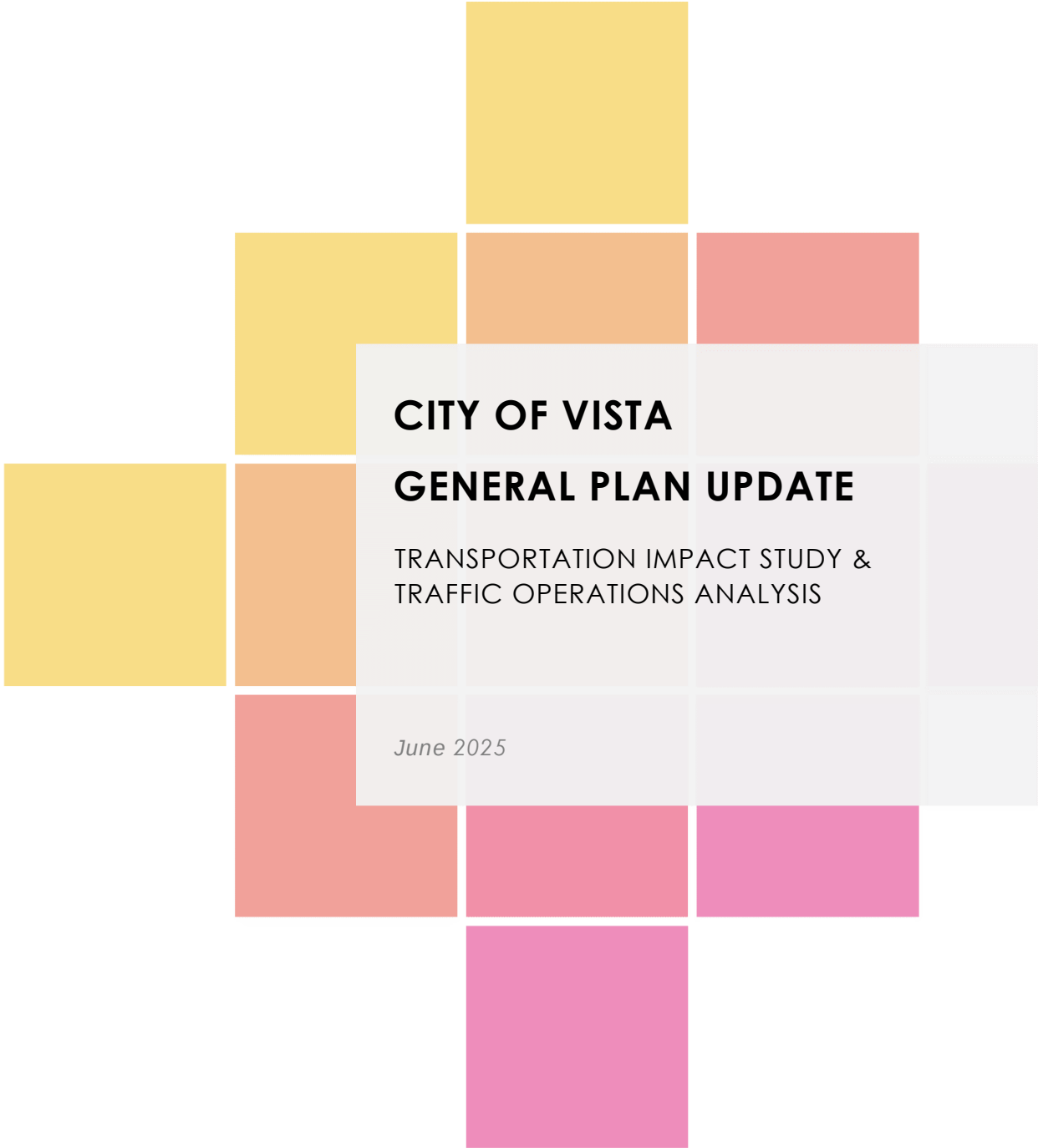


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## **Appendix H**

### Transportation Impact Study and Operations Analysis





# CITY OF VISTA

## GENERAL PLAN UPDATE

TRANSPORTATION IMPACT STUDY &  
TRAFFIC OPERATIONS ANALYSIS

*June 2025*

Prepared For



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Vista, CA 92084

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## Executive Summary

The Transportation Impact Study (TIS) and Traffic Operations Analysis (TOA) was prepared to evaluate the City of Vista's General Plan Update (Vista GPU) and its transportation-related impacts.

The TIS focused on a Vehicle Miles Traveled (VMT) analysis, consistent with Senate Bill 743 and CEQA guidelines. Using a calibrated version of SANDAG's regional travel demand model, the study compared future conditions under both the Vista GPU and the current Adopted General Plan, to Base Year 2016 Conditions.

The analysis concluded that the Vista GPU would result in improved VMT performance, with VMT per Capita and VMT per Employee falling below the region's significance thresholds—indicating a less-than-significant transportation impact for residential, employment, retail, and mixed-use land uses.

The TOA evaluated vehicular traffic operations, focusing on future roadway and intersection performance using Level of Service (LOS) metrics. While the majority of intersections are anticipated to operate at acceptable levels (LOS D or better), 17 intersections are projected to operate at LOS E or F during peak periods, 13 of which already experience substandard conditions today.

Freeway segment analysis along SR-78 showed that future conditions under the Vista GPU would operate at LOS C or better, aided by planned High Occupancy Vehicle (HOV) lane improvements.

Overall, the Vista GPU is expected to support a more efficient and sustainable transportation system while accommodating future growth in the city.

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## 1.0 Introduction

This technical report documents the Transportation Impact Study (TIS) and Traffic Operations Analysis (TOA) conducted as part of the City of Vista's General Plan Update (Vista GPU), in support of the Circulation and Mobility Element.

The TIS is a VMT-based analysis that serves to identify and document potential transportation impacts related to the proposed land uses and mobility networks of the Vista GPU and its No-Project Alternative (the currently adopted General Plan), as well as recommend improvements/mitigation measures, if applicable. The TOA is a Level of Service (LOS)-based analysis that serves to document vehicular traffic operations of the Vista GPU, including LOS analyses of the proposed Circulation and Mobility Element roadway network and key intersections, as well as LOS analyses of freeway segments within the vicinity of the City of Vista.

### 1.1 Background

Vista is situated in northern San Diego County just seven miles inland from the Pacific Ocean. It's bordered by the cities of Carlsbad and Oceanside to the west, northwest and southwest, San Marcos to the southeast, and unincorporated San Diego County to the north and east. Vista encompasses approximately 19 square miles and is home to a diverse population of more than 100,000 residents. A diverse and well-integrated transportation system serves the city, consisting of streets, regional freeways, public transit services, pedestrian infrastructure, and bicycle facilities.

### 1.2 Project Description

The Vista GPU includes an update to the currently adopted General Plan to address future growth and development in the city. **Table 1.1** summarizes key land uses for the currently adopted General Plan and the Vista GPU scenario.

**Table 1.1 - Land Use Summary<sup>1</sup>**

| Land Use        | 2050<br>Adopted General Plan | 2050<br>Vista GPU |
|-----------------|------------------------------|-------------------|
| Dwelling Units  | 48,101                       | 59,482            |
| Retail (sf)     | 21,010,058                   | 11,965,236        |
| Office (sf)     | 1,090,201                    | 866,050           |
| Industrial (sf) | 15,002,661                   | 14,988,662        |

Source: RICK (2025)

Notes:

sf = square feet

<sup>1</sup> Land uses provided in this summary table reflect the primary vehicular traffic generating uses within the City of Vista. Land uses not included in this table include hotels, parks and recreational uses, open space, transportation/utilities (e.g. airport runways, transit stop facilities, etc.), and vacant areas.

The Vista GPU, compared to the Adopted General Plan, would increase residential dwelling units by 24%, while retail and office land uses would decrease by 43% and 21%, respectively. Industrial uses would remain relatively consistent between the Adopted and Proposed Plans.

**Figure 1.1 - Project Regional Location**

## 1.3 Report Organization

The analysis herein is based on the 2025 State of California Environmental Quality Act (CEQA) Guidelines and the City of Vista's Traffic Impact Analysis Guidelines (Vista TIAG, October 2020).

Following this introductory chapter, the remainder of this report is organized into the following two chapters:

- 2.0    *Transportation Impact Study (VMT Analysis)*** – This chapter discusses the VMT analysis and potential CEQA transportation impacts of the Vista GPU and its No-Project Alternative (the currently adopted General Plan).
- 3.0    *Traffic Operations Analysis (LOS Analysis)*** – This chapter summarizes the vehicular operations of the Vista GPU.

## 2.0 Transportation Impact Study (VMT Analysis)

The TIS serves to identify and document potential CEQA transportation impacts related to the Vista GPU and the No-Project Alternative (the currently adopted General Plan), as well as recommend improvements/mitigation measures, as necessary.

### 2.1 Study Scenarios

SANDAG's regional Activity-Based Model (ABM) was customized for the City of Vista study area and utilized to model and evaluate three (3) study scenarios, including base year (2016) and two (2) future year alternatives, as follows:

- **Base Year (2016)** – establishes the existing baseline VMT within the project study area based on the SANDAG Series 14 ABM2+ Regional Model Base Year (2016).
- **Vista GPU (Proposed General Plan)** – represents the buildout of the Vista GPU land uses and mobility networks, which were developed in collaboration with community members, City staff, and the project consultant team.
- **No-Project Alternative (Adopted General Plan)** – represents the growth that the City of Vista may possibly see based on the current General Plan land uses and mobility network.

All study scenarios were modeled using the calibrated *SANDAG Series 14 ABM2+ Regional Model – City of Vista General Plan Update Model* (the “Model”). The Model assumed forecasted growth of the City of Vista proposed land uses and transportation improvements.

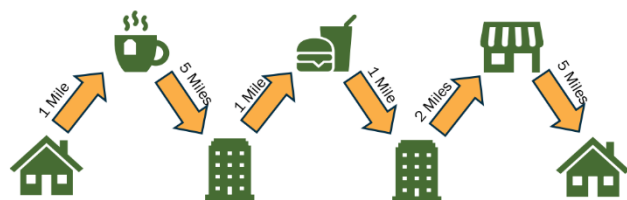
This report has been prepared in accordance with the City's adherence to SB 743 legislation, as outlined by the Governor's Office of Planning and Research (OPR). SB 743 eliminates traffic LOS as a metric for determining significant environmental impacts related to transportation and replaces it with VMT as the primary measure of transportation impacts.

For the purpose of this transportation impact study, Plan-to-Ground analysis was conducted by comparing both the Vista GPU and its No-Project Alternative (Adopted General Plan) to Base Year (2016), which is representative of baseline conditions.

### 2.2 Analysis and Methodology Thresholds

This section describes the CEQA transportation impact analysis methodology that was prepared in accordance with the City's compliance with the SB 743 legislation and the California Environmental Quality Act (CEQA) project review process.

VMT, or vehicle miles traveled, refers to the distance a vehicle travels from each origin to its destination. The graphic to the right demonstrates how VMT is derived for a person's trip tours and as a result, there is a total of 15 vehicle miles traveled.



Source: Vista TIAG (2020)

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### **VMT Metrics**

The following definitions describe how VMT is referred to, calculated, and accounted for in this CEQA impact analysis:

- **VMT per Capita** includes all vehicle-based person trips grouped and summed to the home location of individuals who are drivers or passengers on each trip. It includes home-based and non-home-based trips. The VMT for each home is then summed for all homes in a particular census tract and divided by the population of that census tract to arrive at VMT per Capita.
- **VMT per Employee** includes all vehicle-based person trips grouped and summed to the work location of individuals on the trip. This includes all trips made by employees (commute-portion only) with a job in Vista. The VMT for each work location is then summed for all work locations in a particular census tract and divided by the number of employees of that census tract to arrive at VMT per Employee.
- **Total Retail VMT** is the sum of all vehicle trips generated by retail uses in the community multiplied by their associated trip lengths.
- **Transportation Projects (VMT)** that are included in a General Plan or Community Plan should be analyzed at the general plan/community plan level because the change to a roadway configuration affects the VMT efficiency of the City's VMT per Capita and VMT per employee. Therefore, the impacts or lack thereof due to the roadway configuration(s) are already accounted for in the VMT per Capita and VMT per employee. VMT Analysis for roadways projects can be best considered at regional, citywide, and community levels prior to the consideration of individual projects. The *Institute of Transportation Engineers (ITE) San Diego Regional Guidelines (May 2019)*, recommend that projects included in the citywide or community plan may be presumed to have less than significant VMT impacts.

Furthermore, this does not preclude the lead CEQA agency from conducting additional analyses in the future; instead, it encourages the lead CEQA agency to view the general plan update holistically rather than compartmentally.

## Determination of Significant Impact

The City of Vista utilizes Vista TIAG to establish thresholds and methodology for VMT analysis. These guidelines state that a significant transportation impact would occur if the Project exceeded the thresholds for City of Vista’s compliance with SB 743 legislation, as identified in **Table 2.1**.

**Table 2.1 - Thresholds for Significant VMT Impacts by Land Use Type**

| Category <sup>1</sup>  | VMT Metric                        | Significant Transportation VMT Impact Threshold             |
|------------------------|-----------------------------------|-------------------------------------------------------------|
| Residential            | VMT per Capita                    | 15% below regional average                                  |
| Commercial             | VMT per Employee                  | 15% below regional average                                  |
| Industrial             | VMT per Employee                  | 15% below regional average                                  |
| Retail                 | Net increase in Regional VMT      | Net increase in regional VMT                                |
| Mixed-Use              | Evaluate Each Land Use Separately | Based on Proposed Land Use                                  |
| Redevelopment          | Based on the Proposed Land Use    | Based on Proposed Land Use                                  |
| Transportation Project | N/A                               | Already reflected in the VMT per Resident/Capita efficiency |

Source: Vista TIAG (2020)

Notes:

<sup>1</sup> The thresholds included in this table are for the pertinent land use types of the Vista GPU. Other land use thresholds (e.g. hotel, institutional, etc.) have been excluded as those thresholds are more land use specific and for project-level analyses.

