Planning

12/17/15

Clarify what the morning, midday and afternoon-peak hours are?

County Planning

12/17/15

What are the assumed school hours of operation? For analysis purposes, the school is assumed to operate during the peak periods of the adjacent roadways between 7:45 and 8:45 AM, 3:00 to 4:00 PM and 4:00 to 5:00 PM for morning, midday and afternoon peak hours, respectively.

County Planning

12/17/15

Parking review section notes that demand is 14 vehicles for a school with 60 students. The County Zoning Ordinance parking standards require parking space per student, and one parking space per 4 fixed seats. With a school of 92 students, and 22 staff members – the minimum number of parking spaces requires 42 parking spaces. Acknowledge this information in the traffic study.

County Planning

12/17/15

Traffic study indicates that there is sufficient parking for special events. Please clarify how much parking is available for special events on site. Is there a recommended valet parking plan for off-site parking? In past church festival permits, the applicant has implemented valet parking service with another parking lot off-site to accommodate the peak overflows of parking needed for the events.

County Planning

12/17/15

Does the traffic study accommodate for special events during the school during non-school hours? Same question as above for #5.

County Planning

12/17/15

Recommended site access/circulation measures. Please provide a list that shows the mitigations can be implemented feasibly. Where is the student/parking area for student drop-off and pick-up? How many parking spaces should be converted to short term 10 minute parking and where are they located? How many bicycle parking spaces and where? Traffic study recommends striping of crosswalks across the vehicle entry driveways. Does that require any permit approvals? If so acknowledge what permits are needed.

County Planning

12/17/15

Page 3, First Sentence – The report says that the ITE trip generation rates are consistent with the generation rates measured for other K-8 private schools in Santa Clara County. Are there any data to substantiate this statement? If trip generation surveys were conducted at other private schools in Santa Clara County, then the data from these surveys should be included in the Appendix. The study should describe in layman’s terms how the school would generate only 75 trips for 80 students. Each student dropped off equals two trips. There must be inherent parking and student absence. Maybe not all students start off at the same time.

Town of Los Altos Hills

12/17/15

We recommend that the study be included at the traffic operations at the northernmost project driveway. The trip assignment shows that there would be 26 vehicles making a left-turn from westbound Magdalena Avenue entering the project driveway. Would they affect traffic operations on Magdalena Avenue? Appropriate peak hour factors should be used to reflect school activity that would occur 15-20 minutes before and after school.

Town of Los Altos Hills

12/17/15

Page 8 – The test states that there are no approved projects that would add any traffic in the area. This seems logical for Magdalena but not for Foothill Expressway. The Expressway carries long-distance trips. If no specific projects are nearby, a growth factor would be inappropriate to capture general growth. The project impact should be re-evaluated against the background conditions (with a growth factor) to see if there are any impacts.

Town of Los Altos Hills

12/17/15

Page 9, Table 2 – The trip generation numbers for the Midday and PM peak hours are revised. The peak hour rates should be swapped. The delay calculations used the correct numbers, so only the trip generation table needs to be corrected.

Town of Los Altos Hills

12/17/15

Figure 3 - Intersection #1 and #3 have been mislabeled in the figure. They need to be swapped in order to match the intersection volumes. Also update Figures 4, 5 and 4.5 accordingly.

Town of Los Altos Hills

12/17/15

Figure 4, Intersection #2 – No trips are shown for the EB through movement during the midday peak period. Project trips for this movement during the midday peak hour should be the same as the project trips during the PM peak hour. Also, no trips are shown for the WB through movement for the AM peak hour. Figure 5 should also be revised accordingly. The numbers on the boxes don’t match the numbers on the figure. Please put the boxes in the same order as the figure. This goes for all figures. The delay calculations are correct and only the figures need to be revised.

Town of Los Altos Hills

12/17/15

Figure 3 – Show driveway volumes (inbound/inbound) at the project site. These volumes should match the volumes shown in Table 2. These volumes should also balance between the three study intersections.

Town of Los Altos Hills

12/17/15

Table 4 - Label Background conditions as Existing/Background. State in the test whether the calculated LOS matches the field observations.

Town of Los Altos Hills

12/17/15

Page 5, Sign/Eccentric Criteria – The report should mention that the project impacts were evaluated based on the LOS significance impact criteria established by the Santa Clara County Congestion Management Program.

Town of Los Altos Hills

12/17/15

Page 10 – Parking Plan – The ITE Parking Generation Manual and the SDC (School District) also states that this land use consists of schools where bus service is usually provided to students living beyond a specified distance from the school. Since the proposed project would not serve any bus service, the study should note that the parking demand may be greater than the average demand of 0.17 vehicles per student. However, adequate parking spaces would be available on site.

Town of Los Altos Hills

12/17/15

Page 11, Overall Review – In the last paragraph, “In summary, with the changes above and the attached memorandum, work is underway.”

Town of Los Altos Hills

12/17/15

Page 12, Project Overview – In the first sentence, it should be “west of Foothill Expressway”, instead of south of Foothill Expressway.

Town of Los Altos Hills

12/23/15

Based on previous studies done for similar schools, Hexagon recommends using a higher trip generation rate. Although the ITE rate is well recognized it might be representative of this particular school. An AM peak hour trip generation rate of 1.5 trips per student per period would produce more conservative values for this project and school trips.

Town of Los Altos Hills

12/23/15

The traffic study recommends changes to the site plan, but the site plan included shown on Figure 1 does not reflect these recommendations. The traffic study should include a modified site plan that incorporates the recommendations before it moves forward.

The County of Santa Clara is conditioning the project so the site plan recommendations will be incorporated into the final site and school plans submitted with the final grading and building permits.
Memorandum

Date: February, 19, 2016
To: Mr. Richard Chiu, Town of Los Altos Hills
From: Gary Black
Subject: Church of the Redeemer School Traffic Study Comments

Hexagon Transportation Consultants, Inc. has reviewed the Fehr & Peers traffic study dated November 17, 2015 for the Church of the Redeemer School proposed pre-K through 8th grade private school. This memorandum presents the findings from the peer review.

Trip Generation

Based on previous studies done for similar schools, Hexagon recommends using a higher trip generation rate. Although the ITE rate is well recognized it might not be representative of this particular school. An AM peak hour trip generation rate of 1.5 trips per student would produce more conservative values for this project and school type.

Site Plan Recommendations

The traffic study recommends changes to the site plan, but the site plan included shown on Figure 1 does not reflect these recommendations. The traffic study should include a modified site plan that incorporates the recommendations before it moves forward.
MEMORANDUM

Date: November 17, 2015
To: Father Samer Youssef, Church of the Redeemer
From: Sarah Jampole and Matt Haynes, Fehr & Peers
Subject: Church of the Redeemer School – Focused Transportation Impact Analysis

Fehr & Peers has prepared a focused transportation impact analysis (TIA) and site plan review for a proposed expansion of the Antiochian Orthodox Church of the Redeemer, located at 380 Magdalena Avenue in unincorporated Santa Clara County, California. The purpose of a transportation impact analysis is to evaluate how a proposed project will affect transportation conditions on surrounding streets and intersections. This TIA evaluates how the proposed project will affect automobile, bicycle, pedestrian, and transit conditions. It also considers whether the project will have a significant adverse effect on the transportation system according to the criteria and thresholds consistent with the California Environmental Quality Act (CEQA).

The proposed project includes an expansion of the existing church facilities to accommodate planned church activities and a new school that will be used for kindergarten – eighth grade students.

PROJECT OVERVIEW

The Los Altos Antiochian Orthodox Church of the Redeemer is located on the south side of Magdalena Avenue, south of Foothill Expressway and adjacent to Interstate 280 (I-280). Existing church facilities consist of the church building and two buildings with uses such as a fellowship hall and administrative offices, as well as surface parking with 91 spaces. The proposed project proposes a new two-story, 17,634 square foot building at the Los Altos Antiochian Orthodox Church of the Redeemer in place of the existing two buildings being used as a fellowship hall and administrative offices. This new building will be used as a K-8 school with nine classrooms, administrative offices, a fellowship hall, and a kitchen. The existing surface parking will be
This building will be constructed adjacent to the existing church facilities. The site plan is shown in Figure 1.

**PROJECT TRIP ESTIMATES**

The automobile traffic generated by the proposed project, along with how it could potentially affect the surrounding transportation system, was estimated using a three-step process:

1. **Trip generation** – estimate the amount of new vehicle traffic created by the project
2. **Trip distribution** – define the origins and destinations of vehicles traveling to and from the project site
3. **Trip assignment** – assign project trips to specific street segment and intersection turning movements

The Santa Clara Valley Transportation Authority (VTA) is responsible for evaluating transportation impacts of land use decisions, such as development projects, in Santa Clara County. In October 2014, VTA adopted updated guidelines for transportation impact analyses (TIAs). The TIA Guidelines are commonly used and are adopted by all jurisdictions in Santa Clara County. These guidelines state that a full TIA is required for projects that will generate more than 100 vehicle trips during the peak hour of the surrounding roadways. Projects that do not meet this threshold, such as the proposed project, are not required to follow these guidelines.

Each of these steps is described in more detail below.

**TRIP GENERATION**

All new land uses would generate “trips” to and from the site. Some of the trips are made by car, and the methods of estimating these new trips are well documented using published research and manuals. For this project, trip generation focuses on AM and PM peak hour conditions since those reflect the period where traffic delays are highest. Because this project is a school, however, it is important to analyze midday conditions near the time of school dismissal to evaluate potential impacts of the project. While the analysis in this memorandum is centered around vehicle trips, new bicycle and walking trips would also likely be generated by the project.

Automobile trip generation for the proposed development was developed using appropriate rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 9th Edition* (2012). Trips generated by the proposed school for 80 students were estimated using trip generation rates for the “Private School (K-8)” land use (Code 534). These rates are consistent with
trip generation rates measured for other K-8 private schools in Santa Clara County. Equations to develop trip generation were available for the morning and afternoon peak hours to coincide with the peak travel periods associated with school traffic and are given below in **Table 1**. To be conservative, it was assumed that an equal number of trips would be generated during the evening peak hour as in the afternoon peak hour in order to identify any potential impacts during the evening peak hour when background vehicle volumes are generally at their highest.

**TABLE 1: TRIP GENERATION RATES**

<table>
<thead>
<tr>
<th></th>
<th>AM Peak Hour</th>
<th>Midday Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Generation</td>
<td>0.9*X+3.01</td>
<td>0.61*X-4.7</td>
<td>0.61*X-4.7</td>
</tr>
<tr>
<td>Equation(^1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


**Notes:**
1. \(X\) = number of students in K-8 school.

The trip generation table, showing the number of vehicle trips that the project would create, is presented below in **Table 2**.