<sup>2</sup> The regional average is determined using the Base Year (2016) of the current version of the SANDAG Regional Travel Demand Model (Series 14, version 13.3.2).

Per the Vista TIAG, projects that exceed the significance thresholds are considered significant and will require mitigation. For example, if the residential component of the Vista GPU generates a VMT per Capita that is not at least 15% below the regional average VMT per Resident, mitigation measures would be required to reduce its VMT impact. Projects that are unable to mitigate to a less than significant level of impact must provide a detailed statement of overriding considerations in accordance with CEQA Guidelines Sections 15091 and 15093.

## **2.3 VMT Analysis: Vista GPU**

This section focuses on whether there will be a significant impact if the Vista GPU land uses would, in total, exceed the land use thresholds for the respective VMT.

To establish a baseline understanding, SANDAG’s regional Activity Based Model (ABM2+) was customized for the City of Vista. The incorporated City of Vista plus the city’s Sphere of Influence (SOI) were used to define the study area. Using more detailed local level data, the 2016 model base year was calibrated by updating the Highway and Active Transportation networks to better reflect 2016 roadway conditions and access to the networks within the study area. The results of the model calibration endeavor produced a 2016 scenario that closely matched observed baseline conditions in 2016.

With the calibrated base year model as a foundation, the Vista Proposed Plan and the No-Project (Adopted General Plan) model scenarios were developed using SANDAG’s 2050 vision in accordance with the most recent 2021 Regional Plan. The Highway and Active Transportation networks were updated within the study area for both scenarios; “buildout” land use assumptions were used to update the socio-economic data inputs within the study area. These scenarios provide the relevant metrics for the VMT analysis.

### Employment/Residential

**Table 2.2** presents the City of Vista VMT per Capita and VMT per Employee metrics for the San Diego Regional Base Year and Vista GPU. The VMT reports for Base Year are included in **Appendix A**. The VMT reports for the Vista GPU are included in **Appendix B**.

**Table 2.2 - Vista GPU VMT Efficiency Metrics**

| VMT Metric       | Regional<br>Base Year<br>(2016)<br><b>A</b> | Vista<br>GPU<br>(2050)<br><b>B</b> | % of Regional<br>Base Year<br><b>B/A</b> | VMT Impact<br>Threshold | Significant<br>Impact? |
|------------------|---------------------------------------------|------------------------------------|------------------------------------------|-------------------------|------------------------|
| VMT per Capita   | 19.0                                        | 13.0                               | 68.4%                                    | 85.0%                   | No                     |
| VMT per Employee | 19.0                                        | 11.1                               | 58.4%                                    | 85.0%                   | No                     |

Source: CR Associates (2025)

Under Base Year conditions, the San Diego region has an average VMT per Capita and VMT per Employee of 19. The City of Vista currently has an average VMT per Capita of 16.1 and average VMT per Employee of 15.1. By 2050, with the buildout of the Vista GPU, which includes the proposed land uses and roadway network, the VMT efficiency of the City of Vista substantially improves to 13 for VMT per Capita and 11.1 for VMT per Employee. As a result, both VMT metrics under Vista GPU fall below the VMT impact thresholds of 85% of the regional base year. Therefore, the Vista GPU transportation impacts for residential and employment land uses would be less than significant.

### Retail

Retail uses are considered to be local-serving retail that will serve mainly the City of Vista. OPR's technical advisory suggests that new local-serving retail development shortens trips and reduces VMT by improving retail destination proximity and redistributing existing trips rather than creating new trips. Therefore, the Vista GPU transportation impacts for retail land uses would be less than significant.

### Mixed-Use/Redevelopment

Mixed-use and redevelopment projects inherently fall within the residential, employment, or land use categories. As a result, mixed-use and redevelopment projects for Vista GPU are already included within the broader VMT analysis. Additionally, mixed-use and redevelopment projects often revitalize underutilized areas, promoting more efficient land use patterns that support active transportation and reduced vehicle dependency. Therefore, the Vista GPU transportation impacts for mixed-use/redevelopment land uses would be less than significant.

### Transportation

As mentioned previously, the effects due to roadway configurations are already accounted for in the VMT per Capita and VMT per Employee. In other words, the miles traveled by residents and employees are directly correlated to the transportation network available to travel through. Additionally, as recommended by ITE Guidelines, transportation projects included in citywide or community plans may be presumed to have less than significant VMT impacts. Therefore, the Vista GPU transportation impacts for its transportation projects would be less than significant.

## 2.4 No-Project Alternative (Adopted General Plan)

This section discusses potential VMT impacts under the No-Project Alternative (Adopted General Plan), which represents the currently adopted General Plan without the Vista GPU's proposed land use and mobility network modifications.

The California Environmental Quality Act (CEQA) mandates consideration and analysis of alternatives to the Vista GPU. According to CEQA Guidelines, the range of alternatives “shall include those that could feasibly accomplish most of the basic purposes of the project and could avoid or substantially lessen one or more of the significant impacts” (CEQA Guidelines Section 15126.6 (d) (2)). The purpose of evaluating the No-Project Alternative is to allow decision makers to compare the outcomes of approving the Vista GPU with the potential impacts of maintaining the currently adopted General Plan. The No-Project Alternative represents what would reasonably be expected to occur in the foreseeable future if the Vista GPU were not adopted. The No-Project Alternative consists of the adopted General Plan's land use designations and the currently adopted mobility network. Table 1.1, shown previously, summarizes the buildout land uses under the No-Project Alternative compared to Vista GPU.

**Table 2.3** presents the City of Vista resident and employee VMT efficiency metrics for No Project Alternative conditions. The VMT Reports for this alternative are included in **Appendix C**.

**Table 2.3 - Vista No-Project VMT Efficiency Metrics for Transportation Impact Analysis**

| VMT Metric       | Regional Base Year (2016) | No-Project Alternative (2050) | % of Regional Base Year | VMT Impact Threshold | Significant Impact? |
|------------------|---------------------------|-------------------------------|-------------------------|----------------------|---------------------|
| VMT per Capita   | 19.0                      | 12.6                          | 66.3%                   | 85.0%                | No                  |
| VMT per Employee | 19.0                      | 12.2                          | 64.2%                   | 85.0%                | No                  |

Source: SANDAG (2023); CR Associates (2025)

As shown, the No-Project Alternative is projected to have an average VMT per Capita of 12.6 and an average VMT per Employee of 12.2. Both VMT metrics under the No-Project Alternative fall below the VMT impact thresholds of 85% of the regional base year. Therefore, the No-Project Alternative transportation impacts for residential and employment land uses would be less than significant.

### Retail

Retail uses are considered to be local-serving retail that will serve mainly the City of Vista. OPR's technical advisory suggests that new local-serving retail development shortens trips and reduces VMT by improving retail destination proximity and redistributing existing trips rather than creating new trips. Therefore, similar to the Vista GPU alternative, the No-Project Alternative transportation impacts for retail land uses would be less than significant.

### Mixed-Use/Redevelopment

Mixed-use and redevelopment projects inherently fall within the residential, employment, or land use categories. As a result, mixed-use and redevelopment projects for Vista GPU are already included within the broader VMT analysis. Additionally, mixed-use and redevelopment projects often revitalize underutilized areas, promoting more efficient land use patterns that support active transportation and reduced vehicle dependency. Therefore, similar to the Vista GPU alternative, the No-Project

Alternative transportation impacts for mixed-use/redevelopment land uses would be less than significant.

### **Transportation**

As mentioned previously, the effects due to roadway configurations are already accounted for in the VMT per Capita and VMT per Employee. In other words, the miles traveled by residents and employees are directly correlated to the transportation network available to travel through. Additionally, as recommended by ITE Guidelines, transportation projects included in citywide or community plans may be presumed to have less than significant VMT impacts. Therefore, the No-Project Alternative transportation impacts for its transportation projects would be less than significant.

## **2.5 Plan-to-Plan Comparison**

Table 2.2 above compares the VMT per Capita and VMT per Employee between the Base Year and Proposed GPU, while table 2.3 compares the same between the Base Year and Adopted General Plan. Although a plan-to-plan comparison is not part of this study, it is specifically worth noting the citywide VMT metrics between those scenarios.

- VMT per Capita is 12.6 in the Adopted scenario and 13.0 in the Proposed scenario
- VMT per Employee is 12.2 in the Adopted scenario and 11.1 in the Proposed scenario

With a higher VMT per Capita and lower VMT per Employee in the Proposed scenario, this is a direct reflection of the land use input assumptions between the two scenarios, where the Proposed scenario has over 11,000 more dwelling units and just over 9 million square feet less commercial retail. This means that there are more people and less employment within the city, resulting in the Vista population filling local jobs producing a lower VMT per Employee. This also means that more Vista residents need to commute to more jobs outside of the city which produces a higher VMT per Capita. The balance of population-to-employment within the city between the two future year scenarios is the main driver of these VMT metrics.

## 3.0 Traffic Operations Analysis (LOS Analysis)

This chapter describes the Circulation and Mobility Element key study intersections and freeways that support Vista's vehicular mobility, including an assessment of physical characteristics and level of service (LOS) conditions.

### 3.1 Analysis Methodology

Vehicular operational evaluations consist of peak hour intersection analyses and peak hour freeway/state highway segment analyses. The City of Vista jurisdictional limits were used as the general study area boundaries for the vehicular analyses. The study area selection for each analysis is further detailed within the respective subsection.

Intersection vehicular operational analyses followed the Vista TIAG Guidelines. Operational performance is described in terms of level of Service (LOS), a measure for vehicular operations based on traffic flow characteristics.

**Table 3.1** describes the characteristics of each LOS category, which range from LOS A – approximating free flow conditions, to LOS F – approximating the most congested flow. The quantitative methodologies for determining the LOS for each analysis type are described within the respective subsection.

**Table 3.1 - Vehicular Level of Service Definitions**

| LOS | Characteristics                                                                                                                                                                                                        |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A   | Represents the best operating conditions and is considered free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.                                                       |
| B   | Represents reasonably free-flowing conditions, but with some influence by others.                                                                                                                                      |
| C   | Represents constrained constant flow below speed limits, with additional attention required by the drivers to maintain safe operations. Comfort and convenience levels of the driver decline noticeably.               |
| D   | Represents traffic operations approaching unstable flow with high passing demand and passing capacity near zero, characterized by drivers being severely restricted in maneuverability.                                |
| E   | Represents unstable flow near capacity. LOS E often changes to LOS F very quickly because of disturbances (road conditions, accidents, etc.) in traffic flow.                                                          |
| F   | Represents the worst conditions with heavily congested flow and traffic demand exceeding capacity, characterized by stop-and-go waves, poor travel time, low comfort and convenience, and increased accident exposure. |

*Source: Highway Capacity Manual, Transportation Research Board (2016)*

### 3.1.1 Peak Hour Intersection Level of Service

#### Signalized Intersections

The signalized intersection analysis utilized in this study conforms to the operational analysis methodology outlined in the *2016 Highway Capacity Manual* (HCM 6). This method defines LOS in terms of delay, or more specifically, average control delay per vehicle (seconds/vehicle).

The HCM 6 methodology sets 1,900 passenger-cars per hour per land (pcphpl) as the ideal saturation flow rate at signalized intersections based upon the minimum headway that can be sustained between departing vehicles at a signalized intersection. The service saturation flow rate, which reflects the saturation flow rate specific to the study facility, is determined by adjusting the ideal saturation flow rate for lane width, on-street parking, bus stops, pedestrian volume, traffic composition (or percentage of heavy vehicles), and shared lane movements (e.g., through and right-turn movements sharing the same lane). The computerized analysis of intersection operations was performed utilizing Synchro 12 traffic analysis software by Trafficware.

The following assumptions were utilized in conducting all intersection LOS analyses:

- Each signalized intersection assumed 10 pedestrian crossing signal activations per leg/signal phase per hour, an estimate that is more conservative than the default Synchro 12 value of 5.
- A 3% heavy vehicle factor was applied for all study area intersections. 3% is a standard assumption in HCM methodologies.
- A Peak Hour Factor (PHF) of 0.95 was utilized for all study area intersections.
- Signal timings were optimized by adjusting cycle lengths and splits for uncoordinated signals and splits only (maintaining existing cycle lengths) for coordinated signals.

**Table 3.2** presents the signalized intersection average control delay per vehicle thresholds and describes the operational characteristics of each LOS category. LOS A through D operations are regarded as acceptable performance for signalized Circulation and Mobility Element intersections in the City of Vista.

**Table 3.2 - Signalized Intersection LOS Thresholds and Characteristics**

| LOS | Average Control Delay Per Vehicle (seconds) | LOS Characteristics                                                                                                                                                                                                                                                                 |
|-----|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A   | <10.0                                       | Occurs when the volume-to-capacity ratio is low and either progression is exceptionally favorable, or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping. |
| B   | 10.1 – 20.0                                 | Occurs when the volume-to-capacity ratio is low and either progression is highly favorable, or the cycle length is short. More vehicles stop than with LOS A.                                                                                                                       |
| C   | 20.1 – 35.0                                 | Occurs when progression is favorable, or the cycle length is moderate. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.                                                                                 |
| D   | 35.1 – 55.0                                 | Occurs when the volume-to-capacity ratio is high and either progression is ineffective, or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.                                                                                               |
| E   | 55.1 – 80.0                                 | Occurs when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.                                                                                                                                 |
| F   | >80.0                                       | Occurs when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.                                                                                                                                 |

*Source: Highway Capacity Manual, Transportation Research Board (2016)*

### Unsignalized Intersections

Unsignalized intersections, including two-way and all-way stop-controlled intersections, were analyzed using the HCM 6 unsignalized intersection analysis methodology, and utilizing the Synchro 12 traffic analysis software. The LOS for an all-way stop-controlled (AWSC) intersection is determined by the computed or measured average control delay of all movements. For side-street stop-controlled (SSSC) intersections, LOS is determined by the computed or measured control delay and is defined for each minor movement. Control delay and LOS for the “worst” movement are reported, as opposed to average intersection LOS and delay. **Table 3.3** presents the level of service operations thresholds for unsignalized intersections. LOS A through D operations are regarded as acceptable performance for unsignalized Circulation and Mobility Element intersections in the City of Vista.

**Table 3.3 - Unsignalized Intersection LOS Thresholds**

| Level of Service | Average Control Delay Per Vehicle (seconds) |
|------------------|---------------------------------------------|
| A                | <10.0                                       |
| B                | 10.1 – 15.0                                 |
| C                | 15.1 – 25.0                                 |
| D                | 25.1 – 35.0                                 |
| E                | 35.1 – 50.0                                 |
| F                | >50.0                                       |

*Source: Highway Capacity Manual, Transportation Research Board (2016)*

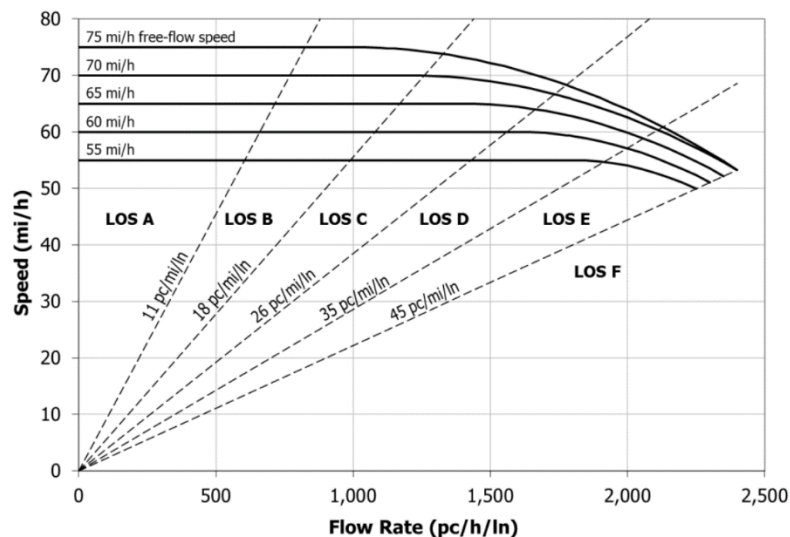
### 3.1.2 Freeway/Highway Level of Service

Freeway level of service analysis is based upon procedures developed by the *Highway Capacity Manual 2010* (HCM 2010). The procedure for calculating freeway LOS involves estimating the vehicle speed (mi/h) and density/flow (pc/mi/ln).

HCS7 software, developed by McTrans, was used to calculate both the vehicle speed and density/flow along the study area freeway segments. The HCS7 software required the following inputs to complete the calculations:

- Average Annual Daily Traffic (AADT) –
- K (peak hour percentage) – Caltrans Traffic Census 2018 AADT Volumes Report.
- D (directional split) – Caltrans Traffic Census 2018 AADT Volumes Report.
- $AADT_{adj}$  – Calculated using AADT and D values provided by Caltrans using the following equation:
  - $AADT_{adj} = \left( \frac{D}{1-D} \right) \times AADT$
  - Represents the direction in the opposite direction of the Peak Direction
- PHF – Assumed to be a typical value of 0.95.
- $P_T$  – (% Trucks and Buses) – Caltrans Traffic Census 2018 AADT Truck Volumes Report
- $P_R$  – (%RVs) – Assumed to be 0, HCM 6 recommends grouping RV volumes with Trucks and Buses as the value is assumed to be less than a 5:1 ratio.
- General Terrain – Assumed to be less than 2% grade and therefore Level Terrain (HCM 6 11-16,17)
- $f_p$  – Driver population factor assumed one as traffic is largely commuter traffic.
- $E_T$  – Value of 1.5 as terrain is Level (HCM 6 11-15)
- $E_R$  – Value of 1.2 as terrain is Level (HCM 6 11-15)
- Lane Width – Assumed 12' maximum value by Google Earth survey.
- Right-Side Clearance – Assumed 6' maximum value by Google Earth survey.
- Total Ramp Density, TRD – Calculated based on Google Earth survey.
  - Density calculated by total number of on/off ramps in single direction within segment length plus 3 miles in both directions, divided by the total length.
- Base Free-Flow Speed, BFFS – Assumed 75.4 mph (HCM 6 11-11)

Using the calculated freeway speed and density/flow, the LOS is determined using the chart below.



## 3.2 Modeling and Traffic Volume Forecasting

This section summarizes the travel demand model forecasting process utilized to project the future travel patterns within the City of Vista. SANDAG's current Activity Based Model (Series 14, ABM2+) was utilized to produce traffic volumes, levels of service, vehicle miles of travel and mode choice for analyzing the City of Vista's proposed General Plan Update (GPU). Section 3.2.1 describes the Base Year model calibration process and Section 3.2.2 describes the process used to develop future-year City of Vista GPU metrics.

### 3.2.1 Base Year Model Calibration

SANDAG's 2016 Base Year was used to calibrate the model to better represent existing travel patterns within the City of Vista with a focus on model socio-economic data representing land uses, and the roadway network geometrics and attributes.

#### Base Year Land Use Verification/Validation

To ensure existing land uses were currently represented in the Base Year model, land use types, descriptions, and quantities were crosschecked with the socio-economic inputs of the model in conjunction with ground conditions using Google Earth/Neatmap aerial imagery and field verifications.

#### Base Year Roadway Network Verification/Validation

The SANDAG Base Year roadway network was compared to 2016 field conditions to ensure an accurate model network. The following variables were compared and adjusted to match actual conditions within the project study area:

- TAZ loading inputs
- Number of lanes on roadways
- Traffic controls
- Posted speed limits
- Signalized intersection geometrics
- Street classification
- Roadway speed limits
- Turn restrictions
- Bicycle facilities
- Multi-use paths

### **Base Year Ground Count Validation & Adjustment**

The 2016 base year model scenario was validated for the City of Vista using historical average daily traffic (ADT) volumes between 2015 and 2019. The ADTs were compiled from the City of Vista's Traffic Count Database and other recent studies to compare to the model output. The City's database included multiple traffic counts representing the same location on numerous segments of the network and were selected based upon nearby trip generations and traffic patterns along each roadway segment and year of data. If available, counts from 2016 were used as the first priority, followed by data from 2015, 2017, 2018, and 2019. Abnormally high or low traffic volumes were assumed to be outliers and thus were not selected to be used for model validation. Adjustments were made as needed to ensure the Base Year model output accurately reflected available traffic count information. The outcome of validating model output with observed ground counts is a calibrated model for use within the City of Vista and Sphere of Influence areas.

### **3.2.2 Traffic Volume Forecasting**

SANDAG's 2050 Vision scenario was used to develop future-year ADTs and travel metrics for the City of Vista's GPU. Two 2050 scenarios were developed to represent "build out" conditions of the study area: Adopted General Plan and Preferred Plan (Vista GPU). **Table 3.4** includes the assumptions for each model scenario.

**Table 3.4 - Model Scenarios**

| Scenario       | Land Use Assumptions           | Network Assumptions          |
|----------------|--------------------------------|------------------------------|
| 2050 Adopted   | Currently Adopted General Plan | Existing Circulation Element |
| 2050 Preferred | Sustainable Growth Scenario    | Proposed Circulation Element |

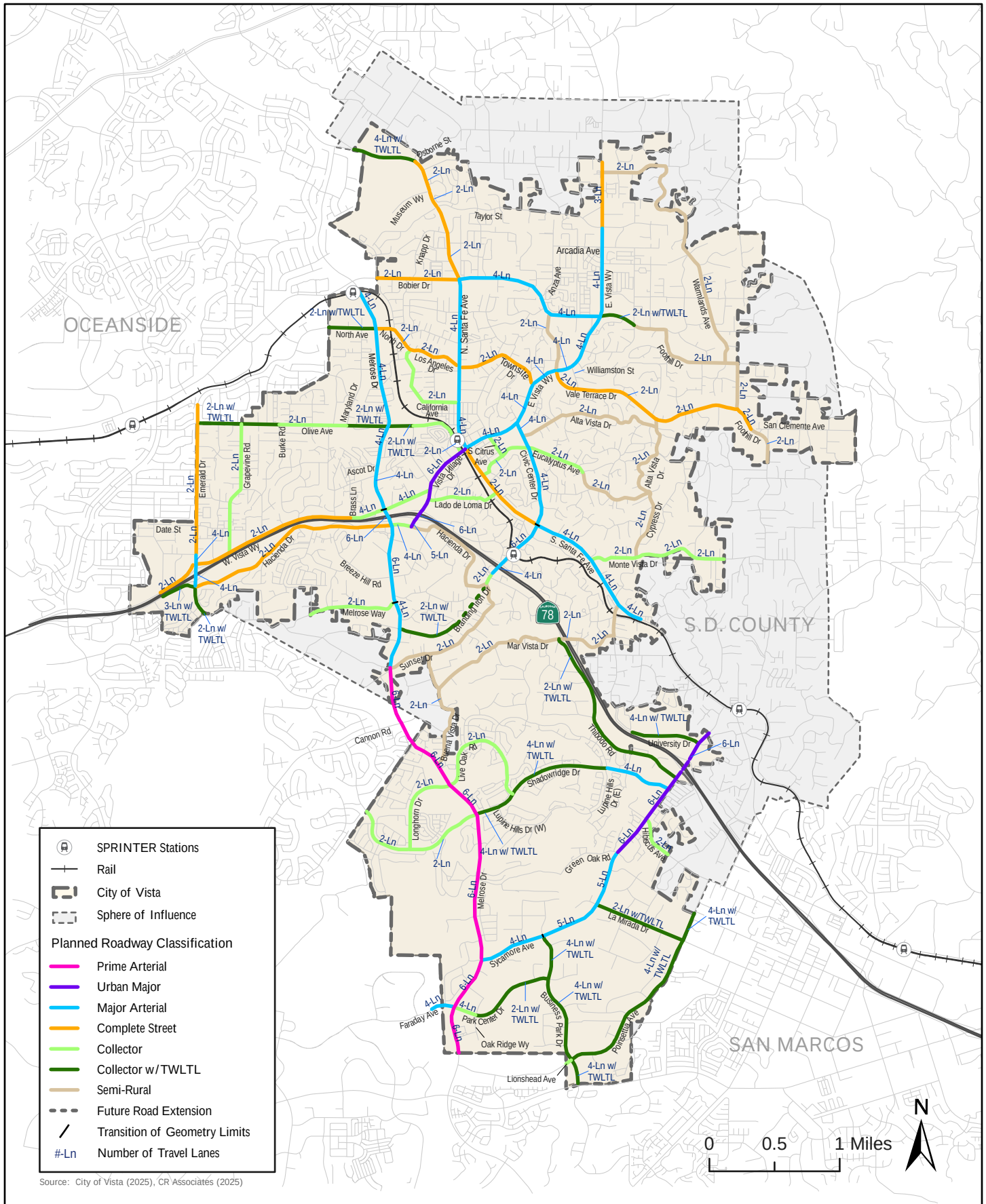
*Source: CR Associates (2025)*

These scenarios also include the following adjustments/assumptions:

- Vista GPU land uses within the project study area.
- Future roadway network within the study area with the roadway segment functional classifications identified in **Figure 3.1**.
- Future active transportation network within the study area with bicycle facilities and pedestrian routes identified in **Figure 3.2** and **Figure 3.3**, respectively.
- Regional model Year 2050 land uses outside of the study area.
- Regional model Year 2050 roadway and active transportation networks outside of the study area.
- Regional model Year 2050 transit network both inside and outside of the study area.

The model inputs described above were reviewed by the project team and approved by City staff prior to running the model forecasts. Vista GPU forecast volumes were reviewed and adjusted by the project team based on a comparison between the Base Year 2016 traffic volumes and historic counts. **Figure 3.4** shows the projected ADT under Vista GPU conditions for all study roadway segments.