**TABLE 2: PROJECT TRIP GENERATION**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Students</th>
<th>AM Peak Hour</th>
<th>Midday Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>In</td>
<td>Out</td>
<td>Total</td>
</tr>
<tr>
<td>Private School (K-8)</td>
<td>80</td>
<td>41</td>
<td>34</td>
<td>75</td>
</tr>
</tbody>
</table>


**TRIP DISTRIBUTION**

Trip distribution shows the origins and/or destinations of vehicles that are traveling to the project site. Generally, trip distribution is presented as a percentage of total trips going to and from the site that use a particular route, and each route providing access to the project site is given a percentage of the trips. The directions of approach and departure for the project trips were estimated based on existing travel patterns and the roadway network in the area surrounding the project site and are detailed in **Figure 2**. While trip distribution may vary, the project applicant provided information in June 2015 regarding the expected student residence locations of the type of school expected to occupy the site. The applicant anticipates that most students will live near the project site, while a portion would travel from further away. As such, 70 percent of the trips were assumed to use Foothill Expressway, Springer Street, or Magdalena Avenue from local neighborhoods, while 30 percent would come from I-280.
Figure 2

Project Trip Distribution
TRIP ASSIGNMENT

Trip assignment takes the trip generation and the trip distribution for a project and designates project volumes to turning movements at the study intersection (e.g., to the left turn at an intersection). Based on the trip distribution discussed in the section above and displayed in Figure 2, the new vehicle trips were assigned to the surrounding roadway network. The proposed distribution of project trips on the surrounding roadway network and study intersections is shown in Figure 3.

INTERSECTION EVALUATION

This section discusses the operation of the three study intersections that could be affected by the proposed project. The intersections considered in the analysis are:

1. Magdalena Avenue / Foothill Expressway (signalized)
2. Magdalena Avenue / I-280 Northbound Ramps (side-street stop-controlled)
3. Magdalena Avenue / I-280 Southbound Ramps – Eastbrook Avenue (all-way stop-controlled)

Intersections were selected for analysis after conducting the trip generation and assignment steps described previously. Minor intersections near the project site are generally not selected for analysis because the addition of through traffic generally does not affect intersection operations as greatly as intersections where turning vehicles will be added.

LEVEL OF SERVICE CALCULATIONS

Operations of the study intersections were evaluated using the method described in Chapter 16 of the 2000 Highway Capacity Manual (HCM) (Special Report 209, Transportation Research Board). The HCM provides techniques, such as equations, for analyzing operations of roadways and intersections, and is considered state-of-the-practice as it is widely used and adopted by agencies in the Bay Area. These techniques are applied in software packages used for intersection analysis. This method evaluates signalized intersection operations on the average vehicular delay, and unsignalized intersection operations on the approach with the most delay. The average delay for intersections is calculated using TRAFFIX 8.0 analysis software and is correlated to a level of service (LOS) designation. TRAFFIX software uses the methods given in the 2000 edition of the HCM, which is the methodology approved by VTA for use in Santa Clara County. LOS criteria are detailed below in Table 3.
Figure 3

Project Trip Assignment
### TABLE 3: INTERSECTION LOS CRITERIA

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Description</th>
<th>Signalized Intersection Delay (seconds)</th>
<th>Unsignalized Intersection Delay (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.</td>
<td>&lt; 10.0</td>
<td>&lt; 10.0</td>
</tr>
<tr>
<td>B</td>
<td>Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.</td>
<td>&gt; 10.0 to 20.0</td>
<td>&gt; 10.0 to 15.0</td>
</tr>
<tr>
<td>C</td>
<td>Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.</td>
<td>&gt; 20.0 to 35.0</td>
<td>&gt; 15.0 to 25.0</td>
</tr>
<tr>
<td>D</td>
<td>The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.</td>
<td>&gt; 35.0 to 55.0</td>
<td>&gt; 25.0 to 35.0</td>
</tr>
<tr>
<td>E</td>
<td>This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.</td>
<td>&gt; 55.0 to 80.0</td>
<td>&gt; 35.0 to 50.0</td>
</tr>
<tr>
<td>F</td>
<td>This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.</td>
<td>&gt; 80.0</td>
<td>&gt; 50.0</td>
</tr>
</tbody>
</table>

SIGNIFICANCE CRITERIA

The impacts of the project were evaluated by comparing the results of the level of service calculations for the Background plus Project Conditions scenario to the Background Conditions scenario.

The project would result in an impact at the signalized intersection of Magdalena Avenue and Foothill Expressway when the addition of project traffic causes one of the following:

- Intersection operations to deteriorate from LOS E to LOS F; or
- Exacerbate unacceptable operations (LOS F) by increasing the average critical delay by four seconds or more and increasing the critical volume-to-capacity (V/C) ratio by 0.01 or more.

The project would result in an impact at an unsignalized intersection when the addition of project traffic causes the worst approach at a side-street stop-controlled unsignalized intersection, or the entire intersection for a four-way stop controlled intersection, to operate at LOS F.

DATA COLLECTION

Morning, afternoon, and evening peak period intersection turning movement counts were conducted on a typical weekday in September 2015 at the three study intersections, except at the Magdalena Avenue / Foothill Expressway intersection, where morning and evening intersection turning movement counts were provided by the County of Santa Clara. Data provided by the County of Santa Clara was collected in 2014 as part of the Expressway Plan 2040 project which is studying the operations of each expressway in Santa Clara County in order to identify projects to upgrade existing deficiencies for vehicles, pedestrians, and bicycles.

Physical characteristics of the study area, the surrounding roadway network, and adjacent land uses were also reviewed to confirm existing roadway cross-sections, intersection lane configurations, and traffic control devices. These observations are detailed below.

EXISTING CONDITIONS

Existing Conditions represent current roadway volumes and conditions. Field observations were performed in September 2015 on the same days that turning movement counts were collected.
Intersection Operations

Intersection operations at the three study intersections along Magdalena Avenue were observed during the peak hours. The intersections at the I-280 interchange operated with little delay on any of the approaches. No excessive vehicle queues were observed, and vehicles did not suffer from long waits to turn on and off the freeways. The intersection of Magdalena Avenue and Foothill Expressway, however, was congested with queues of more than 20 vehicles observed on Foothill Expressway during the peak hours. In addition, vehicles waiting to turn right onto Foothill Expressway from Magdalena Avenue or Springer Street often were not able turn right on red due to long queues from through or left-turning vehicles. This resulted in more long queues for right-turning vehicles.

Bicycle and Pedestrian Observations

Magdalena Avenue has striped bike lanes from the I-280 interchange east to Foothill Expressway. No bicycle facilities exist on the west side of I-280. On the east side of Foothill Expressway, Magdalena Avenue changes to Springer Road, which also has bike lanes north to El Camino Real. Foothill Expressway has shoulders that are not designated as bike lanes, but are frequently used by cyclists. Little bicycle activity was observed during the peak hours, with bicycle activity appearing to be through traffic along Magdalena Avenue and Foothill Expressway, rather than originating or ending in the study area.

Magdalena Avenue has sidewalks along the south side from the I-280 interchange east to Foothill Expressway. Along the north side, sidewalks are discontinuous, with gaps between I-280 and Hillview Road and in the vicinity of Gronwall Lane and Magdalena Court. Foothill Expressway lacks sidewalks near Magdalena Avenue. Signalized crosswalks are located at Summerhill Avenue and Foothill Expressway, while an unsignalized crosswalk is located at the I-280 Southbound Ramps – Eastbrook Avenue intersection. Little pedestrian activity was observed during the peak hours, with pedestrian activity centered near the signalized intersections to cross between the residential areas divided by Magdalena Avenue and Foothill Expressway.

Transit Operations

No fixed-route transit systems currently operate in the study area. No public transit vehicles were observed along Magdalena Avenue or Foothill Expressway near the project site.
BACKGROUND CONDITIONS

Background Conditions represent Existing Conditions plus traffic generated by approved (but not yet constructed or occupied) projects near the project site. Evaluating background conditions is important to assess conditions with and without the project in a scenario where approved projects in the area of the project site are constructed. These projects would add vehicles to the roadways being studied; therefore, background conditions represent the combined effect of future development and roadway projects on the study area. Project lists were solicited from the County of Santa Clara, the Town of Los Altos Hills, and the City of Los Altos. No approved or unoccupied projects that would substantially affect traffic conditions were located in the immediate vicinity of the proposed project site. In addition, no roadway improvements are planned and funded in the study area. Therefore, background conditions are assumed to be equal to existing conditions as of September 2015.

Existing intersection lane configuration, signal timings, and peak hour turning movement volumes were used to calculate the LOS for the intersection during each peak hour. The peak hour traffic volumes and lane configurations are shown in Figure 4.

BACKGROUND PLUS PROJECT CONDITIONS

Background plus Project Conditions represent Background Conditions plus project automobile trips calculated using the trip generation and distribution discussed earlier in this memorandum. No geometric changes at the study intersections were assumed with the addition of the project. The Background plus Project turning movement volumes were used to calculate the delay and LOS for Background plus Project conditions. The peak hour traffic volumes and lane configurations for Background plus Project Conditions are shown in Figure 5. LOS calculations are given below in Table 4.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Control</th>
<th>Peak Hour</th>
<th>Background</th>
<th>Background plus Project</th>
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<td></td>
<td></td>
<td></td>
<td>Delay</td>
<td>Delay</td>
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<td></td>
<td></td>
<td></td>
<td>LOS</td>
<td>LOS</td>
</tr>
<tr>
<td>1. Magdalena Avenue / Foothill Expressway</td>
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<td>AM</td>
<td>55.1</td>
<td>55.5</td>
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<tr>
<td></td>
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<td>58.6</td>
<td>58.7</td>
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<td>71.1</td>
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<td></td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>2. Magdalena Avenue / I-280 Northbound Ramps</td>
<td>SSSC</td>
<td>AM</td>
<td>15.4</td>
<td>15.6</td>
</tr>
<tr>
<td></td>
<td></td>
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</table>
Figure 4
Peak Hour Traffic Volumes and Lane Configurations - Background Conditions
## Figure 5
Peak Hour Traffic Volumes and Lane Configurations - Background plus Project Conditions

<table>
<thead>
<tr>
<th>Location</th>
<th>AM (Midday)</th>
<th>PM (Evening)</th>
<th>AM (Midday)</th>
<th>PM (Evening)</th>
<th>AM (Midday)</th>
<th>PM (Evening)</th>
<th>AM (Midday)</th>
<th>PM (Evening)</th>
<th>AM (Midday)</th>
<th>PM (Evening)</th>
<th>AM (Midday)</th>
<th>PM (Evening)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Foothill Expressway/Magdalena Avenue</td>
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<tr>
<td>Magdalena Avenue</td>
<td>151 [129] (97) 481 [268] (202)</td>
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<td>Magdalena Avenue</td>
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<tr>
<td>I-280 Northbound/Magdalena Avenue</td>
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<tr>
<td>Magdalena Avenue</td>
<td>94 [50] (53) 511 [320] (211)</td>
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<tr>
<td>I-280 Southbound/Magdalena Avenue</td>
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<tr>
<td>Magdalena Avenue</td>
<td>33 [38] (29) 176 [93] (99)</td>
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</tbody>
</table>

Source: SJ15 Projects SJ15_Projects SJ15_1620_Chrch_of_the_Redeemer_TIA Graphics
3. Magdalena Avenue / I-280 Southbound Ramps – Eastbrook Avenue

<table>
<thead>
<tr>
<th></th>
<th>AM</th>
<th>Afternoon</th>
<th>PM</th>
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</thead>
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<tr>
<td>AWSC</td>
<td>14.3</td>
<td>10.8</td>
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<td>B</td>
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<td>B</td>
</tr>
<tr>
<td>PM</td>
<td>14.6</td>
<td>10.9</td>
<td>12.5</td>
</tr>
<tr>
<td>night</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

Notes:
2. SSSC = side-street stop-controlled. AWSC = all-way stop-controlled.
3. AM = morning peak hour, afternoon = midday peak hour, PM = evening peak hour.
4. Whole intersection weighted average control delay expressed in seconds per vehicle calculated using methods described in the 2000 Highway Capacity Manual, with adjusted saturation flow rates to reflect Santa Clara County Conditions for signalized intersections. For the side-street stop-controlled intersection, values reported are for the worst approach.
5. LOS = level of service. LOS calculations conducted using the TRAFFIX analysis software package, which applies the methods described in the 2000 Highway Capacity Manual.