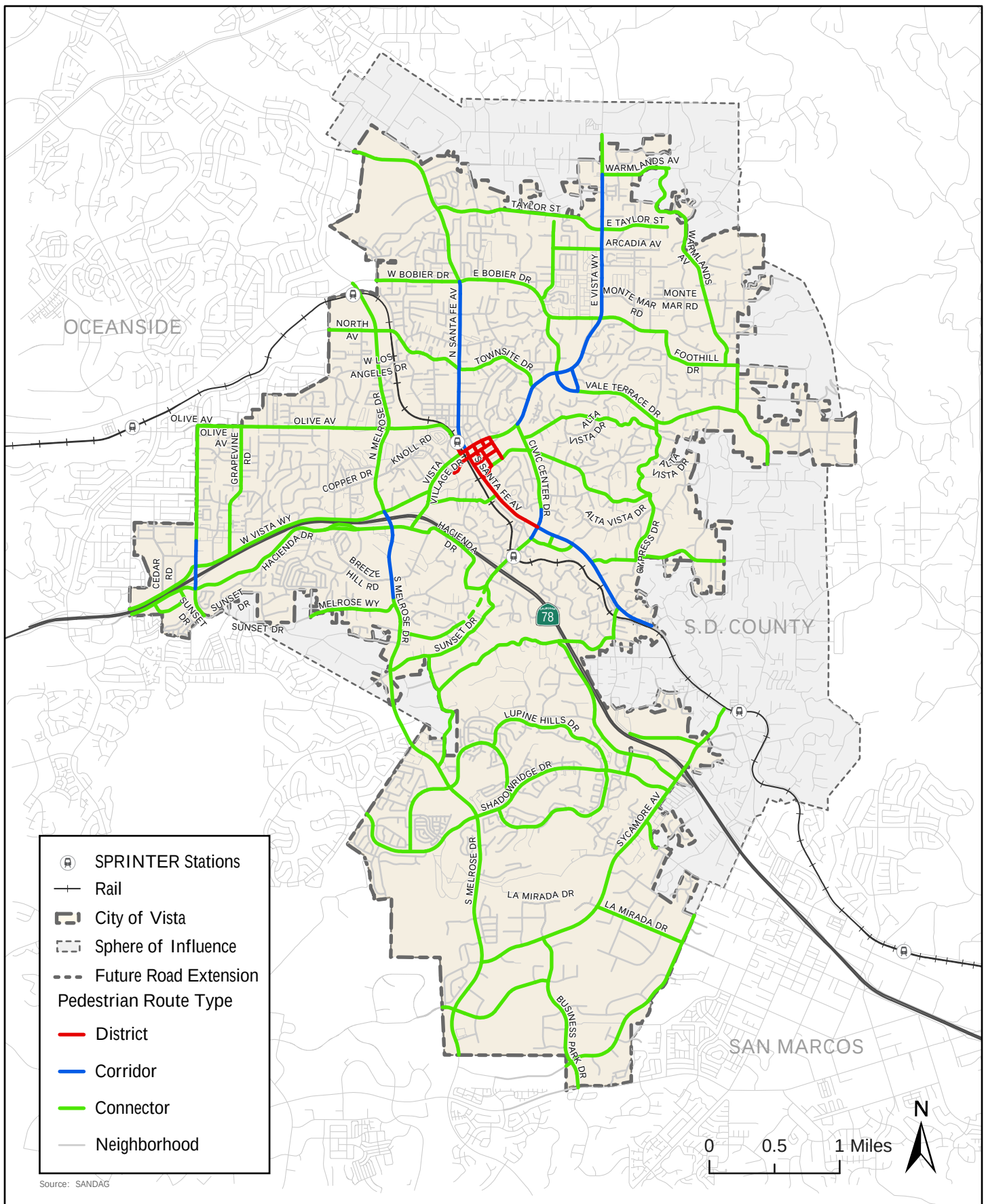














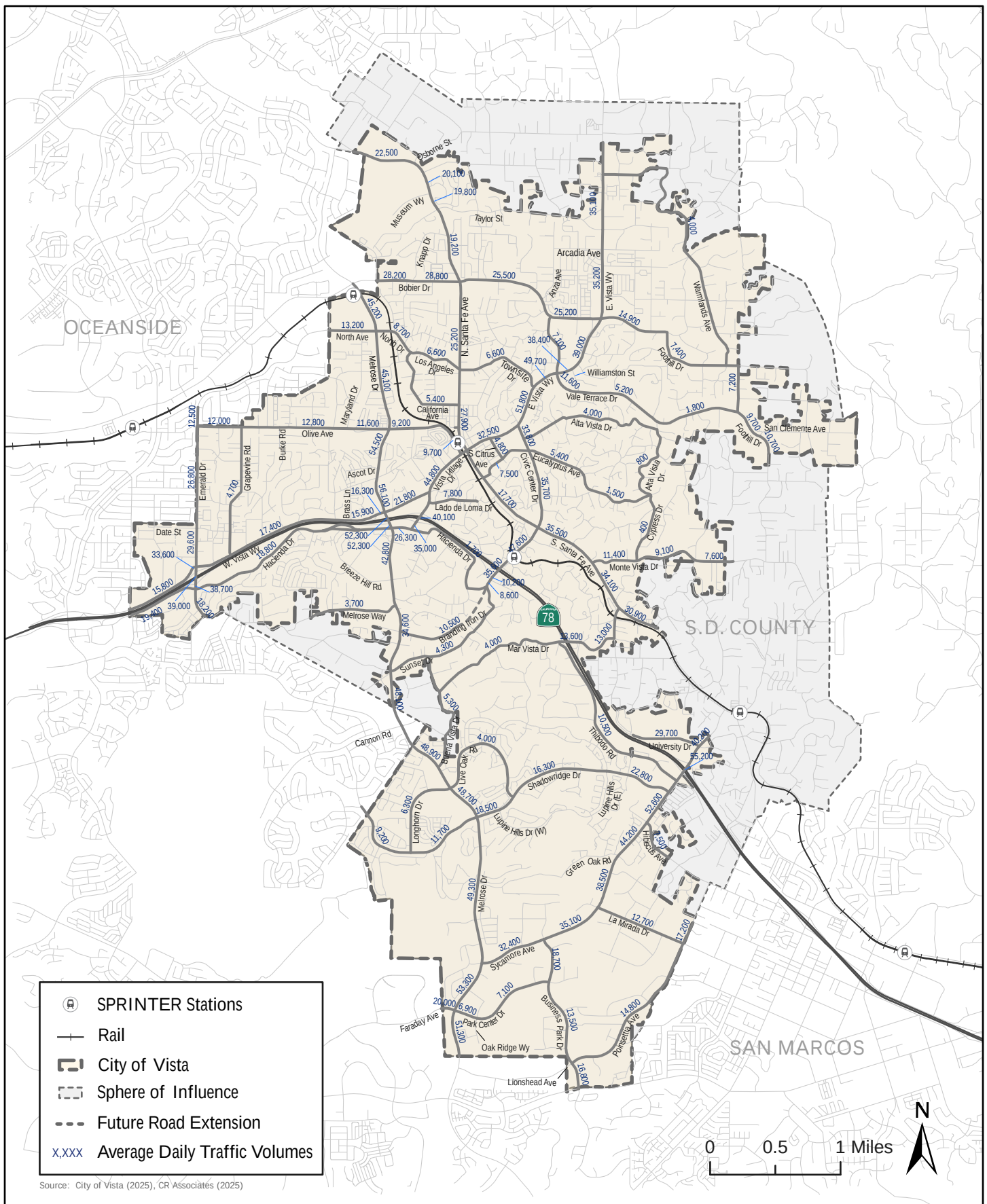
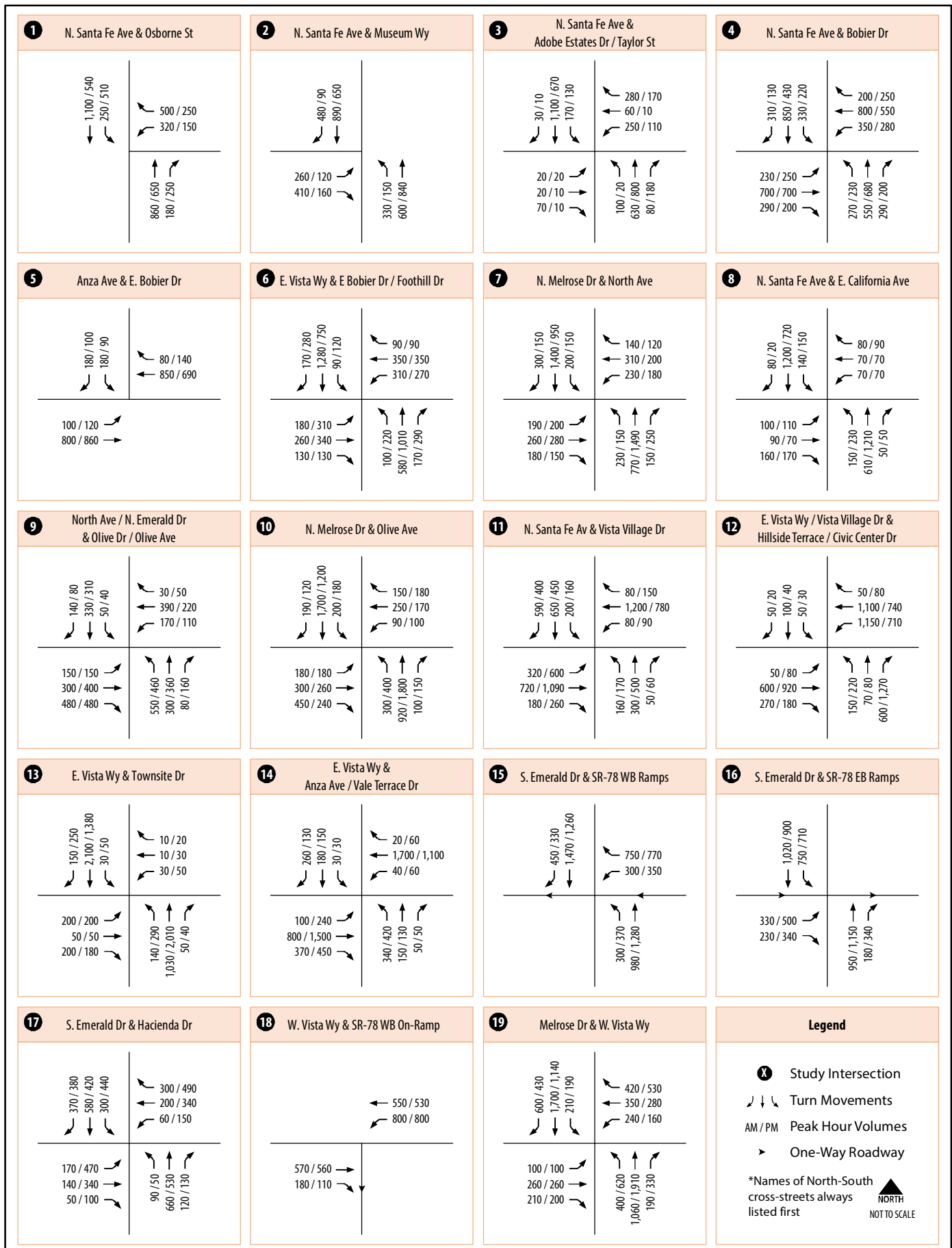


Figure 3.4  
Vista GPU 2050 Daily Traffic Volumes

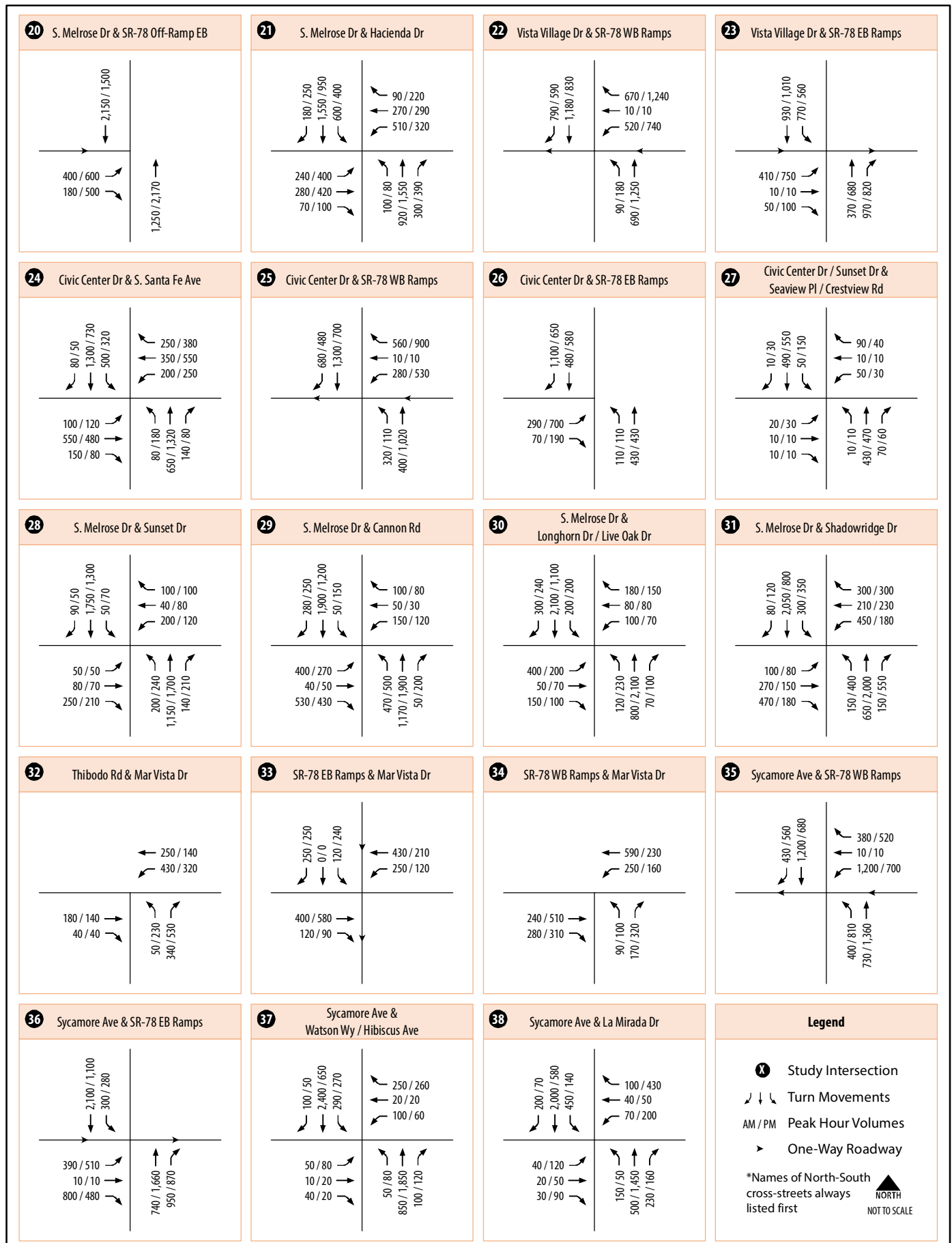


Intersection geometrics were assumed to be the same as existing conditions. Detailed analysis for existing conditions can be found in the *City of Vista General Plan Update Existing Conditions Report* (March 2023). Intersection peak hour turning movement volumes were developed by utilizing the National Cooperative Highway Research Program (NCHRP) Report 255 methodology for estimating intersection turning movements. This methodology describes the use of growth factors, based on the comparison of existing daily roadway segment volumes and estimated daily roadway segment volumes, which are applied to existing peak hour intersection approach and departure volumes. Manual adjustments were also made to ensure that traffic volumes among adjacent intersections were reasonably balanced. **Figure 3.5** shows the projected peak hour intersection turning movement volumes under Vista GPU conditions for all study intersections.



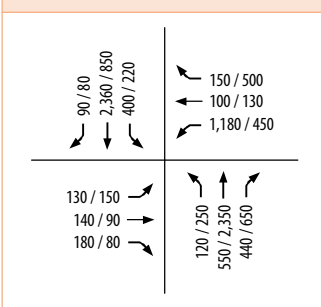




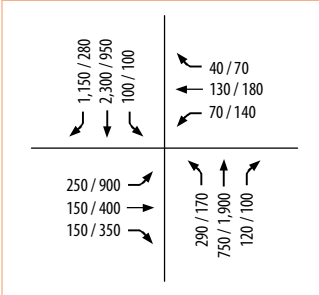




**39** S. Melrose Dr & Sycamore Ave



**40** S. Melrose Dr & Faraday Ave / Park Center Dr



**Legend**

-  Study Intersection
-  Turn Movements
- AM / PM Peak Hour Volumes
-  One-Way Roadway
- \*Names of North-South cross-streets always listed first
-  NORTH  
NOT TO SCALE



### 3.3 Traffic Conditions

#### 3.3.1 Intersection LOS Results

**Table 3.6** presents the traffic control types, peak hour intersection delays, and peak hour LOS results for the forty (40) study intersections under both existing and Vista GPU conditions, for comparison purposes. Intersection LOS calculation worksheets are provided in **Appendix D**. Detailed analysis for existing conditions can be found in the *City of Vista General Plan Update Existing Conditions Report* (March 2023). **Figure 3.7** presents Vista GPU's intersection level of service analysis results.

As shown, all of the Vista GPU's study intersections are anticipated to operate at LOS D or better, with the exception of the following seventeen (17) intersections:

- I-1. N. Santa Fe Avenue & Osborne Street – LOS E (AM), LOS F (PM)**
- I-4. N. Santa Fe Avenue & Bobier Drive – LOS F (AM/PM)**
- I-7. N. Melrose Drive & North Avenue – LOS F (AM)
- I-8. N. Santa Fe Avenue & California Drive – LOS F (AM/PM)**
- I-10. N. Melrose Drive & Olive Avenue – LOS E (AM/PM)
- I-15. Emerald Drive & SR-78 WB Ramps – LOS E (AM/PM)**
- I-16. Emerald Drive & SR-78 EB Ramps – LOS F (AM/PM)**
- I-17. Emerald Drive & Hacienda Drive – LOS E (PM)
- I-22. Vista Village Drive & SR-78 WB Ramps – LOS E (PM)**
- I-26. Civic Center Drive & SR-78 EB Ramps – LOS F (AM/PM)**
- I-28. Melrose Drive & Sunset Drive – LOS F (AM)
- I-31. S. Melrose Drive & Shadowridge Drive – LOS E (AM), LOS F (PM)**
- I-32. Thibodo Road & Mar Vista Drive – LOS F (AM)**
- I-33. SR-78 EB Ramps & Mar Vista Drive – LOS F (AM/PM)**
- I-34. SR-78 WB Ramps & Mar Vista Drive – LOS F (AM/PM)**
- I-38. Sycamore Avenue & La Mirada Drive – LOS F (AM), LOS E (PM)**
- I-39. S. Melrose Drive & Sycamore Avenue – LOS F (AM/PM)**

**Bold** = Intersections operate at LOS E or F under both Existing Conditions and Vista GPU.



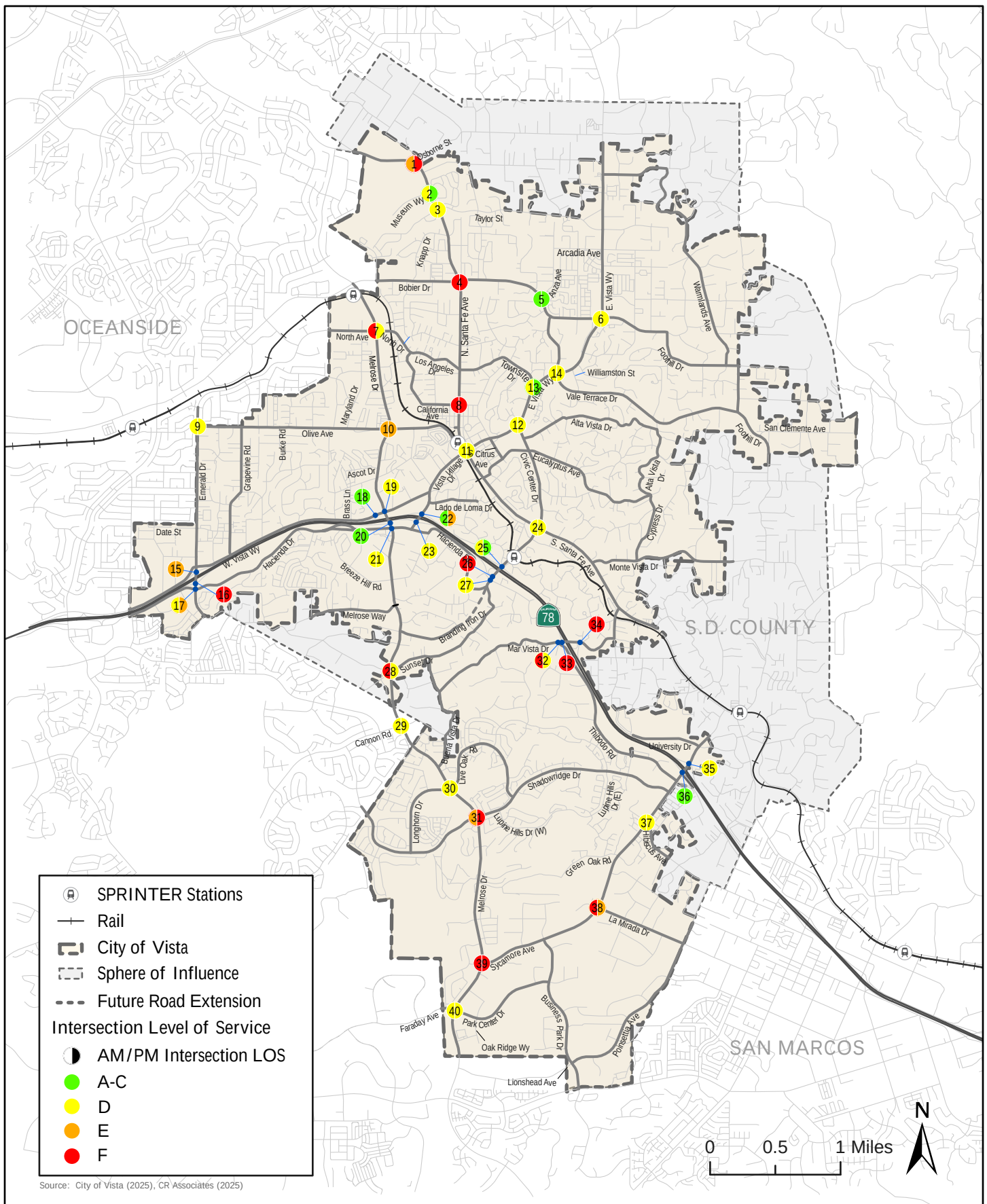




**Table 3.5 - Peak Hour Intersection LOS Results**

| ID   | Intersection                                                               | Peak Hour | Traffic Control | Existing Conditions |     | Vista GPU       |     | Δ Delay |
|------|----------------------------------------------------------------------------|-----------|-----------------|---------------------|-----|-----------------|-----|---------|
|      |                                                                            |           |                 | Delay (sec/veh)     | LOS | Delay (sec/veh) | LOS |         |
| I-1  | N. Santa Fe Avenue & Osborne Street                                        | AM        | Signal          | 58.0                | E   | 62.7            | E   | 4.7     |
|      |                                                                            | PM        |                 | 215.4               | F   | 224.3           | F   | 8.9     |
| I-2  | N. Santa Fe Avenue & Museum Way                                            | AM        | Signal          | 42.0                | D   | 48.1            | D   | 6.1     |
|      |                                                                            | PM        |                 | 10.9                | B   | 14.1            | B   | 3.2     |
| I-3  | N. Santa Fe Avenue & Taylor Street                                         | AM        | Signal          | 50.8                | D   | 54.9            | D   | 4.1     |
|      |                                                                            | PM        |                 | 39.4                | D   | 51.3            | D   | 11.9    |
| I-4  | N. Santa Fe Avenue & Bobier Drive                                          | AM        | Signal          | 97.4                | F   | 126.7           | F   | 29.3    |
|      |                                                                            | PM        |                 | 47.7                | D   | 105.0           | F   | 57.3    |
| I-5  | Anza Avenue (North) & E. Bobier Drive                                      | AM        | Signal          | 8.9                 | A   | 10.1            | B   | 8.4     |
|      |                                                                            | PM        |                 | 7.4                 | A   | 8.0             | A   | 0.6     |
| I-6  | E. Vista Way & E. Bobier Drive / Foothill Drive                            | AM        | Signal          | 44.3                | D   | 47.3            | D   | 3.0     |
|      |                                                                            | PM        |                 | 37.6                | D   | 42.6            | D   | 5.0     |
| I-7  | N. Melrose Drive & North Avenue                                            | AM        | Signal          | 53.8                | D   | 83.8            | F   | 30.0    |
|      |                                                                            | PM        |                 | 35.4                | D   | 51.7            | D   | 16.3    |
| I-8  | N. Santa Fe Avenue & California Drive                                      | AM        | Signal          | 57.5                | E   | 81.5            | F   | 24.0    |
|      |                                                                            | PM        |                 | 60.8                | E   | 85.5            | F   | 24.7    |
| I-9  | Emerald Drive & Olive Avenue                                               | AM        | Signal          | 40.4                | D   | 54.5            | D   | 14.1    |
|      |                                                                            | PM        |                 | 32.8                | D   | 52.0            | D   | 19.2    |
| I-10 | N. Melrose Drive & Olive Avenue                                            | AM        | Signal          | 45.6                | D   | 72.4            | E   | 26.8    |
|      |                                                                            | PM        |                 | 36.1                | D   | 55.6            | E   | 19.5    |
| I-11 | N. Santa Fe Avenue & Vista Village Drive                                   | AM        | Signal          | 39.9                | D   | 51.2            | D   | 11.3    |
|      |                                                                            | PM        |                 | 38.8                | D   | 47.8            | D   | 9.0     |
| I-12 | Civic Center Drive - Hillside Terrace & E. Vista Way / Vista Village Drive | AM        | Signal          | 31.1                | C   | 53.2            | D   | 22.1    |
|      |                                                                            | PM        |                 | 42.5                | D   | 44.1            | D   | 1.6     |
| I-13 | E. Vista Way & Townsite Drive                                              | AM        | Signal          | 35.9                | D   | 54.6            | D   | 18.7    |
|      |                                                                            | PM        |                 | 13.7                | B   | 33.4            | C   | 19.7    |
| I-14 | Anza Avenue / Vale Terrace Drive & E. Vista Way                            | AM        | Signal          | 30.2                | C   | 45.3            | D   | 15.1    |
|      |                                                                            | PM        |                 | 27.4                | C   | 36.9            | D   | 9.5     |
| I-15 | Emerald Drive & SR-78 WB Ramps                                             | AM        | Signal          | 54.2                | D   | 58.5            | E   | 4.3     |
|      |                                                                            | PM        |                 | 56.0                | E   | 62.4            | E   | 6.4     |
| I-16 | Emerald Drive & SR-78 EB Ramps                                             | AM        | Signal          | 79.2                | E   | 85.1            | F   | 5.9     |
|      |                                                                            | PM        |                 | 99.5                | E   | 107.5           | F   | 8.0     |
| I-17 | Emerald Drive & Hacienda Drive                                             | AM        | Signal          | 24.9                | C   | 49.0            | D   | 24.1    |
|      |                                                                            | PM        |                 | 54.5                | D   | 66.2            | E   | 11.7    |
| I-18 | SR-78 WB On-Ramp & W. Vista Way                                            | AM        | Signal          | 9.9                 | A   | 10.6            | B   | 0.7     |
|      |                                                                            | PM        |                 | 8.6                 | A   | 10.5            | B   | 1.9     |
| I-19 | S. Melrose Drive & W. Vista Way                                            | AM        | Signal          | 49.8                | D   | 54.6            | D   | 4.8     |
|      |                                                                            | PM        |                 | 28.7                | C   | 39.6            | D   | 10.9    |
| I-20 | S. Melrose Drive & SR-78 EB Off Ramp                                       | AM        | Signal          | 9.2                 | A   | 10.1            | B   | 0.9     |
|      |                                                                            | PM        |                 | 15.6                | B   | 17.2            | B   | 1.6     |
| I-21 | S. Melrose Drive & Hacienda Drive                                          | AM        | Signal          | 38.1                | D   | 41.1            | D   | 3.0     |
|      |                                                                            | PM        |                 | 48.6                | D   | 51.4            | D   | 2.8     |
| I-22 | Vista Village Drive & SR-78 WB Ramps                                       | AM        | Signal          | 22.3                | C   | 24.2            | C   | 1.9     |
|      |                                                                            | PM        |                 | 55.2                | E   | 58.2            | E   | 3.0     |
| I-23 | Vista Village Drive & SR-78 EB Ramps                                       | AM        | Signal          | 35.1                | D   | 36.2            | D   | 1.1     |
|      |                                                                            | PM        |                 | 46.9                | D   | 50.0            | D   | 3.1     |