As detailed above in Table 4, all intersections operate acceptably under Background and Background plus Project. As such, the proposed project of a K-8 school at the Antiochian Church of the Redeemer will not negatively impact intersection operations in the surrounding area.

Impacts to Bicycles and Pedestrians

The project would not construct any physical changes to the public right-of-way that would negatively impact bicycles or pedestrians. Existing bicycle lanes and sidewalks to access the project site would be maintained with construction of the project.

SITE PLAN AND PARKING REVIEW

Fehr & Peers also reviewed the current site plan (received by Fehr & Peers in May 2015) for the project to determine if there are any site access/circulation or parking deficiencies associated with the project.

SITE ACCESS AND CIRCULATION

The proposed site plan is in Figure 1. Vehicles accessing the Church of the Redeemer site will do so using the northernmost driveway onto Magdalena Avenue. Based on the proposed site plan, we recommend several changes be considered to ensure for efficient access and circulation of automobiles, as well as bicycle and pedestrians, on the site. Potential changes to consider include:

- The site plan should incorporate a dedicated student drop-off and pick-up area where vehicles can pull up directly to a curb. This drop-off and pick-up area should be located near the school entrance for students to avoid having students walking through the parking lot. In addition, the site plan could convert some of the parking spaces near the
school entrance to short term (10 minute) parking spaces to accommodate parents who need to exit their vehicle during drop-off or pick-up times. The applicant indicated these changes will be made in a future revision of the site plan.

- The site plan should provide bicycle parking spaces for students or staff.
- The site plan should stripe crosswalks across the existing vehicle entry driveways to the project site that will remain with the project, as there is existing sidewalk along the project frontage.

PARKING REVIEW

We also performed a review of the projects proposed parking supply and expected demand. The project will provide 88 parking spaces and four accessible parking spaces, including one space specifically reserved for accessible vans, for a total of 92 spaces. The ITE Parking Generation Manual, 4th Edition (2010) estimates that peak period parking demand for schools is approximately 0.17 vehicles per student. This would result in a peak period parking demand of 14 vehicles for a school with 80 students. 74 spaces would remain for use during school hours by people using the other church facilities or visitors to the school. These excess spaces would also be available for pick-up and drop-off traffic, which the ITE rates do not account for.

SPECIAL EVENTS AND SUNDAY TRIP GENERATION

A qualitative review of special events and the change in Sunday vehicle traffic around the Church of the Redeemer is given in the following section.

SPECIAL EVENTS

The project applicant indicated that special events that use church facilities, such as a wedding or funeral, would not take place during school hours or during periods of peak travel on the adjacent roadways. This would not change with the construction of the proposed building. As such, there would continue to be sufficient parking for these events, and these events would not negatively impact peak hour travel.

SUNDAY TRIP GENERATION

The proposed project provides facilities to existing church members and activities. It is not expected that these facilities would result in an increase in traffic on Sundays, therefore, vehicle traffic patterns on Sundays are anticipated to be the same with the proposed project.
ATTACHMENT A: INTERSECTION AND ROADWAY COUNTS
Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5220 FOOTHILL/MAGDALENA

Cycle (sec): 150                Critical Vol./Cap.(X): 0.715
Loss Time (sec): 12                Average Delay (sec/veh): 57.2
Optimal Cycle: 171                Level Of Service: E+

Street Name: FOOTHILL EXPWY        MAGDALENA AVE
Approach: North Bound      South Bound       East Bound       West Bound
Movement: L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R

Control: Protected        Protected       Split Phase      Split Phase
Min. Green: 32 68 68 19 55 55 38 38 38 34 34 34
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0
Lanes: 1 0 2 0 1    1 0 2 0 1    0 1 1 0 1    1 1 1 0 1

Volume Module: >> Count Date: 26 Sep 2013 << 8 : 00 - 9 : 00
Base Vol: 146 926 124 120 259 101 142 476 152 227 532 153
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 146 926 124 120 259 101 142 476 152 227 532 153
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 146 926 124 120 259 101 142 476 152 227 532 153
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 146 926 124 120 259 101 142 476 152 227 532 153
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 146 926 124 120 259 101 142 476 152 227 532 153

Saturation Flow Module:
Sat/Lane: 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Adjustment: 0.92 1.00 0.92 1.00 0.92 1.00 0.92 0.92 0.92 0.75 0.92 0.92
Lanes: 1.00 2.00 1.00 1.00 2.00 1.00 0.49 1.51 1.00 1.00 2.00 1.00
Final Sat.: 1750 3800 1750 1750 3800 1750 856 2870 1750 1750 2850 1750

Capacity Analysis Module:
Vol/Sat: 0.08 0.24 0.07 0.07 0.07 0.06 0.17 0.17 0.09 0.13 0.19 0.09
Green Time: 28.1 59.6 89.5 16.7 48.2 81.6 33.3 33.3 61.4 29.8 29.8 46.5
Volume/Cap: 0.45 0.61 0.12 0.62 0.21 0.11 0.75 0.75 0.21 0.65 0.94 0.28
Delay/Veh: 62.7 47.3 20.9 78.4 45.6 24.6 65.7 65.7 32.8 64.4 85.9 44.9
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 62.7 47.3 20.9 78.4 45.6 24.6 65.7 65.7 32.8 64.4 85.9 44.9
LOS by Move: E  D  C+  E-  D     C     E    E    C-     E    F     D

Note: Queue reported is the number of cars per lane.
# Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>02:00 PM</td>
<td>15</td>
<td>101</td>
<td>44</td>
<td>161</td>
<td>23</td>
<td>51</td>
<td>19</td>
<td>93</td>
<td>19</td>
<td>83</td>
<td>19</td>
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<td>0</td>
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<tr>
<td>02:15 PM</td>
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<tr>
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<td>15</td>
<td>115</td>
<td>42</td>
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# Traffic Data Service

Campbell, CA
(408) 377-2988
tdsbay@cs.com
### URS Model 2040 Expressways Study

#### Foothill Expressway

**Existing PM**

---

**Level Of Service Computation Report**

2000 HCM Operations Method (Base Volume Alternative)

### Intersection #5220 FOOTHILL/MAGDALENA

| Cycle (sec): | 190 | Critical Vol./Cap.(X): | 0.750 |
| Loss Time (sec): | 12 | Average Delay (sec/veh): | 73.3 |
| Optimal Cycle: | 202 | Level Of Service: | E |

### Street Name:

- **FOOTHILL EXPWY**
- **MAGDALENA AVE**

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| Control: | Protected | Protected | Split Phase | Split Phase |
| Min. Green: | 27 | 75 | 75 | 24 | 72 | 72 | 43 | 43 | 43 | 48 | 48 | 48 |
| Y+R: | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lanes: | 1 | 0 | 2 | 0 | 1 |

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Note: Queue reported is the number of cars per lane.
## Traffic Data Service

**Campbell, CA**  
**(408) 377-2988**  
**tdsbay@cs.com**

File Name: 2AM FINAL  
Site Code: 00000002  
Start Date: 9/24/2015  
Page No: 1

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**Traffic Data Service**
Campbell, CA
(408) 377-2988
tdsbay@cs.com

File Name: 2PM FINAL
Site Code: 00000002
Start Date: 9/24/2015
Page No: 1
### Peak Hour Data

**Peak Hour Begins at 02:30 PM**

#### Vehicles

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Total Volume: 396

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**Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1**

Peak Hour for Entire Intersection Begins at 04:00 PM

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Total Volume: 396

% App. Total:

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**Traffic Data Service**

Campbell, CA
(408) 377-2988
tdsbay@cs.com
### Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:45 AM

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### Traffic Data Service

Campbell, CA  
(408) 377-2988  
tdsbay@cs.com

File Name: 3AM FINAL  
Site Code: 00000003  
Start Date: 9/24/2015  
Page No: 1
Traffic Data Service
Campbell, CA
(408) 377-2988
tdsbay@cs.com

I-280 SB RAMPS
MAGDALENA AVE
EASTBROOK AVE

Right
26
Thru
29
Left
327

In
Out
Total
295
295
677

Right
212
Thru
75
Left
87

Out
In
Total
598
374
972

Left
1
Thru
50
Right
97

Out
In
Total
118
148
266

Peak Hour Begins at 07:45 AM
Vehicles

North

MAGDALENA AVE

EASTBROOK AVE

Out
In
Total
118
148
266

Left
Thru
Right
1
50
97
### Traffic Data Service

Campbell, CA  
(408) 377-2988  
tdsbay@cs.com

**File Name:** 3PM FINAL  
**Site Code:** 00000003  
**Start Date:** 9/24/2015  
**Page No:** 1

#### Groups Printed: Vehicles

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#### Peak Hour Analysis

**Peak Hour for Entire Intersection Begins at:** 03:00 PM

- **Peak Hour From 02:00 PM to 03:45 PM - Peak 1 of 1**
- **Start Time:** 03:00 PM
- **Peak Hour from:** 03:00 PM to 03:54 PM

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Peak Hour Data

Peak Hour Begins at 03:00 PM
Vehicles

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

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Total Volume: 266
% App. Total: 15.3
PHF: .722
Traffic Data Service
Campbell, CA
(408) 377-2988
tdsbay@cs.com

Peak Hour Data
Peak Hour Begins at 04:00 PM
Vehicles

280 SB RAMPS
Out 530
In 170
Total 700

Right

26

Thru

25

Left

119

In

Out

Total

482

116

113

Out

Total

259

647

906

In

79

65

144

Out

Total

Left

29

Thru

98

Right

5

North

421

121

144

2

In

Out

Total

144

132

276

Peak Hour Data

North

Campbell, CA
(408) 377-2988
tdsbay@cs.com
**Traffic Data Service -- Campbell, CA**

**Event Counts**

**Datasets:**
- Site: [1EB] MAGDALENA AVE BETWEEN SUMMERHILL AVE AND MAGDALENA CT
- Input A: 
  - 2 - East bound. - Lane= 0, Added to totals. (/2.000)
- Input B: 
  - 0 - Unused or unknown. - Lane= 0, Excluded from totals.
- Data type: Axle sensors - Separate (Count)

**Profile:**
- Name: Default Profile
- Scheme: Count events divided by setup divisor
- Units: Non metric (ft, mi, ft/s, mph, lb, ton)

**Wednesday, September 23, 2015=2705 (Incomplete) , 15 minute drops**

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**Thursday, September 24, 2015=6609, 15 minute drops**

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**Friday, September 25, 2015=977 (Incomplete) , 15 minute drops**

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Traffic Data Service -- Campbell, CA

Event Counts

Datasets:
- Site: [1WB] MAGDALENA AVE BETWEEN SUMMERHILL AVE AND MAGDALENA CT
- Input A: 4 - West bound. - Lane= 0, Added to totals. (/2.000)
- Input B: 0 - Unused or unknown. - Lane= 0, Excluded from totals.
- Data type: Axle sensors - Separate (Count)

Profile:
- Name: Default Profile
- Scheme: Count events divided by setup divisor
- Units: Non metric (ft, mi, ft/s, mph, lb, ton)

* Wednesday, September 23, 2015=3799 (Incomplete), 15 minute drops

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* Thursday, September 24, 2015=7658, 15 minute drops

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AM Peak 0800 - 0900 (737), AM PHF=0.81 PM Peak 1600 - 1700 (891), PM PHF=0.92

* Friday, September 25, 2015=3268 (Incomplete), 15 minute drops

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AM Peak 0745 - 0845 (649), AM PHF=0.81
ATTACHMENT B: INTERSECTION ANALYSIS SHEETS
## Summary Scenario Comparison Report (With Average Critical Delay)
**Future Volume Alternative**

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<thead>
<tr>
<th>Intersection</th>
<th>LOS</th>
<th>Avg Del (sec)</th>
<th>Avg Crit Del (sec)</th>
<th>Avg</th>
<th>Avg Crit Del (sec)</th>
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<th>Background PP AM</th>
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Intersection #1: Magdalena Avenue / Foothill Expressway

Street Name:       Foothill Expressway                 Magdalena Avenue
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R

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Volume Module:
Base Vol:     146  926   124   120  259   101   142  476   152   227  532   153
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  146  926   124   120  259   101   142  476   152   227  532   153
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  146  926   124   120  259   101   142  476   152   227  532   153
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   146  926   124   120  259   101   142  476   152   227  532   153
Reduced Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  146  926   124   120  259   101   142  476   152   227  532   153

Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.92  0.92  0.92 0.75  0.92
Lanes:       1.00 2.00  1.00  1.00 2.00  1.00  0.47 1.53  1.00  1.00 2.00  1.00
Final Sat.:  1750 3800  1750  1750 3800  1750   850 2849  1750  1750 2850  1750

Capacity Analysis Module:
Vol/Sat:      0.08 0.24   0.07  0.07 0.07  0.06  0.17 0.17   0.09  0.13 0.19   0.09
Crit Moves:   ****  ****   ****  ****
Green Time:   28.1 59.6   89.5  16.7 48.2   81.6  33.3 33.3   61.4 29.8 29.8   46.5
Volume/Cap:   0.45 0.61   0.12  0.62 0.21   0.11  0.75 0.75   0.21 0.65 0.94   0.28
Delay/Veh:    62.6 41.8   15.0  78.4 42.3   18.9  66.0 66.0   32.8 64.4 85.9   44.9
User DelAdj:   1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00 1.00 1.00   1.00
AdjDel/Veh:    62.6 41.8   15.0  78.4 42.3   18.9  66.0 66.0   32.8 64.4 85.9   44.9
LOS by Move:     E    D     B    E-    D    B-     E    E    C-     E    F     D
HCM2kAvgQ:    7 19    3  7   5   3   17 17   5 12 17   6
Note: Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PP AM

Intersection #1: Magdalena Avenue / Foothill Expressway

Street Name: Foothill Expressway       Magdalena Avenue
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Min. Green: 32 68 68 19 55 55 38 38 38 34 34 34
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0

Volume Module:
Base Vol: 146 926 124 120 259 101 142 476 152 227 532 153
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 146 926 124 120 259 101 142 476 152 227 532 153
Added Vol: 10 0 0 0 0 0 10 9 5 9 0 6 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 156 926 124 120 259 111 151 481 161 227 538 153
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 156 926 124 120 259 111 151 481 161 227 538 153
Reduced Vol: 0 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 156 926 124 120 259 111 151 481 161 227 538 153
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Final Volume: 156 926 124 120 259 111 151 481 161 227 538 153

Saturation Flow Module:
Sat/Lane: 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Adjustment: 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.75 0.92 0.75 0.92
Lanes: 1.00 2.00 1.00 1.00 2.00 1.00 1.00 2.00 1.00 2.00 1.00 2.00
Final Sat.: 1750 3800 1750 1750 3800 1750 884 2815 1750 1750 2850 1750

Capacity Analysis Module:
Vol/Sat: 0.09 0.24 0.07 0.07 0.07 0.07 0.06 0.17 0.17 0.09 0.13 0.19 0.09
Crit Moves: **** **** **** ****
Green Time: 28.1 59.6 89.5 16.7 48.2 81.6 33.3 33.3 61.4 61.4 29.8 29.8 46.5
Volume/Cap: 0.48 0.61 0.12 0.62 0.21 0.12 0.77 0.77 0.22 0.22 0.65 0.95 0.28
Delay/Veh: 63.1 41.8 15.0 78.4 42.3 19.0 66.8 66.8 33.0 64.4 88.0 44.9
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 63.1 41.8 15.0 78.4 42.3 19.0 66.8 66.8 33.0 64.4 88.0 44.9
LOS by Move: E D B E- D B- E E C- E F D
HCM2kAvgQ: 8 19 3 7 5 3 17 17 6 12 18 6

Note: Queue reported is the number of cars per lane.
Intersection #2: Magdalena Avenue / I-280 Northbound Ramps

Street Name: I-280 Northbound Ramps Magdalena Avenue
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Volume Module:
Base Vol: 97 1 278 0 0 0 94 503 0 0 285 416
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 97 1 278 0 0 0 94 503 0 0 285 416
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 97 1 278 0 0 0 94 503 0 0 285 416
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 97 1 278 0 0 0 94 503 0 0 285 416
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 97 1 278 0 0 0 94 503 0 0 285 416

Critical Gap Module:
Critical Gp: 6.8 6.5 6.9 xxxxx xxxxx xxxxx 4.1 xxxxx xxxxx xxxxx xxxxx
FollowUpTim: 3.5 4.0 3.3 xxxxx xxxxx xxxxx 2.2 xxxxx xxxxx xxxxx xxxxx

Capacity Module:
Conflict Vol: 834 976 252 xxxxx xxxxx xxxxx 285 xxxxx xxxxx xxxxx xxxxx
Potent Cap.: 311 253 754 xxxxx xxxxx xxxxx 1289 xxxxx xxxxx xxxxx xxxxx
Move Cap.: 293 234 754 xxxxx xxxxx xxxxx 1289 xxxxx xxxxx xxxxx xxxxx
Volume/Cap: 0.33 0.00 0.37 xxxxx xxxxx xxxxx 0.07 xxxxx xxxxx xxxxx xxxxx

Level Of Service Module:
2Way95thQ: xxxxx xxxxx 1.7 xxxxx xxxxx xxxxx 0.2 xxxxx xxxxx xxxxx xxxxx xxxxx
Control Del: xxxxx xxxxx 12.5 xxxxx xxxxx xxxxx 8.0 xxxxx xxxxx xxxxx xxxxx xxxxx
LOS by Move: * A B * A * * * * Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
SharedCap.: 292 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
SharedQueue: 1.4 xxxxx xxxxx xxxxx xxxxx xxxxx 0.2 xxxxx xxxxx xxxxx xxxxx xxxxx
Shrd ConDel: 23.4 xxxxx xxxxx xxxxx xxxxx xxxxx 8.0 xxxxx xxxxx xxxxx xxxxx xxxxx
Shared LOS: C A * * * * * * * ApproachDel: 15.4 xxxxx xxxxx xxxxx
ApproachLOS: C * * *
Intersection #2: Magdalena Avenue / I-280 Northbound Ramps

Street Name: I-280 Northbound Ramps Magdalena Avenue

Approach: North Bound South Bound East Bound West Bound

Movement: L - T - R L - T - R L - T - R L - T - R

Volume Module:

Base Vol: 97 1 278 0 0 0 94 503 0 0 285 416
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 97 1 278 0 0 0 94 503 0 0 285 416
Added Vol: 0 0 6 0 0 0 0 8 0 0 7 5
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 97 1 284 0 0 0 94 511 0 0 292 421
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 97 1 284 0 0 0 94 511 0 0 292 421
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 97 1 284 0 0 0 94 511 0 0 292 421

Capacity Module:

Cnflict Vol: 845 991 256 xxxxx xxxxx xxxxx 292 xxxxx xxxxx xxxxx
Potent Cap.: 306 248 750 xxxxx xxxxx xxxxx 1281 xxxxx xxxxx xxxxx
Move Cap.: 288 229 750 xxxxx xxxxx xxxxx 1281 xxxxx xxxxx xxxxx
Volume/Cap: 0.34 0.00 0.38 xxxxx xxxxx xxxxx 0.07 xxxxx xxxxx xxxxx

Level Of Service Module:

2Way95thQ: xxxxx xxxxx 1.8 xxxxx xxxxx xxxxx 0.2 xxxxx xxxxx xxxxx xxxxx
Control Del: xxxxx xxxxx 12.7 xxxxx xxxxx xxxxx 8.0 xxxxx xxxxx xxxxx xxxxx
LOS by Move: * * B * * * * A * * * * Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Del: 287 xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx xxxxx
SharedQueue: 1.5 xxxxx xxxxx xxxxx xxxxx 0.2 xxxxx xxxxx xxxxx xxxxx xxxxx
Shrd ConDel: 23.9 xxxxx xxxxx xxxxx xxxxx 8.0 xxxxx xxxxx xxxxx xxxxx xxxxx
Shared LOS: C * * * * A * * * * Approach Del: 15.6 xxxxx xxxxx xxxxx
Approach LOS: C * * *

Note: Queue reported is the number of cars per lane.
Intersection #3: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue

Final Vol:
Lanes: 26 1 0 29 1 0 327***

Signal=Stop/Rights=Include

Final Vol:
Lanes: 33 1

Signal=Stop

Final Vol:
Lanes: 174*** 0

Signal=Stop

Final Vol:
Lanes: 2 0

Signal=Stop

Signal=Stop/Rights=Include

Street Name: I-280 Southbound Ramps Magdalena Avenue

Approach: North Bound South Bound East Bound West Bound

Movement: L - T - R L - T - R L - T - R L - T - R

Min. Green: 7 10 10 7 10 10 7 10 10

Volume Module:
Base Vol: 1 50 97 327 29 26 33 174 2 87 75 212
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 1 50 97 327 29 26 33 174 2 87 75 212
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 1 50 97 327 29 26 33 174 2 87 75 212
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 1 50 97 327 29 26 33 174 2 87 75 212
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 1 50 97 327 29 26 33 174 2 87 75 212
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 1 50 97 327 29 26 33 174 2 87 75 212

Saturation Flow Module:
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 0.01 0.34 0.65 1.00 1.00 1.00 0.99 0.01 0.47 0.53 1.00
Final Sat.: 4 175 340 510 543 607 471 501 6 238 274 591

Capacity Analysis Module:
Vol/Sat: 0.29 0.29 0.29 0.64 0.05 0.04 0.07 0.35 0.35 0.37 0.27 0.36
Crit Moves: **** **** **** ****
Delay/Veh: 11.8 11.8 11.8 20.3 9.4 8.6 10.4 12.6 12.6 12.3 12.3 11.5
Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 11.8 11.8 11.8 20.3 9.4 8.6 10.4 12.6 12.6 12.3 12.3 11.5
LOS by Move: B B A B A B B B B B
ApproachDel: 11.8 18.7 12.3 11.9
Delay Adj: 1.00 1.00 1.00 1.00
ApprAdjDel: 11.8 18.7 12.3 11.9
LOS by Appr: C B B
AllWayAvgQ: 0.3 0.3 0.3 1.5 0.1 0.0 0.1 0.5 0.5 0.4 0.5 0.5

Note: Queue reported is the number of cars per lane.
### Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background PP AM