**Table 3.5 - Peak Hour Intersection LOS Results**

| ID   | Intersection                                          | Peak Hour | Traffic Control | Existing Conditions |     | Vista GPU       |     | Δ Delay |
|------|-------------------------------------------------------|-----------|-----------------|---------------------|-----|-----------------|-----|---------|
|      |                                                       |           |                 | Delay (sec/veh)     | LOS | Delay (sec/veh) | LOS |         |
| I-24 | Civic Center Drive & S. Santa Fe Avenue               | AM        | Signal          | 44.4                | D   | 48.5            | D   | 4.1     |
|      |                                                       | PM        |                 | 47.4                | D   | 54.6            | D   | 7.2     |
| I-25 | Civic Center Drive & SR-78 WB Ramps                   | AM        | Signal          | 24.7                | C   | 40.5            | D   | 15.8    |
|      |                                                       | PM        |                 | 32.9                | C   | 34.0            | C   | 1.1     |
| I-26 | Civic Center Drive & SR-78 EB Ramps                   | AM        | Signal          | 105.3               | F   | 112.9           | F   | 7.6     |
|      |                                                       | PM        |                 | 97.8                | F   | 100.8           | F   | 3.0     |
| I-27 | Civic Center Drive & Seaview Place / Crest View Road  | AM        | Signal          | 47.5                | D   | 53.6            | D   | 6.1     |
|      |                                                       | PM        |                 | 51.8                | D   | 54.8            | D   | 3.0     |
| I-28 | S. Melrose Drive & Sunset Drive                       | AM        | Signal          | 50.9                | D   | 84.1            | F   | 33.2    |
|      |                                                       | PM        |                 | 21.5                | C   | 51.4            | D   | 29.9    |
| I-29 | Melrose Drive & Canon Road                            | AM        | Signal          | 35.9                | D   | 54.5            | D   | 18.6    |
|      |                                                       | PM        |                 | 41.1                | D   | 49.1            | D   | 8.0     |
| I-30 | S. Melrose Drive & Live Oak Road / Longhorn Drive     | AM        | Signal          | 33.2                | C   | 50.8            | D   | 17.6    |
|      |                                                       | PM        |                 | 17.5                | B   | 39.0            | D   | 21.5    |
| I-31 | S. Melrose Drive & Shadowridge Drive                  | AM        | Signal          | 40.5                | D   | 61.4            | E   | 20.9    |
|      |                                                       | PM        |                 | 96.1                | F   | 104.4           | F   | 8.3     |
| I-32 | Thibodo Road & Mar Vista Drive                        | AM        | TWSC            | 63.7                | F   | 64.9            | F   | 1.2     |
|      |                                                       | PM        |                 | 19.3                | C   | 28.7            | D   | 9.4     |
| I-33 | SR-78 EB Ramps & Mar Vista Dr                         | AM        | TWSC            | 229.2               | F   | 251.1           | F   | 21.9    |
|      |                                                       | PM        |                 | 67.6                | F   | 157.7           | F   | 90.1    |
| I-34 | SR-78 WB Ramps & Mar Vista Dr                         | AM        | TWSC            | 86.3                | F   | 136.0           | F   | 49.7    |
|      |                                                       | PM        |                 | 37.3                | E   | 130.3           | F   | 93.0    |
| I-35 | Sycamore Avenue & SR-78 WB Ramps                      | AM        | Signal          | 34.6                | C   | 53.1            | D   | 18.5    |
|      |                                                       | PM        |                 | 39.8                | D   | 45.8            | D   | 6.0     |
| I-36 | Sycamore Avenue & SR-78 EB Ramps                      | AM        | Signal          | 21.6                | C   | 27.4            | C   | 5.8     |
|      |                                                       | PM        |                 | 18.7                | B   | 21.1            | C   | 2.4     |
| I-37 | Sycamore Avenue & Watson Way / Hibiscus Avenue        | AM        | Signal          | 28.6                | C   | 36.2            | D   | 7.6     |
|      |                                                       | PM        |                 | 40.7                | D   | 46.3            | D   | 5.6     |
| I-38 | Sycamore Avenue & La Mirada Drive                     | AM        | Signal          | 103.2               | F   | 116.2           | F   | 13.0    |
|      |                                                       | PM        |                 | 41.7                | D   | 76.6            | E   | 34.9    |
| I-39 | S. Melrose Drive & Sycamore Avenue                    | AM        | Signal          | 70.0                | E   | 98.7            | F   | 28.7    |
|      |                                                       | PM        |                 | 80.1                | F   | 120.9           | F   | 40.8    |
| I-40 | S. Melrose Drive & Faraday Avenue / Park Center Drive | AM        | Signal          | 37.7                | D   | 50.1            | D   | 12.4    |
|      |                                                       | PM        |                 | 46.5                | D   | 52.5            | D   | 6.0     |

Source: CR Associates (2025)

Notes:

**Bold** letter indicates LOS E or F.

TWSC = Two-Way Stop-Controlled

### 3.3.2 Freeway/Highway LOS Analysis

**Table 3.8** presents the freeway level of service analysis results for the seven (7) segments of SR-78 freeway located within the vicinity of the City of Vista. Detailed freeway LOS analysis inputs and calculations are provided in **Appendix E**. HCS software worksheets are provided in **Appendix F**. For comparison purposes, level of service information under Existing (2022) is also included. Detailed analysis for existing conditions can be found in the *City of Vista General Plan Update Existing Conditions Report* (March 2023).

As shown, all of the Vista GPU's study freeway/highway segments are anticipated to operate at LOS C or better. It should be noted that although freeway volumes for all study segments increased, compared to Existing (2022) conditions, the Vista GPU assumes SR-78 would have High Occupancy Vehicle (HOV) lanes, increasing the capacity of the freeway/highway systems.

**Table 3.6 - Freeway/Highway Segment LOS Results**

| Freeway | Segment                                   | Peak Hour | Direction | Vista GPU |                  |                     |         |     | Existing Conditions |         |          |
|---------|-------------------------------------------|-----------|-----------|-----------|------------------|---------------------|---------|-----|---------------------|---------|----------|
|         |                                           |           |           | ADT       | Peak Hour Volume | Average Speed (mph) | Density | LOS | Average Speed (mph) | Density | LOS      |
| SR-78   | Western City Limits to Emerald Drive      | AM        | EB        | 129,000   | 3,880            | 69.6                | 14.6    | B   | 69.1                | 20.7    | C        |
|         |                                           |           | WB        |           | 5,000            | 68.7                | 21.7    | C   | 65.0                | 28.4    | D        |
|         |                                           | PM        | EB        |           | 5,840            | 69.6                | 16.1    | B   | 59.2                | 36.4    | <b>E</b> |
|         |                                           |           | WB        |           | 4,260            | 69.2                | 20.3    | C   | 68.1                | 23.1    | C        |
| SR-78   | Emerald Drive to Melrose Drive            | AM        | EB        | 129,000   | 3,410            | 69.6                | 15.7    | B   | 69.6                | 18.1    | C        |
|         |                                           |           | WB        |           | 5,330            | 68.7                | 21.7    | C   | 63.0                | 31.2    | D        |
|         |                                           | PM        | EB        |           | 5,130            | 69.6                | 16.1    | B   | 64.2                | 29.5    | D        |
|         |                                           |           | WB        |           | 4,770            | 69.2                | 20.3    | C   | 66.1                | 26.6    | D        |
| SR-78   | Melrose Drive to Vista Village Drive      | AM        | EB        | 131,000   | 3,280            | 69.2                | 16.1    | B   | 69.2                | 17.4    | B        |
|         |                                           |           | WB        |           | 5,120            | 68.2                | 22.3    | C   | 64.1                | 29.4    | D        |
|         |                                           | PM        | EB        |           | 4,930            | 69.2                | 16.5    | B   | 65.2                | 27.8    | D        |
|         |                                           |           | WB        |           | 4,580            | 68.7                | 20.8    | C   | 66.8                | 25.2    | C        |
| SR-78   | Vista Village Drive to Civic Center Drive | AM        | EB        | 126,000   | 3,280            | 69.3                | 20.0    | C   | 69.6                | 17.3    | B        |
|         |                                           |           | WB        |           | 5,120            | 70.0                | 18.6    | C   | 64.4                | 29.2    | D        |
|         |                                           | PM        | EB        |           | 4,930            | 69.6                | 15.5    | B   | 65.4                | 27.7    | D        |
|         |                                           |           | WB        |           | 4,570            | 69.5                | 20.4    | C   | 67.1                | 25.1    | C        |
| SR-78   | Civic Center Drive to Mar Vista Drive     | AM        | EB        | 133,000   | 3,410            | 69.5                | 21.1    | C   | 70.1                | 17.9    | B        |
|         |                                           |           | WB        |           | 5,330            | 70.0                | 19.6    | C   | 63.4                | 30.9    | D        |
|         |                                           | PM        | EB        |           | 4,190            | 70.4                | 16.2    | B   | 68.7                | 22.4    | C        |
|         |                                           |           | WB        |           | 5,010            | 69.3                | 21.6    | C   | 65.4                | 28.2    | D        |
| SR-78   | Mar Vista Drive to Sycamore Avenue        | AM        | EB        | 130,000   | 5,030            | 68.7                | 20.8    | C   | 64.9                | 28.4    | D        |
|         |                                           |           | WB        |           | 4,990            | 69.1                | 19.4    | C   | 64.9                | 28.2    | D        |
|         |                                           | PM        | EB        |           | 4,130            | 69.2                | 16.1    | B   | 68.5                | 22.1    | C        |
|         |                                           |           | WB        |           | 4,930            | 68.6                | 21.3    | C   | 65.2                | 27.7    | D        |
| SR-78   | Sycamore Avenue to N Rancho Sanat Fe Road | AM        | EB        | 145,000   | 3,880            | 68.0                | 23.3    | C   | 69.1                | 20.7    | C        |
|         |                                           |           | WB        |           | 5,000            | 68.4                | 21.8    | C   | 65.0                | 28.4    | D        |
|         |                                           | PM        | EB        |           | 5,840            | 69.6                | 17.8    | B   | 59.2                | 36.4    | <b>E</b> |
|         |                                           |           | WB        |           | 4,260            | 67.4                | 24.1    | C   | 68.1                | 23.1    | C        |

Source: CR Associates (2025)

Note: **Bold** letter indicates LOS E or F.

**Appendix A**  
VMT Report  
Base Year (2016)



| Mode Share Summary           |           |       |
|------------------------------|-----------|-------|
| Mode                         | Vista GPU |       |
| Drive Alone                  | 289,643   | 45.7% |
| Shared Ride 2                | 139,720   | 22.0% |
| Shared Ride 3+               | 149,617   | 23.6% |
| Transit                      | 9,551     | 1.5%  |
| Bike                         | 2,421     | 0.4%  |
| Walk                         | 29,813    | 4.7%  |
| Taxi & TNC                   | 3,282     | 0.5%  |
| Micromobility & Microtransit | -         | 0.0%  |
| School Bus                   | 9,930     | 1.6%  |
| Total                        | 633,977   | 100%  |

| VMT Per Capita |       |
|----------------|-------|
| SANDAG         | 19.00 |
| Vista          | 16.14 |

| VMT Per Employee |       |
|------------------|-------|
| SANDAG           | 19.00 |
| Vista            | 15.13 |

|    | TAZ | VMT Per Capita |
|----|-----|----------------|
| 0  | 342 | 19.82          |
| 1  | 345 | 16.58          |
| 2  | 352 | 19.36          |
| 3  | 353 | 19.90          |
| 4  | 354 | 22.93          |
| 5  | 360 | 18.10          |
| 6  | 362 | 21.87          |
| 7  | 367 | 16.66          |
| 8  | 372 | 14.92          |
| 9  | 374 | 16.18          |
| 10 | 375 | 16.97          |
| 11 | 376 | 16.42          |
| 12 | 380 | 17.56          |
| 13 | 384 | 16.15          |
| 14 | 386 | 18.19          |
| 15 | 389 | 19.84          |
| 16 | 390 | 15.24          |
| 17 | 401 | 18.12          |
| 18 | 406 | 16.05          |
| 19 | 407 | 17.13          |
| 20 | 408 | 16.52          |
| 21 | 415 | 15.90          |
| 22 | 417 | 15.02          |
| 23 | 418 | 14.44          |
| 24 | 419 | 14.16          |
| 25 | 423 | 14.33          |
| 26 | 426 | 14.54          |
| 27 | 432 | 13.87          |
| 28 | 433 | 15.51          |
| 29 | 436 | 13.70          |
| 30 | 438 | 13.00          |
| 31 | 439 | 15.37          |
| 32 | 440 | 13.78          |
| 33 | 447 | 17.80          |
| 34 | 450 | 17.90          |
| 35 | 455 | 16.36          |
| 36 | 456 | 14.61          |
| 37 | 460 | 17.85          |
| 38 | 461 | 12.09          |
| 39 | 462 | 18.02          |
| 40 | 465 | 12.39          |
| 41 | 467 | 13.11          |
| 42 | 468 | 13.80          |
| 43 | 470 | 15.39          |
| 44 | 476 | 19.70          |
| 45 | 480 | 12.23          |
| 46 | 487 | 15.01          |
| 47 | 490 | 12.56          |
| 48 | 506 | 17.49          |
| 49 | 507 | 16.56          |
| 50 | 508 | 16.37          |