**Intersection #3: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue**

**Street Name:** I-280 Southbound Ramps

<table>
<thead>
<tr>
<th>Approach</th>
<th>North Bound</th>
<th>South Bound</th>
<th>East Bound</th>
<th>West Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement</td>
<td>L - T - R</td>
<td>L - T - R</td>
<td>L - T - R</td>
<td>L - T - R</td>
</tr>
</tbody>
</table>

| Min. Green: | 7 10 10 7 10 10 7 10 10 |

**Volume Module:**

| Base Vol: | 1 50 97 327 29 26 |
| Growth Adj: | 1.00 1.00 1.00 1.00 1.00 1.00 |
| Initial Bse: | 1 50 97 327 29 26 |
| Added Vol: | 0 0 0 0 0 0 |
| PasserByVol: | 0 0 0 0 0 0 |
| Initial Fut: | 1 50 97 333 29 26 |
| User Adj: | 1.00 1.00 1.00 1.00 1.00 1.00 |
| FHF Adj: | 1.00 1.00 1.00 1.00 1.00 1.00 |
| FHF Volume: | 1 50 97 333 29 26 |
| Reduct Vol: | 0 0 0 0 0 0 |
| PCE Adj: | 1.00 1.00 1.00 1.00 1.00 1.00 |
| MLP Adj: | 1.00 1.00 1.00 1.00 1.00 1.00 |
| FinalVolume: | 1 50 97 333 29 26 |

**Saturation Flow Module:**

| Adjustment: | 1.00 1.00 1.00 1.00 1.00 1.00 |
| Lanes: | 0.01 0.34 0.65 1.00 1.00 1.00 |
| Final Sat.: | 3 174 337 508 541 604 |

**Capacity Analysis Module:**

| Vol/Sat: | 0.29 0.29 0.29 0.66 0.05 0.04 |
| Crit Moves: | **** **** **** **** |
| Delay/Veh: | 11.9 11.9 11.9 21.0 9.5 8.6 |
| Delay Adj: | 1.00 1.00 1.00 1.00 1.00 1.00 |
| AdjDel/Veh: | 11.9 11.9 11.9 21.0 9.5 8.6 |
| LOS by Move: | B B B C A A B B B B |
| ApproachDel: | 11.9 19.3 12.4 12.0 |
| Delay Adj: | 1.00 1.00 1.00 1.00 |
| ApprAdjDel: | 11.9 19.3 12.4 12.0 |
| LOS by Appr: | B C B B |
| AllWayAvgQ: | 0.3 0.3 0.3 1.6 0.1 0.0 0.1 0.5 0.5 0.4 0.5 0.5 |

Note: Queue reported is the number of cars per lane.
<table>
<thead>
<tr>
<th>Intersection</th>
<th>Background Midday</th>
<th>Background PP Midday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg Del (sec)</td>
<td>Crit Del (sec)</td>
</tr>
<tr>
<td>#1 Magdalena Avenue / Foothill Expressway</td>
<td>E+ 58.6</td>
<td>0.572</td>
</tr>
<tr>
<td>#2 Magdalena Avenue / I-280 Northbound Ramps</td>
<td>B 11.4</td>
<td>0.199</td>
</tr>
<tr>
<td>#3 Magdalena Avenue / I-280 Southbound Ramps-Eastbrook</td>
<td>B 10.8</td>
<td>0.465</td>
</tr>
</tbody>
</table>
Intersection #1: Magdalena Avenue / Foothill Expressway

Street Name: Foothill Expressway
Approach: North Bound
Movement: L - T - R
Min. Green: 27 75 75 24 72 72
Y+R: 4.0 4.0 4.0 4.0 4.0 4.0

Volume Module:
Base Vol: 140 440 88 173 747 196 123 265 109 167 445 112
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 140 440 88 173 747 196 123 265 109 167 445 112
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 140 440 88 173 747 196 123 265 109 167 445 112
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 140 440 88 173 747 196 123 265 109 167 445 112
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 140 440 88 173 747 196 123 265 109 167 445 112
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 140 440 88 173 747 196 123 265 109 167 445 112

Saturation Flow Module:
Sat/Lane: 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Lanes: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Final Sat.: 1750 3800 1750 1750 3800 1750 1173 2526 1750 1750 2850 1750

Capacity Analysis Module:
Vol/Sat: 0.08 0.12 0.05 0.10 0.20 0.11 0.10 0.10 0.06 0.10 0.16 0.06
Crit Moves: **** **** ****
Green Time: 25.4 70.5 115.7 22.6 67.7 108.2 40.4 40.4 40.4 65.8 45.1 45.1
Volume/Cap: 0.60 0.31 0.08 0.83 0.55 0.20 0.49 0.49 0.18 0.40 0.66 0.18
Uniform Del: 82.4 45.2 16.3 87.0 52.1 21.1 69.9 69.9 46.0 64.9 69.6 44.7
IncrmntDel: 4.2 0.1 0.0 23.8 0.5 0.1 0.5 0.5 0.1 0.2 1.7 0.1
InitQueuDel: 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Delay/Veh: 86.6 45.3 16.3 110.9 52.6 21.2 70.4 70.4 46.1 65.1 71.3 44.8
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 86.6 45.3 16.3 110.9 52.6 21.2 70.4 70.4 46.1 65.1 71.3 44.8
LOS by Move: F D B F D C+ E E E D
HCM2KAvgQ: 9 9 2 13 18 6 12 12 6 10 14 6
Note: Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PP Midday

Intersection #1: Magdalena Avenue / Foothill Expressway

Final Vol: 201
Lanes: 1 0 2 0 1

Final Vol: 129
Lanes: 0 0 1

Final Vol: 268
Lanes: 1

Final Vol: 115
Lanes: 1

Street Name: Magdalena Avenue
Approach: North Bound
Movement: L - T - R
Min. Green: 27
Y+R: 4.0
Vol Cnt Date: n/a

Street Name: Foothill Expressway
Approach: South Bound
Movement: L - T - R
Min. Green: 75
Y+R: 4.0
Vol Cnt Date: n/a

Volume Module:
Base Vol: 140 440 88 173 747 196 123 265 109 167 445 112
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 140 440 88 173 747 196 123 265 109 167 445 112
Added Vol: 5 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 145 440 88 173 747 201 129 268 115 167 448 112
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 145 440 88 173 747 201 129 268 115 167 448 112
Reduced Vol: 145 440 88 173 747 201 129 268 115 167 448 112
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 145 440 88 173 747 201 129 268 115 167 448 112

Saturation Flow Module:
Sat/Lane: 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900
Adjustment: 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92
Lanes: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Final Sat.: 1750 3800 1750 1750 3800 1750 1202 2497 1750 1750 2850 1750

Capacity Analysis Module:
Vol/Sat: 0.08 0.12 0.05 0.10 0.20 0.11 0.11 0.11 0.07 0.10 0.16 0.06
Crit Moves: **** **** **** ****
Green Time: 25.4 70.5 115.7 22.6 67.7 108.2 40.4 40.4 65.8 45.1 45.1 67.7
Volume/Cap: 0.62 0.31 0.08 0.83 0.55 0.20 0.50 0.50 0.19 0.40 0.66 0.18
Uniform Del: 82.7 45.2 16.3 87.0 52.1 21.2 70.1 70.1 46.2 64.9 69.7 44.7
IncremmtDel: 5.0 0.1 0.0 23.8 0.5 0.1 0.5 0.5 0.2 0.2 1.8 0.1
InitQueuDel: 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Delay/Veh: 87.7 45.3 16.3 110.9 52.6 21.3 70.6 70.6 46.3 65.1 71.4 44.8
User DelAdj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 87.7 45.3 16.3 110.9 52.6 21.3 70.6 70.6 46.3 65.1 71.4 44.8
LOS by Move: F D B F D- C+ E E D E D
HCM2kAvgQ: 10 9 2 13 18 6 12 12 7 10 14 6
Note: Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background Midday

Intersection #2: Magdalena Avenue / I-280 Northbound Ramps

Street Name: I-280 Northbound Ramps  Magdalena Avenue
Approach: North Bound  South Bound  East Bound  West Bound
Movement: L - T - R  L - T - R  L - T - R  L - T - R

Volume Module:
Base Vol: 54 0 172 0 0 0 60 320 0 0 346 342
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 54 0 172 0 0 0 60 320 0 0 346 342
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 54 0 172 0 0 0 60 320 0 0 346 342
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 54 0 172 0 0 0 60 320 0 0 346 342
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Final Volume: 54 0 172 0 0 0 60 320 0 0 346 342

Critical Gap Module:
Critical Gp: 6.8 6.5 6.9 xxxx xxxx xxxx 4.1 xxxx xxxx xxxx xxxx xxxx xxxx
FollowUpTim: 3.5 4.0 3.3 xxxx xxxx xxxx 2.2 xxxx xxxx xxxx xxxx xxxx xxxx

Capacity Module:
Cnflict Vol: 613 786 160 xxxx xxxx xxxx 346 xxxx xxxx xxxx xxxx xxxx xxxx
Potent Cap.: 429 326 863 xxxx xxxx xxxx 1224 xxxx xxxx xxxx xxxx xxxx xxxx
Move Cap.: 412 310 863 xxxx xxxx xxxx 1224 xxxx xxxx xxxx xxxx xxxx xxxx
Volume/Cap: 0.13 0.00 0.20 xxxx xxxx xxxx 0.05 xxxx xxxx xxxx xxxx xxxx xxxx

Level Of Service Module:
2Way95thQ: xxxx xxxx 0.7 xxxx xxxx xxxx 0.2 xxxx xxxx xxxx xxxx xxxx xxxx
Control Del:xxxxx xxxx 10.2 xxxx xxxx xxxx 8.1 xxxx xxxx xxxx xxxx xxxx xxxx
LOS by Move: * * B * * A * * * *
Movement: LT - LTR - RT  LT - LTR - RT  LT - LTR - RT  LT - LTR - RT
Shared Cap.: 412 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
SharedQueue: 0.4 xxxx xxxx xxxx xxxx xxxx xxxx 0.2 xxxx xxxx xxxx xxxx xxxx xxxx
Shrd ConDel: 15.0 xxxx xxxx xxxx xxxx xxxx 8.1 xxxx xxxx xxxx xxxx xxxx xxxx
Shared LOS: C * * * A * * * *
Approach Del: 11.4 xxxx xxxx xxxx xxxx xxxx xxxx
Approach LOS: B * * *

Note: Queue reported is the number of cars per lane.
Intersection #2: Magdalena Avenue / I-280 Northbound Ramps

Street Name: I-280 Northbound Ramps Magdalena Avenue

Approach: North Bound South Bound East Bound West Bound

Movement: L - T - R L - T - R L - T - R L - T - R

Volume Module:

Base Vol: 54 0 172 0 0 0 60 320 0 0 346 342
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 54 0 172 0 0 0 60 320 0 0 346 342
Added Vol: 0 0 3 0 0 0 0 4 0 0 5 3
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 54 0 175 0 0 0 60 324 0 0 351 345
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 54 0 175 0 0 0 60 324 0 0 351 345
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 54 0 175 0 0 0 60 324 0 0 351 345

Critical Gap Module:

Critical Gp: 6.8 6.5 6.9 xxxxx xxxxx xxxxx 4.1 xxxxx xxxxx xxxxx xxxxx 2.2 xxxxx xxxxx xxxxx xxxxx
FollowUpTim: 3.5 4.0 3.3 xxxxx xxxxx xxxxx 2.2 xxxxx xxxxx xxxxx xxxxx

Capacity Module:

Cnflict Vol: 620 795 162 xxxxx xxxxx xxxxx 351 xxxxx xxxxx xxxxx xxxxx
Potent Cap.: 425 323 861 xxxxx xxxxx xxxxx 1219 xxxxx xxxxx xxxxx xxxxx
Move Cap.: 408 306 861 xxxxx xxxxx xxxxx 1219 xxxxx xxxxx xxxxx xxxxx
Volume/Cap: 0.13 0.00 0.20 xxxxx xxxxx xxxxx 0.05 xxxxx xxxxx xxxxx xxxxx

Level Of Service Module:

2Way95thQ: xxxx xxxx 0.8 xxxx xxxx xxxx 0.2 xxxx xxxx xxxx xxxx xxxx
Control Del:10.2 xxxx xxxx xxxx 8.1 xxxx xxxx xxxx xxxx xxxx xxxx xxxx
LOS by Move: * * * * A * * * * * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
SharedCap.: 408 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
SharedQueue: 0.5 xxxx xxxx xxxx xxxx xxxx 0.2 xxxx xxxx xxxx xxxx xxxx xxxx
Shrd ConDel: 15.2 xxxx xxxx xxxx xxxx xxxx 8.1 xxxx xxxx xxxx xxxx xxxx xxxx
Shared LOS: C * * * * A * * * * * *
ApproachDel: 11.4 xxxxx xxxxx xxxxx xxxxx
ApproachLOS: B * * *

Note: Queue reported is the number of cars per lane.
Intersection #3: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue

Street Name: I-280 Southbound Ramps Magdalena Avenue
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R
-------------|---------------||---------------||---------------||---------------|
Min. Green: 7 10 10 7 10 10 7 10 10 7 10 10
-------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol: 1 29 50 172 11 32 38 92 3 46 102 335
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 1 29 50 172 11 32 38 92 3 46 102 335
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 1 29 50 172 11 32 38 92 3 46 102 335
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 1 29 50 172 11 32 38 92 3 46 102 335
Reducut Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 1 29 50 172 11 32 38 92 3 46 102 335
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume: 1 29 50 172 11 32 38 92 3 46 102 335
-------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 0.01 0.36 0.63 1.00 1.00 1.00 1.00 0.97 0.03 0.19 0.81 1.00
Final Sat.: 7 205 354 522 560 628 535 563 18 118 502 721
-------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat: 0.14 0.14 0.14 0.33 0.02 0.05 0.07 0.16 0.16 0.39 0.20 0.46
Crit Moves: **** **** **** ****
Delay/Veh: 9.8 9.8 9.8 12.2 8.9 8.3 9.6 9.7 9.7 10.0 10.0 11.5
Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 9.8 9.8 9.8 12.2 8.9 8.3 9.6 9.7 9.7 10.0 10.0 11.5
LOS by Move: A A A B A A A A A B B
ApproachDel: 9.8 11.5 9.6 11.0
Delay Adj: 1.00 1.00 1.00 1.00
ApprAdjDel: 9.8 11.5 9.6 11.0
LOS by Appr: A B A
AllWayAvgQ: 0.1 0.1 0.1 0.4 0.0 0.0 0.1 0.2 0.2 0.3 0.8 0.8
Note: Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background PP Midday

Intersection #3: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue

Street Name:      I-280 Southbound Ramps               Magdalena Avenue
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
---------------|---------------||---------------||---------------||---------------|
Min. Green: 7  10  10  10  7  10  10  7  10  10
---------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1   29    50   172   11    32    38   92     3    46  102   335
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    1   29    50   172   11    32    38   92     3    46  102   335
Added Vol:      0    0     0     3    0     0     0    1     0     0    1     3
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1   29    50   175   11    32    38   93     3    46  103   338
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     1   29    50   172   11    32    38   92     3    46  102   335
Reduct Vol:      3    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    1   29    50   175   11    32    38   93     3    46  103   338
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    1   29    50   175   11    32    38   93     3    46  103   338
---------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.01 0.36  0.63 1.00 1.00  1.00 1.00 0.97  0.03  0.19 0.81  1.00
Final Sat.:     7  204  352  521  558  626  533  561  18 117 502  719
---------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.14 0.14  0.14 0.34 0.02  0.05 0.07 0.17  0.17 0.39 0.21  0.47
Crit Moves:       ****     ****     ****     ****
Delay/Veh:    9.8  9.8   9.8  12.3  8.9  8.3  9.6  9.7  9.7 10.1 10.1  11.6
Delay Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   9.8  9.8   9.8  12.3  8.9  8.3  9.6  9.7  9.7 10.1 10.1  11.6
LOS by Move: A A A A A A A A A A A A
ApproachDel:  9.8  11.6  9.7  11.1
Delay Adj:    1.00  1.00  1.00  1.00
ApprAdjDel:  9.8  11.6  9.7  11.1
LOS by Aprr: A A B A B
AllWayAvgQ:  0.1  0.1  0.1  0.4  0.0  0.0  0.1  0.2  0.2  0.3  0.8  0.8
Note: Queue reported is the number of cars per lane.
<table>
<thead>
<tr>
<th>Intersection</th>
<th>Background PM</th>
<th>Background PP PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg Del (sec)</td>
<td>Crit V/C (sec)</td>
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<tr>
<td>#1 Magdalena Avenue / Foothill Expressway</td>
<td>71.1</td>
<td>0.755</td>
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<tr>
<td>#2 Magdalena Avenue / I-280 Northbound Ramps</td>
<td>11.1</td>
<td>0.119</td>
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<td>#3 Magdalena Avenue / I-280 Southbound Ramps</td>
<td>12.4</td>
<td>0.637</td>
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### Intersection #1: Magdalena Avenue / Foothill Expressway

<table>
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<tr>
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<th>L - T - R</th>
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<tbody>
<tr>
<td>Min. Green</td>
<td>27 75 75 72 72</td>
<td>43 43 48 48 48</td>
<td>4.0 4.0 4.0 4.0 4.0</td>
<td>4.0 4.0 4.0 4.0 4.0</td>
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<tr>
<td>Y+R:</td>
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<td>4.0</td>
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#### Volume Module:

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<tbody>
<tr>
<td>Base Vol:</td>
<td>158 455 100</td>
<td>158 1351 193</td>
<td>91 199 148 214</td>
<td>516 74</td>
</tr>
<tr>
<td>Growth Adj:</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
</tr>
<tr>
<td>Initial Bse:</td>
<td>158 455 100</td>
<td>158 1351 193</td>
<td>91 199 148 214</td>
<td>516 74</td>
</tr>
<tr>
<td>Added Vol:</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
<tr>
<td>PasserByVol:</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
<tr>
<td>Initial Fut:</td>
<td>158 455 100</td>
<td>158 1351 193</td>
<td>91 199 148 214</td>
<td>516 74</td>
</tr>
<tr>
<td>User Adj:</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
</tr>
<tr>
<td>PHF Adj:</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
</tr>
<tr>
<td>PHF Volume:</td>
<td>158 455 100</td>
<td>158 1351 193</td>
<td>91 199 148 214</td>
<td>516 74</td>
</tr>
<tr>
<td>Reduct Vol:</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
<tr>
<td>Reduced Vol:</td>
<td>158 455 100</td>
<td>158 1351 193</td>
<td>91 199 148 214</td>
<td>516 74</td>
</tr>
<tr>
<td>PCE Adj:</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
</tr>
<tr>
<td>MLF Adj:</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
</tr>
<tr>
<td>Final Volume:</td>
<td>158 455 100</td>
<td>158 1351 193</td>
<td>91 199 148 214</td>
<td>516 74</td>
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</table>

#### Saturation Flow Module:

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<th>L - T - R</th>
<th>L - T - R</th>
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</thead>
<tbody>
<tr>
<td>Sat/Lane:</td>
<td>1900 1900</td>
<td>1900 1900 1900</td>
<td>1900 1900 1900</td>
<td>1900 1900 1900</td>
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<tr>
<td>Adjustment:</td>
<td>0.92 1.00</td>
<td>0.92 0.92 1.00</td>
<td>0.92 0.95 0.99</td>
<td>0.92 0.92 0.75 0.92</td>
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<tr>
<td>Lanes:</td>
<td>1.00 2.00</td>
<td>1.00 2.00 1.00</td>
<td>1.00 1.36</td>
<td>1.00 1.36 1.00</td>
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<tr>
<td>Final Sat.:</td>
<td>1750 3800</td>
<td>1750 3800 1750</td>
<td>1750 2538</td>
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#### Capacity Analysis Module:

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<th>L - T - R</th>
<th>L - T - R</th>
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</thead>
<tbody>
<tr>
<td>Vol/Sat:</td>
<td>0.09 0.12</td>
<td>0.06 0.09 0.36</td>
<td>0.11 0.08 0.08</td>
<td>0.08 0.12 0.18 0.04</td>
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<tr>
<td>Crit Moves:</td>
<td>****</td>
<td>****</td>
<td>****</td>
<td>****</td>
</tr>
<tr>
<td>Green Time:</td>
<td>25.4 70.5 115.7</td>
<td>22.6 67.7 108.2</td>
<td>40.4 40.4 45.1</td>
<td>45.1 65.8 67.7 67.7</td>
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<td>Volume/Cap:</td>
<td>0.68 0.32</td>
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<td>0.19 0.37 0.37</td>
<td>0.24 0.51 0.76 0.12</td>
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<tr>
<td>Uniform Del:</td>
<td>83.3 45.4</td>
<td>16.4 86.2 64.9</td>
<td>21.1 67.9 67.9</td>
<td>47.1 66.9 71.7 43.7</td>
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<tr>
<td>IncremntDel:</td>
<td>7.6 0.1</td>
<td>0.0 15.0 23.8</td>
<td>0.1 0.3 0.3</td>
<td>0.2 0.3 3.6 0.1</td>
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<tr>
<td>InitQueuDel:</td>
<td>0.0 0.0</td>
<td>0.0 0.0 0.0</td>
<td>0.0 0.0 0.0</td>
<td>0.0 0.0 0.0 0.0</td>
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<tr>
<td>Delay Adj:</td>
<td>1.00 1.00</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
</tr>
<tr>
<td>Delay/Veh:</td>
<td>91.0 45.5</td>
<td>16.4 101.2 88.7</td>
<td>21.2 68.2 68.2</td>
<td>47.3 67.2 75.3 43.8</td>
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<td>User DelAdj:</td>
<td>1.00 1.00</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00</td>
<td>1.00 1.00 1.00 1.00</td>
</tr>
<tr>
<td>AdjDel/Veh:</td>
<td>91.0 45.5</td>
<td>16.4 101.2 88.7</td>
<td>21.2 68.2 68.2</td>
<td>47.3 67.2 75.3 43.8</td>
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<tr>
<td>LOS by Move:</td>
<td>F</td>
<td>D B F+ C+ E E D E E-</td>
<td>D</td>
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</table>

Note: Queue reported is the number of cars per lane.
# Level Of Service Computation Report

2000 HCM Operations (Future Volume Alternative)
Background PP PM

## Intersection #1: Magdalena Avenue / Foothill Expressway

### Street Name:
- **Foothill Expressway**
- **Magdalena Avenue**

### Approach:
- North Bound
- South Bound
- East Bound
- West Bound

### Movement:
<table>
<thead>
<tr>
<th>L - T - R</th>
<th>L - T - R</th>
<th>L - T - R</th>
<th>L - T - R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Min. Green:
- **27 75 75 24 72 72**
- **43 43 43 48 48 48**

### Y+R:
- **4.0 4.0 4.0 4.0 4.0 4.0**

### Volume Module:
- **Base Vol**: 158 455 100 158 1351 193
- **Growth Adj**: 1.00 1.00 1.00 1.00 1.00 1.00
- **Initial Bse**: 158 455 100 158 1351 193
- **Added Vol**: 5 0 0 5 6 3
- **PasserByVol**: 0 0 0 0 0 0
- **Initial Fut**: 163 455 100 158 1351 198
- **User Adj**: 1.00 1.00 1.00 1.00 1.00 1.00
- **PHF Adj**: 1.00 1.00 1.00 1.00 1.00 1.00
- **PHF Volume**: 163 455 100 158 1351 198
- **Reduct Vol**: 0 0 0 0 0 0
- **Reduced Vol**: 163 455 100 158 1351 198
- **PCE Adj**: 1.00 1.00 1.00 1.00 1.00 1.00
- **MLF Adj**: 1.00 1.00 1.00 1.00 1.00 1.00
- **FinalVolume**: 163 455 100 158 1351 198

### Saturation Flow Module:
- **Sat/Lane**: 1900 1900 1900 1900 1900 1900
- **Adjustment**: 0.92 0.92 0.92 0.92 0.92 0.92
- **Lanes**: 1.00 2.00 1.00 1.00 2.00 1.00
- **Final Sat.**: 1750 3800 1750 1750 3800 1750

### Capacity Analysis Module:
- **Vol/Sat**: 0.09 0.12 0.06 0.09 0.36 0.11
- **Uniform Del**: 83.6 45.4 21.1 68.1 68.1 47.3
- **IncremntDel**: 8.9 0.1 0.1 0.1 0.1 0.1
- **InitQueuDel**: 0.0 0.0 0.0 0.0 0.0 0.0
- **Delay Adj**: 1.00 1.00 1.00 1.00 1.00 1.00
- **Delay/Veh**: 92.5 45.5 21.2 68.4 68.4 47.5
- **AdjDel/Veh**: 92.5 45.5 21.2 68.4 68.4 47.5
- **LOS by Move**: F D B F F C+ E E E D E- D

### Note:
Queue reported is the number of cars per lane.
### Level Of Service Computation Report

#### 2000 HCM Unsignalized (Future Volume Alternative)

**Background PM**

---

#### Intersection #2: Magdalena Avenue / I-280 Northbound Ramps

**Street Name:** I-280 Northbound Ramps, Magdalena Avenue

**Approach:** North Bound, South Bound, East Bound, West Bound

<table>
<thead>
<tr>
<th>Movement</th>
<th>L - T - R</th>
<th>L - T - R</th>
<th>L - T - R</th>
<th>L - T - R</th>
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<tbody>
<tr>
<td>Volume Module:</td>
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<tr>
<td>Base Vol:</td>
<td>49</td>
<td>1</td>
<td>111</td>
<td>0</td>
</tr>
<tr>
<td>Growth Adj:</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Initial Bse:</td>
<td>49</td>
<td>1</td>
<td>111</td>
<td>0</td>
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<tr>
<td>Added Vol:</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>PasserByVol:</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Initial Fut:</td>
<td>49</td>
<td>1</td>
<td>111</td>
<td>0</td>
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<tr>
<td>User Adj:</td>
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<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<td>PHF Adj:</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<td>PHF Volume:</td>
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<td>1</td>
<td>111</td>
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<td>Reuct Vol:</td>
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<td>0</td>
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<td>FinalVolume:</td>
<td>49</td>
<td>1</td>
<td>111</td>
<td>0</td>
</tr>
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</table>

**Critical Gap Module:**

| Critical Gp: | 6.8 | 6.5 | 6.9 | xxxx | xxxx | xxxx | 4.1 | xxxx | xxxx | xxxx | xxxx | xxxx |
| FollowUpTim: | 3.5 | 4.0 | 3.3 | xxxx | xxxx | xxxx | 2.2 | xxxx | xxxx | xxxx | xxxx | xxxx |

**Capacity Module:**

| Cnflict Vol: | 611 | 908 | 104 | xxxx | xxxx | xxxx | 595 | xxxx | xxxx | xxxx | xxxx | xxxx |
| Potent Cap.: | 430 | 277 | 938 | xxxx | xxxx | xxxx | 991 | xxxx | xxxx | xxxx | xxxx | xxxx |
| Move Cap.: | 412 | 262 | 938 | xxxx | xxxx | xxxx | 991 | xxxx | xxxx | xxxx | xxxx | xxxx |
| Volume/Cap: | 0.12 | 0.00 | 0.12 | xxxx | xxxx | xxxx | 0.05 | xxxx | xxxx | xxxx | xxxx | xxxx |

**Level Of Service Module:**

| 2Way95thQ: | xxxx | xxxx | 0.4 | xxxx | xxxx | xxxx | 0.2 | xxxx | xxxx | xxxx | xxxx | xxxx |
| Control Del:| 9.4 | xxxx | xxxx | xxxx | xxxx | xxxx | 8.8 | xxxx | xxxx | xxxx | xxxx | xxxx |
| LOS by Move: | * | * | A | * | * | * | A | * | * | * | * | * |
| SharedCap.: | 408 | xxxx | xxxx | xxxx | xxxx | xxxx | 8.8 | xxxx | xxxx | xxxx | xxxx | xxxx |
| SharedQueue: | 0.4 | xxxx | xxxx | xxxx | xxxx | xxxx | 0.2 | xxxx | xxxx | xxxx | xxxx | xxxx |
| Shrd ConDel: | 15.1 | xxxx | xxxx | xxxx | xxxx | xxxx | 8.8 | xxxx | xxxx | xxxx | xxxx | xxxx |
| Shared LOS: | C | * | * | * | A | * | * | * | * | * | * | * |
| ApproachDel: | 11.1 | xxxx | xxxx | xxxx | xxxx | xxxx | 11.1 | xxxx | xxxx | xxxx | xxxx | xxxx |
| ApproachLOS: | B | * | * | * | * | * | * | * | * | * | * | * |

**Note:** Queue reported is the number of cars per lane.
Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PP PM

Intersection #2: Magdalena Avenue / I-280 Northbound Ramps

<table>
<thead>
<tr>
<th>Movement</th>
<th>North Bound</th>
<th>South Bound</th>
<th>East Bound</th>
<th>West Bound</th>
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<tr>
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<td>L - T - R</td>
<td>L - T - R</td>
<td>L - T - R</td>
<td>L - T - R</td>
</tr>
</tbody>
</table>

Volume Module:
Base Vol: 49 1 111 0 0 0 53 207 0 0 595 396
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 49 1 111 0 0 0 53 207 0 0 595 396
Added Vol: 0 0 3 0 0 0 0 4 0 0 5 3
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 49 1 114 0 0 0 53 211 0 0 600 399
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 49 1 114 0 0 0 53 211 0 0 600 399
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
FinalVolume: 49 1 114 0 0 0 53 211 0 0 600 399

Critical Gap Module:
Critical Gp: 6.8 6.5 6.9 xxxxx xxxx xxxx 4.1 xxxx xxxx xxxx xxxx xxxx xxxx
FollowUpTim: 3.5 4.0 3.3 xxxx xxxx xxxx 2.2 xxxx xxxx xxxx xxxx xxxx

Capacity Module:
Conflict Vol: 617 917 106 xxxx xxxx xxxx 600 xxxx xxxx xxxx xxxx xxxx
Potent Cap.: 426 274 935 987 987 987 987 987 987 987 987 987
Move Cap.: 408 259 935 987 987 987 987 987 987 987 987 987
Volume/Cap: 0.12 0.00 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12

Level Of Service Module:
LOS by Move: * A * * A * * * A * * * A
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
SharedCap.: 404 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
SharedQueue: 0.4 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Shrd ConDel: 15.2 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
Shared LOS: C * * * A * * * A * * * A
ApproachDel: 11.1 xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
ApproachLOS: B * * * * Note: Queue reported is the number of cars per lane.
Intersection #3: Magdalena Avenue / I-280 Southbound Ramps-Eastbrook Avenue

Street Name: I-280 Southbound Ramps Magdalena Avenue
Approach: North Bound South Bound East Bound West Bound
Movement: L - T - R L - T - R L - T - R L - T - R

Min. Green: 7 10 10 7 10 10 7 10 10

Volume Module:
Base Vol: 2 21 42 119 25 26 29 98 5 49 116 482
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse: 2 21 42 119 25 26 29 98 5 49 116 482
Added Vol: 0 0 0 0 0 0 0 0 0 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 2 21 42 119 25 26 29 98 5 49 116 482
User Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Volume: 2 21 42 119 25 26 29 98 5 49 116 482
Reduce Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Reduced Vol: 2 21 42 119 25 26 29 98 5 49 116 482
PCE Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Final Volume: 2 21 42 119 25 26 29 98 5 49 116 482

Saturation Flow Module:
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes: 0.03 0.32 0.65 1.00 1.00 1.00 1.00 0.95 0.05 0.15 0.85 1.00
Final Sat.: 17 176 353 496 531 592 540 561 29 98 549 756

Capacity Analysis Module:
Vol/Sat: 0.12 0.12 0.12 0.24 0.05 0.04 0.05 0.17 0.17 0.50 0.21 0.64
Crit Moves: **** ***** **** ****
Delay/Veh: 9.8 9.8 9.8 11.5 9.3 8.6 9.4 9.7 9.7 10.0 10.0 14.9
Delay Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh: 9.8 9.8 9.8 11.5 9.3 8.6 9.4 9.7 9.7 10.0 10.0 14.9
LOS by Move: A A A B A A A A A A B
ApproachDel: 9.8 10.7 9.7 13.7
Delay Adj: 1.00 1.00 1.00 1.00
ApprAdjDel: 9.8 10.7 9.7 13.7
LOS by Appr: A A B A
AllWayAvgQ: 0.1 0.1 0.1 0.3 0.0 0.0 0.1 0.2 0.2 0.3 1.6 1.6
Note: Queue reported is the number of cars per lane.
### Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background PP PIM

#### Street Name: I-280 Southbound Ramps
Magdalena Avenue

#### Approach: North Bound | South Bound | East Bound | West Bound

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</table>

#### Saturation Flow Module:

| Adjustment: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lanes: | 0.03 | 0.32 | 0.65 | 1.00 | 1.00 | 1.00 | 0.95 | 0.05 | 0.15 | 0.85 | 1.00 |
| Final Sat. | 17 | 176 | 351 | 495 | 529 | 590 | 539 | 559 | 28 | 97 | 548 | 754 |

#### Capacity Analysis Module:

| Vol/Sat: | 0.12 | 0.12 | 0.12 | 0.25 | 0.05 | 0.04 | 0.05 | 0.18 | 0.18 | 0.50 | 0.21 | 0.64 |
| Crit Moves: | **** | **** | **** | **** |
| Delay/Veh: | 9.8 | 9.8 | 9.8 | 11.6 | 9.3 | 8.6 | 9.4 | 9.8 | 9.8 | 10.0 | 10.0 | 15.1 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| AdjDel/Veh: | 9.8 | 9.8 | 9.8 | 11.6 | 9.3 | 8.6 | 9.4 | 9.8 | 9.8 | 10.0 | 10.0 | 15.1 |
| LOS by Move: | A | A | A | B | A | A | A | A | B | C |
| ApproachDel: | 9.8 | 9.8 | 10.8 | 9.7 | 13.8 |
| Delay Adj: | 1.00 | 1.00 | 1.00 | 1.00 |
| ApprAdjDel: | 9.8 | 10.8 | 9.7 | 13.8 |
| LOS by Appr: | A | B | A | B |
| AllWayAvgQ: | 0.1 | 0.1 | 0.1 | 0.3 | 0.0 | 0.0 | 0.1 | 0.2 | 0.2 | 0.3 | 1.6 | 1.6 |

Note: Queue reported is the number of cars per lane.
Hexagon Transportation Consultants, Inc. has reviewed the focused transportation impact analysis, dated November 17, 2015, for the proposed expansion of the Antiochian Orthodox Church of the Redeemer, located at 380 Magdalena Avenue in unincorporated Santa Clara County in California. Overall, we agree with the study methodology and conclusions. We don’t believe that the proposed school would have any significant traffic impacts.