|    | TAZ | VMT Per Employee |
|----|-----|------------------|
| 0  | 342 | 4.20             |
| 1  | 345 | 13.58            |
| 2  | 351 | 12.35            |
| 3  | 352 | 5.32             |
| 4  | 353 | 15.17            |
| 5  | 354 | 15.33            |
| 6  | 360 | 13.91            |
| 8  | 367 | 10.49            |
| 9  | 372 | 8.77             |
| 10 | 374 | 10.46            |
| 11 | 375 | 14.20            |
| 12 | 376 | 9.86             |
| 13 | 380 | 4.15             |
| 14 | 384 | 17.35            |
| 15 | 386 | 12.62            |
| 16 | 389 | 17.04            |
| 17 | 390 | 9.52             |
| 18 | 401 | 9.19             |
| 19 | 406 | 1.71             |
| 20 | 407 | 14.59            |
| 21 | 408 | 10.59            |
| 22 | 415 | 15.40            |
| 23 | 417 | 4.20             |
| 24 | 418 | 1.89             |
| 25 | 419 | 12.96            |
| 26 | 423 | 10.35            |
| 27 | 426 | 13.83            |
| 28 | 432 | 7.84             |
| 29 | 433 | 4.88             |
| 30 | 436 | 3.02             |
| 31 | 438 | 12.36            |
| 32 | 439 | 0.68             |
| 33 | 440 | 13.06            |
| 34 | 447 | 4.51             |
| 35 | 450 | 9.30             |
| 36 | 455 | 10.32            |
| 37 | 456 | 8.28             |
| 38 | 460 | 13.59            |
| 39 | 461 | 5.63             |
| 40 | 462 | 14.24            |
| 41 | 465 | 9.42             |
| 42 | 467 | 13.32            |
| 43 | 468 | 11.23            |
| 44 | 470 | 13.08            |
| 45 | 476 | 14.54            |
| 46 | 480 | 7.18             |
| 47 | 483 | 16.74            |
| 48 | 487 | 13.10            |
| 49 | 490 | 7.97             |
| 50 | 506 | 3.18             |
| 51 | 507 | 5.44             |

|     |     |       |     |     |       |
|-----|-----|-------|-----|-----|-------|
| 51  | 509 | 13.39 | 52  | 508 | 3.79  |
| 52  | 511 | 11.24 | 53  | 509 | 11.25 |
| 53  | 515 | 10.79 | 54  | 511 | 12.18 |
| 54  | 516 | 12.11 | 55  | 515 | 15.06 |
| 55  | 517 | 16.12 | 56  | 516 | 11.65 |
| 56  | 518 | 15.78 | 57  | 517 | 0.89  |
| 57  | 523 | 17.35 | 58  | 518 | 17.31 |
| 58  | 525 | 13.91 | 59  | 523 | 4.31  |
| 59  | 530 | 12.26 | 60  | 525 | 14.66 |
| 60  | 532 | 12.82 | 61  | 530 | 14.68 |
| 61  | 534 | 17.75 | 62  | 532 | 11.70 |
| 62  | 536 | 18.03 | 63  | 534 | 9.38  |
| 63  | 537 | 16.34 | 64  | 536 | 4.82  |
| 64  | 538 | 14.12 | 65  | 537 | 11.56 |
| 65  | 540 | 11.37 | 66  | 538 | 8.91  |
| 66  | 541 | 20.58 | 67  | 540 | 14.15 |
| 67  | 547 | 2.28  | 68  | 541 | 18.87 |
| 68  | 550 | 16.38 | 69  | 547 | 13.51 |
| 69  | 557 | 13.93 | 70  | 550 | 10.51 |
| 70  | 558 | 13.47 | 71  | 557 | 13.20 |
| 71  | 559 | 15.55 | 72  | 558 | 14.48 |
| 72  | 560 | 16.60 | 73  | 559 | 7.96  |
| 73  | 565 | 15.81 | 74  | 560 | 1.69  |
| 74  | 567 | 14.95 | 76  | 567 | 13.97 |
| 75  | 570 | 16.56 | 77  | 570 | 9.69  |
| 76  | 576 | 14.17 | 78  | 576 | 14.20 |
| 77  | 578 | 15.38 | 79  | 578 | 10.55 |
| 78  | 579 | 15.54 | 80  | 579 | 13.84 |
| 79  | 583 | 20.94 | 81  | 583 | 15.44 |
| 80  | 586 | 8.19  | 82  | 586 | 14.83 |
| 81  | 587 | 14.60 | 83  | 587 | 9.82  |
| 82  | 590 | 17.23 | 84  | 590 | 13.70 |
| 83  | 593 | 16.20 | 85  | 591 | 14.62 |
| 84  | 595 | 13.14 | 86  | 593 | 15.41 |
| 85  | 599 | 18.63 | 87  | 595 | 14.01 |
| 86  | 600 | 15.76 | 88  | 599 | 7.19  |
| 87  | 610 | 16.16 | 89  | 600 | 11.78 |
| 88  | 613 | 14.84 | 90  | 602 | 16.28 |
| 89  | 614 | 14.37 | 91  | 610 | 15.52 |
| 90  | 619 | 15.91 | 92  | 613 | 14.62 |
| 91  | 620 | 14.09 | 93  | 614 | 12.67 |
| 92  | 623 | 17.35 | 94  | 619 | 2.42  |
| 93  | 624 | 15.90 | 95  | 620 | 15.08 |
| 94  | 627 | 12.82 | 96  | 623 | 2.60  |
| 95  | 628 | 19.45 | 97  | 624 | 14.62 |
| 96  | 633 | 14.75 | 98  | 627 | 16.03 |
| 97  | 641 | 14.10 | 99  | 628 | 14.84 |
| 98  | 642 | 18.30 | 100 | 633 | 5.27  |
| 99  | 644 | 15.13 | 101 | 641 | 12.72 |
| 100 | 647 | 18.70 | 102 | 642 | 6.63  |
| 101 | 649 | 18.30 | 103 | 644 | 14.76 |
| 102 | 650 | 12.60 | 104 | 647 | 10.08 |
| 103 | 652 | 16.39 | 105 | 649 | 2.75  |
| 104 | 653 | 16.00 | 106 | 650 | 14.70 |
| 105 | 655 | 15.34 | 107 | 652 | 10.96 |
| 106 | 663 | 19.97 | 108 | 653 | 2.80  |
| 107 | 665 | 16.12 | 109 | 655 | 12.53 |
| 108 | 666 | 18.17 | 110 | 661 | 15.17 |
| 109 | 667 | 14.25 | 111 | 663 | 6.34  |
| 110 | 672 | 18.35 | 112 | 665 | 6.36  |
| 111 | 676 | 15.63 | 113 | 666 | 10.89 |
| 112 | 677 | 14.64 | 114 | 667 | 12.39 |
| 113 | 678 | 23.06 | 115 | 672 | 6.34  |
| 114 | 679 | 17.51 | 118 | 678 | 10.63 |
| 115 | 688 | 17.36 | 119 | 679 | 13.25 |
| 116 | 708 | 17.74 | 120 | 688 | 11.23 |
| 117 | 715 | 22.89 | 121 | 708 | 7.25  |
| 118 | 722 | 16.04 | 122 | 715 | 4.20  |
| 119 | 728 | 16.75 | 123 | 722 | 13.76 |
| 120 | 729 | 19.75 | 125 | 729 | 8.90  |
| 121 | 732 | 19.52 | 126 | 732 | 7.50  |
| 122 | 734 | 18.93 | 127 | 734 | 9.68  |
| 123 | 746 | 18.55 | 129 | 753 | 0.62  |

|     |      |       |     |      |       |
|-----|------|-------|-----|------|-------|
| 124 | 753  | 18.63 | 130 | 759  | 15.74 |
| 125 | 759  | 38.99 | 131 | 762  | 13.56 |
| 126 | 762  | 15.96 | 132 | 763  | 3.38  |
| 127 | 763  | 18.80 | 133 | 771  | 11.59 |
| 128 | 771  | 17.38 | 134 | 775  | 8.92  |
| 129 | 775  | 19.00 | 135 | 776  | 14.42 |
| 130 | 776  | 11.05 | 136 | 780  | 15.19 |
| 131 | 780  | 18.28 | 137 | 785  | 14.27 |
| 132 | 785  | 18.02 | 138 | 796  | 2.24  |
| 133 | 796  | 18.62 | 139 | 799  | 11.85 |
| 134 | 799  | 15.84 | 140 | 801  | 6.78  |
| 135 | 801  | 17.91 | 141 | 806  | 15.75 |
| 136 | 806  | 20.77 | 142 | 814  | 13.80 |
| 137 | 814  | 18.35 | 143 | 824  | 5.99  |
| 138 | 824  | 18.23 | 144 | 826  | 2.52  |
| 139 | 826  | 15.90 | 145 | 830  | 11.53 |
| 140 | 830  | 14.87 | 146 | 836  | 3.62  |
| 141 | 836  | 19.34 | 147 | 839  | 7.60  |
| 142 | 839  | 13.98 | 148 | 842  | 16.84 |
| 143 | 842  | 15.74 | 149 | 868  | 18.54 |
| 144 | 874  | 18.15 | 150 | 874  | 9.15  |
| 145 | 881  | 12.96 | 151 | 881  | 18.24 |
| 146 | 887  | 19.63 | 152 | 887  | 12.16 |
| 147 | 890  | 17.51 | 153 | 890  | 18.20 |
| 148 | 907  | 13.71 | 154 | 907  | 19.13 |
| 149 | 936  | 10.80 | 155 | 925  | 18.24 |
| 150 | 956  | 17.80 | 156 | 931  | 17.93 |
| 151 | 991  | 10.59 | 157 | 936  | 17.90 |
| 152 | 1060 | 16.90 | 158 | 956  | 13.30 |
|     |      |       | 159 | 957  | 17.96 |
|     |      |       | 160 | 982  | 17.99 |
|     |      |       | 161 | 985  | 18.07 |
|     |      |       | 162 | 986  | 18.12 |
|     |      |       | 163 | 991  | 17.59 |
|     |      |       | 164 | 1060 | 15.76 |



**Appendix B**  
VMT Report  
Vista GPU



| Mode Share Summary           |           |        |
|------------------------------|-----------|--------|
| Mode                         | Vista GPU |        |
| Drive Alone                  | 417,031   | 42.0%  |
| Shared Ride 2                | 221,811   | 22.4%  |
| Shared Ride 3+               | 191,815   | 19.3%  |
| Transit                      | 45,032    | 4.5%   |
| Bike                         | 9,352     | 0.9%   |
| Walk                         | 81,921    | 8.3%   |
| Taxi & TNC                   | 9,283     | 0.9%   |
| Micromobility & Microtransit | 2,486     | 0.3%   |
| School Bus                   | 13,214    | 1.3%   |
| Total                        | 991,945   | 100.0% |