The findings of our peer review are divided into two sections – issues to be addressed and minor editorial comments, as described below:

**Issues to be addressed**

1. Page 3, First Sentence – The report says that the ITE trip generation rates are consistent with trip generation rates measured for other K-8 private schools in Santa Clara County. Are there any data to substantiate this statement? If trip generation surveys were conducted at other private schools in Santa Clara County, then the data from these surveys should be included in the Appendix. The study should describe in layman’s terms how the school would generate only 75 trips for 80 students. Each student dropped off equals two trips. There must be inherent carpooling and student absences. Maybe not all grades start at the same time?

2. We recommend that the study look at the traffic operations at the northernmost project driveway. The trip assignment shows that there would be 26 vehicles making a left-turn from westbound Magdalena Avenue entering the project driveway. Would they affect traffic operations on Magdalena Avenue? Appropriate peak hour factors should be used to reflect school activity that would occur 15-20 minutes before and after school.

3. Page 8 – The text states that there are no approved projects that would add any traffic in the area. This seems logical for Magdalena but not for Foothill Expressway. The Expressway carries long distance trips. If no specific projects are nearby, a growth factor would be appropriate to capture general regional growth. The project impacts should be re-evaluated against the background conditions (with a growth factor) to see if there are any impacts.
Minor Editorial Comments

1. Page 1, Project Overview – The report states that there are a total of 91 existing parking spaces on site. The site plan shows 92 spaces. Unless the project is proposing to add an additional parking space, the existing number of parking spaces should be revised to 92 spaces. The overview should mention the number of added students.

2. Page 3, Table 2 – The trip generation numbers for the Midday and PM peak hours are incorrect. The total/in/out numbers should be swapped. The delay calculations used the correct numbers, so only the trip generation table needs to be corrected.

3. Figure 3 - Intersections #1 and #3 have been mislabeled in the figure. They need to be swapped in order to match the intersection volumes. Also update Figures 2, 4 and 5 accordingly.

4. Figure 3, Intersection #2 – No trips are shown for the EB through movement during the midday peak period. Project trips for this movement during the midday peak hour should be the same as the project trips during the PM peak hour. Also, no trips are shown for the WB through movement for the AM peak hour. Figure 5 should also be revised accordingly. The numbers on the boxes don’t match the numbers on the Figure. Please put the boxes in the same order as the figure. This goes for all figures. The delay calculations are correct and only the figures need to be revised.

5. Figure 3 – Show driveway volumes (inbound/outbound) at the project site. These volumes should match the volumes shown in Table 2. These volumes should also balance between the three study intersections.

6. Table 4 – Label Background conditions as Existing/Background. State in the text whether the calculated LOS matches the field observations.

7. Page 6, Significance Criteria – The report should mention that the project impacts were evaluated based on the LOS significance impact criteria established by the Santa Clara County Congestion Management Program.

8. Page 10 – Parking Review – The ITE Parking Generation Manual for Land Use 520 (Elementary School) also states that this land use consists of schools where bus service is usually provided to students living beyond a specified distance from the school. Since the proposed project would not provide any bus service, the study should note that the parking demand may be greater than the average peak period parking demand of 0.17 vehicles per student. However, adequate parking spaces would be available on site.

9. Page 1, 1st Paragraph – In the last sentence, “It also considers whether…..”, insert “to” between “according” and “the criteria…”.

10. Page 1, Project Overview – In the first sentence, it should be “west of Foothill Expressway…” instead of south of Foothill Expressway.
City of Los Altos

12/7/15

Three intersections were chosen to be analyzed: 1) Foothill Expwy/Magdalena Ave, 2) 1-280/Slack Ave, 3) 1-280/Slack Magdalena Ave. The signalized intersection of Spring/ Fremont Avenue is very close to the intersection of Foothill Expwy/Magdalena and often runs coordinated/traffic responsive with it and is maintained by the County. Therefore we request that Spring/Fremont Avenue be included in the TIA.

City of Los Altos

12/7/15

The intersection of Berry Ave/Springer is a 4-way stop controlled intersection that also provides access to Loyal Elementary school. We request that this intersection also be included to understand additional impacts since school start times can be similar.

County Planning

12/7/15

Is staff traffic accommodated for in the analysis? Proposed 22 staff members. It appears that the trip generation accommodated for 80 students only.

County Planning

12/7/15

Clarify what the morning, mid day and afternoon peak hours are.

County Planning

12/7/15

What are the assumed school hours of operation?

County Planning

12/7/15

Parking review section notes that demand is 14 vehicles for a school with 60 students. The County Zoning Ordinance parking standards requires parking space per student, and one parking space per 4 fixed seats. With a school of 80 students, and 22 staff members - the minimum number of parking spaces required is 42 parking spaces. Acknowledge this information in the traffic study.

County Planning

12/7/15

Traffic study indicates that there is sufficient parking for special events. Please clarify how much parking is available for special events on site. Is there a recommended valet parking plan for off-site parking? In past church festival permits, the applicant has implemented valet shuttle parking with another parking lot off-site to accommodate the peak overflow of parking needed for the events.

County Planning

12/7/15

Does the traffic study accommodate for special events for the school during non school hours? Same question as above for #5.

County Planning

Recommended site access/circulation measures. Please provide a list of the mitigations that can be implemented feasibly. Where is the existing parking for student drop off and pick up? How many parking spaces should be converted to short term 10 minute parking and where are they located? How many bicycle parking spaces and where? Traffic study recommends striping of crosswalks across the vehicle entrance driveway. Does that require any permit approvals? If so what permits are needed.

Town of Los Altos Hills

We recommend that the study look at the traffic operations at the northwestern project driveway. The trip assignment shows that there would be 30 vehicles making a left turn from westbound Magdalena Avenue entering the project driveway. Would they affect traffic operations on Magdalena Avenue? Appropriate peak hour factors should be used to reflect school activity that would occur 15-20 minutes before and after school.

Town of Los Altos Hills

We recommend that the study look at the traffic operations at the northwestern project driveway. The trip assignment shows that there would be 30 vehicles making a left turn from westbound Magdalena Avenue entering the project driveway. Would they affect traffic operations on Magdalena Avenue? Appropriate peak hour factors should be used to reflect school activity that would occur 15-20 minutes before and after school.

Town of Los Altos Hills

Page 3. First Sentence - The report says that the ITF trip generation rates are consistent with the trip generation rates measured for other I-5 private schools in Santa Clara County. Are there any data to substantiate this statement? If trip generation surveys were conducted at other private schools in Santa Clara County, then the data from these surveys should be included in the Appendix. The study should describe in layman's terms how the school would generate only 75 trips for 80 students. Each student dropped off equals two trips. There are neither in-house parking and student absences. Maybe not all grades start at the same time.

Town of Los Altos Hills

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Town of Los Altos Hills

Page 8 - The text states that there are no approved projects that would add any traffic in the area. This seems logical for Magdalena but not for Foothill Expressway. The Expressway carries long distance trips. If no specific projects are nearby, a growth factor would be appropriate to capture general regional growth. The project impact should be re-calculated against the background conditions (with a growth factor) to see if there are any impacts.

Town of Los Altos Hills

Page 9. Table 2 - The trip generation numbers for the Midday and PM peak hours are revised. The total/cuyo numbers should be updated. The delay calculations used the correct numbers, so only the trip generation table needs to be corrected.

Town of Los Altos Hills

Page 3. Table 2. The trip generation numbers for the Midday and PM peak hours are revised. The total/cuyo numbers should be updated. The delay calculations used the correct numbers, so only the trip generation table needs to be corrected.

Town of Los Altos Hills

Page 3. Figure 3 - Intersections #2 and #3 have been mislabeled in the figure. They need to be updated in order to match the intersection volumes. Also update Figures 2, 4 and 5 accordingly.

Town of Los Altos Hills

Figure 3. Intersection #2 - No trips are shown for the EB through movement during the midday peak period. Project trips for this movement during the midday peak hour should be the same as the project trips during the PM peak hour. Also, no trips are shown for the WB through movement for the AM peak hour. Figure 5 should also be revised accordingly. The numbers on the boxes don’t match the numbers on the figure. Please put the boxes in the same order as the figure. This goes for all figures. The delay calculations are correct and only the figures need to be revised.

Town of Los Altos Hills

Figure 3. Show driveway volumes (northbound/southbound) at the project site. These volumes should match the volumes shown in Table 2. These volumes should also balance between the three study intersections.

Town of Los Altos Hills

Table 4 - Label Background conditions as Existing/Background. State in the text whether the calculated LOS matches the field observations.

Town of Los Altos Hills

Page 6, Sign/Eccentric Criteria - The report should mention that the project impacts were evaluated based on the LOS significance impact criteria established by the Santa Clara County Congestion Management Program.

Town of Los Altos Hills

Page 10 - Parking Analysis - The ITE Parking Generation Manual and UCD 620 (Elementary School) also states that this land use consists of schools where bus service is usually provided to students living beyond a specified distance from the school. Since the proposed project would not serve any bus service, the study should note that the parking demand may be greater than the average demand of 0.17 vehicles per student. However, adequate parking spaces would be available on site.

Town of Los Altos Hills

Page 7. For #4 – “Transportation Impact” for the last sentence, it should be “west of Foothill Expressway” instead of north of Foothill Expressway.

Town of Los Altos Hills

Page 7. For #4 – “Transportation Impact” for the last sentence, it should be “west of Foothill Expressway” instead of north of Foothill Expressway.

Town of Los Altos Hills

The requested trip generation rate is very high - higher than surveys we have collected at other schools in Santa Clara County and higher than the ITE rates which incorporate nationwide trip generation surveys. We feel a trip generation rate of 1.5 trips per student in the peak hour is too conservative for this project and would thus overestimate the traffic generated by it.

Town of Los Altos Hills

The traffic study recommends changes to the site plan, but the site plan included shown on figure 3 does not reflect these recommendations. The traffic study should include a modified site plan that incorporates the recommendations before it moves forward.
Memorandum

Date: February, 19, 2016
To: Mr. Richard Chiu, Town of Los Altos Hills
From: Gary Black
Subject: Church of the Redeemer School Traffic Study Comments

Hexagon Transportation Consultants, Inc. has reviewed the Fehr & Peers traffic study dated November 17, 2015 for the Church of the Redeemer School proposed pre-K through 8th grade private school. This memorandum presents the findings from the peer review.

**Trip Generation**

Based on previous studies done for similar schools, Hexagon recommends using a higher trip generation rate. Although the ITE rate is well recognized it might not be representative of this particular school. An AM peak hour trip generation rate of 1.5 trips per student would produce more conservative values for this project and school type.

**Site Plan Recommendations**

The traffic study recommends changes to the site plan, but the site plan included shown on Figure 1 does not reflect these recommendations. The traffic study should include a modified site plan that incorporates the recommendations before it moves forward.