VMT Per Capita  
**SANDAG** 16.37  
**Vista** 13.00

VMT Per Employee  
**SANDAG** 14.69  
**Vista** 11.10

|    | TAZ | VMT Per Capita |
|----|-----|----------------|
| 0  | 338 | 17.64          |
| 1  | 342 | 18.61          |
| 2  | 345 | 19.84          |
| 3  | 352 | 15.82          |
| 4  | 353 | 17.61          |
| 5  | 354 | 15.40          |
| 6  | 360 | 16.70          |
| 7  | 362 | 12.49          |
| 8  | 367 | 14.29          |
| 9  | 372 | 14.89          |
| 10 | 374 | 15.35          |
| 11 | 375 | 14.13          |
| 12 | 376 | 14.84          |
| 13 | 380 | 16.54          |
| 14 | 384 | 16.65          |
| 15 | 386 | 18.13          |
| 16 | 389 | 22.01          |
| 17 | 390 | 15.02          |
| 18 | 401 | 18.02          |
| 19 | 406 | 14.35          |
| 20 | 407 | 12.68          |
| 21 | 408 | 11.12          |
| 22 | 415 | 13.26          |
| 23 | 417 | 11.34          |
| 24 | 418 | 14.78          |
| 25 | 419 | 14.90          |
| 26 | 423 | 15.52          |
| 27 | 426 | 14.16          |
| 28 | 432 | 14.14          |
| 29 | 433 | 13.94          |
| 30 | 436 | 13.05          |
| 31 | 438 | 15.24          |
| 32 | 439 | 15.25          |
| 33 | 440 | 16.35          |
| 34 | 447 | 15.61          |
| 35 | 450 | 17.74          |
| 36 | 455 | 14.43          |
| 37 | 456 | 15.21          |
| 38 | 460 | 13.64          |
| 39 | 461 | 11.16          |
| 40 | 462 | 10.96          |
| 41 | 465 | 9.37           |
| 42 | 467 | 7.05           |
| 43 | 468 | 8.54           |
| 44 | 470 | 15.39          |
| 45 | 476 | 18.01          |
| 46 | 480 | 10.23          |
| 47 | 483 | 13.23          |
| 48 | 487 | 9.06           |
| 49 | 490 | 13.56          |
| 50 | 506 | 15.86          |

|    | TAZ | VMT Per Employee |
|----|-----|------------------|
| 0  | 338 | 14.27            |
| 2  | 345 | 14.45            |
| 3  | 351 | 10.09            |
| 4  | 352 | 2.74             |
| 5  | 353 | 13.74            |
| 7  | 360 | 11.98            |
| 9  | 367 | 9.17             |
| 10 | 372 | 5.01             |
| 11 | 374 | 10.07            |
| 12 | 375 | 12.97            |
| 13 | 376 | 2.92             |
| 14 | 380 | 2.45             |
| 15 | 384 | 11.74            |
| 16 | 386 | 2.68             |
| 17 | 389 | 3.65             |
| 18 | 390 | 7.42             |
| 19 | 401 | 4.27             |
| 20 | 406 | 4.76             |
| 21 | 407 | 10.33            |
| 22 | 408 | 10.51            |
| 23 | 415 | 10.04            |
| 24 | 417 | 1.95             |
| 25 | 418 | 2.89             |
| 26 | 419 | 8.74             |
| 27 | 423 | 10.69            |
| 28 | 426 | 12.12            |
| 29 | 432 | 3.04             |
| 30 | 433 | 2.01             |
| 31 | 436 | 2.66             |
| 32 | 438 | 3.80             |
| 33 | 439 | 0.63             |
| 34 | 440 | 3.38             |
| 35 | 447 | 0.93             |
| 36 | 450 | 6.62             |
| 37 | 455 | 8.73             |
| 38 | 456 | 1.18             |
| 39 | 460 | 2.89             |
| 40 | 461 | 3.05             |
| 41 | 462 | 2.63             |
| 42 | 465 | 1.68             |
| 43 | 467 | 9.34             |
| 44 | 468 | 1.68             |
| 45 | 470 | 4.20             |
| 46 | 476 | 1.41             |
| 47 | 480 | 2.15             |
| 48 | 483 | 7.05             |
| 49 | 487 | 4.39             |
| 50 | 490 | 3.51             |
| 51 | 506 | 2.77             |
| 52 | 507 | 2.36             |
| 53 | 508 | 2.90             |

|     |     |       |     |     |       |
|-----|-----|-------|-----|-----|-------|
| 51  | 507 | 15.49 | 54  | 509 | 9.64  |
| 52  | 508 | 15.50 | 55  | 511 | 2.69  |
| 53  | 509 | 10.11 | 56  | 515 | 6.18  |
| 54  | 511 | 8.89  | 57  | 516 | 4.41  |
| 55  | 515 | 8.13  | 58  | 517 | 3.21  |
| 56  | 516 | 7.28  | 59  | 518 | 17.94 |
| 57  | 517 | 18.14 | 60  | 523 | 3.58  |
| 58  | 518 | 14.88 | 61  | 525 | 9.50  |
| 59  | 523 | 14.00 | 62  | 530 | 5.42  |
| 60  | 525 | 9.89  | 63  | 532 | 5.06  |
| 61  | 530 | 9.33  | 64  | 534 | 6.07  |
| 62  | 532 | 8.71  | 65  | 536 | 5.30  |
| 63  | 534 | 14.82 | 66  | 537 | 8.86  |
| 64  | 536 | 14.98 | 67  | 538 | 9.36  |
| 65  | 537 | 13.07 | 68  | 540 | 5.07  |
| 66  | 538 | 11.69 | 69  | 541 | 8.36  |
| 67  | 540 | 9.35  | 70  | 547 | 6.37  |
| 68  | 541 | 16.18 | 71  | 550 | 11.21 |
| 69  | 547 | 8.26  | 72  | 557 | 5.02  |
| 70  | 550 | 16.86 | 73  | 558 | 5.56  |
| 71  | 557 | 6.57  | 74  | 559 | 3.04  |
| 72  | 558 | 8.78  | 75  | 560 | 2.88  |
| 73  | 559 | 12.75 | 76  | 565 | 6.07  |
| 74  | 560 | 15.13 | 77  | 567 | 8.94  |
| 75  | 565 | 19.67 | 78  | 570 | 5.42  |
| 76  | 567 | 9.82  | 79  | 576 | 3.71  |
| 77  | 570 | 14.89 | 80  | 578 | 4.15  |
| 78  | 576 | 10.90 | 81  | 579 | 4.16  |
| 79  | 578 | 11.04 | 82  | 583 | 5.54  |
| 80  | 579 | 13.38 | 83  | 586 | 7.12  |
| 81  | 583 | 18.75 | 84  | 587 | 4.06  |
| 82  | 586 | 13.06 | 85  | 590 | 7.10  |
| 83  | 587 | 12.82 | 86  | 591 | 4.11  |
| 84  | 590 | 13.55 | 87  | 593 | 1.97  |
| 85  | 591 | 10.85 | 88  | 595 | 6.07  |
| 86  | 593 | 15.05 | 89  | 599 | 7.71  |
| 87  | 595 | 10.92 | 90  | 600 | 10.68 |
| 88  | 599 | 13.82 | 91  | 602 | 9.47  |
| 89  | 600 | 13.76 | 92  | 610 | 2.61  |
| 90  | 610 | 13.38 | 93  | 613 | 12.43 |
| 91  | 613 | 14.01 | 94  | 614 | 9.85  |
| 92  | 614 | 13.62 | 95  | 619 | 8.25  |
| 93  | 619 | 16.21 | 96  | 620 | 9.82  |
| 94  | 620 | 13.83 | 97  | 623 | 10.94 |
| 95  | 623 | 15.21 | 98  | 624 | 11.34 |
| 96  | 624 | 15.78 | 99  | 627 | 3.76  |
| 97  | 627 | 12.93 | 100 | 628 | 14.28 |
| 98  | 628 | 20.96 | 101 | 633 | 3.80  |
| 99  | 633 | 6.85  | 102 | 641 | 12.00 |
| 100 | 641 | 11.14 | 103 | 642 | 10.60 |
| 101 | 642 | 11.10 | 104 | 644 | 2.94  |
| 102 | 644 | 10.13 | 106 | 649 | 8.35  |
| 103 | 647 | 19.34 | 107 | 650 | 2.55  |
| 104 | 649 | 17.23 | 108 | 652 | 10.12 |
| 105 | 650 | 14.75 | 109 | 653 | 4.03  |
| 106 | 652 | 14.99 | 110 | 655 | 5.90  |
| 107 | 653 | 15.31 | 111 | 661 | 11.48 |
| 108 | 655 | 15.68 | 112 | 663 | 1.41  |
| 109 | 661 | 15.38 | 113 | 665 | 5.93  |
| 110 | 663 | 17.14 | 114 | 666 | 1.33  |
| 111 | 665 | 17.86 | 115 | 667 | 7.25  |
| 112 | 666 | 16.77 | 116 | 672 | 0.40  |
| 113 | 667 | 13.58 | 117 | 676 | 9.34  |
| 114 | 672 | 15.77 | 118 | 677 | 2.68  |
| 115 | 676 | 14.52 | 119 | 678 | 9.12  |
| 116 | 677 | 14.77 | 120 | 679 | 3.90  |
| 117 | 678 | 14.81 | 121 | 688 | 1.83  |
| 118 | 679 | 16.55 | 123 | 715 | 4.20  |
| 119 | 688 | 16.71 | 124 | 722 | 2.82  |
| 120 | 708 | 19.97 | 125 | 728 | 14.95 |
| 121 | 715 | 17.11 | 126 | 729 | 2.96  |
| 122 | 722 | 18.40 | 127 | 732 | 2.52  |
| 123 | 728 | 16.53 | 128 | 734 | 8.06  |
| 124 | 729 | 14.88 | 129 | 746 | 1.92  |
| 125 | 732 | 16.07 | 130 | 753 | 3.93  |
| 126 | 734 | 11.83 | 131 | 759 | 10.28 |
| 127 | 746 | 15.32 | 132 | 762 | 6.58  |

|     |     |       |
|-----|-----|-------|
| 128 | 753 | 14.62 |
| 129 | 759 | 11.42 |
| 130 | 762 | 10.57 |
| 131 | 763 | 15.47 |
| 132 | 771 | 14.60 |
| 133 | 775 | 13.63 |
| 134 | 776 | 14.57 |
| 135 | 780 | 10.95 |
| 136 | 785 | 15.76 |
| 137 | 796 | 14.43 |
| 138 | 799 | 12.17 |
| 139 | 801 | 13.40 |
| 140 | 806 | 17.87 |
| 141 | 814 | 16.44 |
| 142 | 824 | 16.17 |
| 143 | 826 | 13.31 |
| 144 | 830 | 18.53 |
| 145 | 836 | 19.55 |
| 146 | 839 | 15.84 |
| 147 | 842 | 11.86 |
| 148 | 868 | 14.55 |
| 149 | 874 | 16.90 |
| 150 | 881 | 13.00 |
| 151 | 887 | 17.70 |
| 152 | 890 | 14.31 |
| 153 | 956 | 16.80 |
| 154 | 991 | 14.04 |

|     |      |       |
|-----|------|-------|
| 133 | 763  | 4.86  |
| 134 | 771  | 11.01 |
| 135 | 775  | 5.65  |
| 136 | 776  | 11.54 |
| 137 | 780  | 13.22 |
| 138 | 785  | 11.24 |
| 139 | 796  | 8.84  |
| 140 | 799  | 6.36  |
| 141 | 801  | 9.23  |
| 142 | 806  | 12.51 |
| 143 | 814  | 10.61 |
| 144 | 824  | 3.17  |
| 145 | 826  | 3.54  |
| 146 | 830  | 1.12  |
| 147 | 836  | 5.06  |
| 148 | 839  | 7.46  |
| 149 | 842  | 15.01 |
| 150 | 868  | 15.46 |
| 151 | 874  | 4.40  |
| 152 | 881  | 16.62 |
| 153 | 887  | 10.57 |
| 154 | 890  | 14.99 |
| 155 | 907  | 17.05 |
| 156 | 925  | 16.92 |
| 157 | 931  | 13.80 |
| 158 | 936  | 15.99 |
| 159 | 956  | 11.40 |
| 160 | 957  | 13.04 |
| 161 | 982  | 14.17 |
| 162 | 985  | 13.35 |
| 163 | 986  | 13.18 |
| 164 | 991  | 15.06 |
| 165 | 1060 | 10.90 |



## **Appendix C**

VMT Report

No Project Alternative (Adopted General Plan)



| Mode Share Summary           |           |      |
|------------------------------|-----------|------|
| Mode                         | Vista GPU |      |
| Drive Alone                  | 454,980   | 45%  |
| Shared Ride 2                | 229,099   | 23%  |
| Shared Ride 3+               | 196,033   | 19%  |
| Transit                      | 38,671    | 4%   |
| Bike                         | 8,812     | 1%   |
| Walk                         | 68,848    | 7%   |
| Taxi & TNC                   | 7,562     | 1%   |
| Micromobility & Microtransit | 2,112     | 0%   |
| School Bus                   | 10,280    | 1%   |
| Total                        | 1,016,397 | 100% |

|        | VTM Per Capita |
|--------|----------------|
| SANDAG | 16.34          |
| Vista  | 12.60          |

|        | VTM Per Employee |
|--------|------------------|
| SANDAG | 14.56            |
| Vista  | 12.20            |

|    | TAZ | VTM Per Capita |
|----|-----|----------------|
| 0  | 338 | 16.99          |
| 1  | 342 | 14.18          |
| 2  | 345 | 15.90          |
| 3  | 352 | 14.28          |
| 4  | 353 | 14.45          |
| 5  | 354 | 17.21          |
| 6  | 360 | 13.48          |
| 7  | 362 | 17.88          |
| 8  | 367 | 12.72          |
| 9  | 372 | 13.79          |
| 10 | 374 | 15.08          |
| 11 | 375 | 12.38          |
| 12 | 376 | 13.55          |
| 13 | 380 | 15.02          |
| 14 | 384 | 14.98          |
| 15 | 386 | 16.60          |
| 16 | 389 | 20.11          |
| 17 | 390 | 14.71          |
| 18 | 401 | 15.26          |
| 19 | 406 | 12.33          |
| 20 | 407 | 11.97          |
| 21 | 408 | 10.58          |
| 22 | 415 | 12.57          |
| 23 | 417 | 9.08           |
| 24 | 418 | 12.46          |
| 25 | 419 | 12.69          |
| 26 | 423 | 13.41          |
| 27 | 426 | 12.50          |
| 28 | 432 | 11.30          |
| 29 | 433 | 12.90          |
| 30 | 436 | 11.78          |
| 31 | 438 | 14.81          |
| 32 | 439 | 15.58          |
| 33 | 440 | 11.43          |
| 34 | 447 | 18.71          |
| 35 | 450 | 16.03          |
| 36 | 455 | 14.57          |
| 37 | 456 | 12.19          |
| 38 | 460 | 13.05          |
| 39 | 461 | 12.61          |
| 40 | 462 | 11.18          |
| 41 | 465 | 9.05           |
| 42 | 467 | 8.40           |
| 43 | 468 | 8.29           |
| 44 | 470 | 9.95           |
| 45 | 476 | 15.67          |
| 46 | 480 | 11.47          |
| 47 | 487 | 11.70          |
| 48 | 490 | 8.20           |
| 49 | 506 | 12.58          |
| 50 | 507 | 14.54          |
| 51 | 508 | 12.57          |

|    | TAZ | VTM Per Employee |
|----|-----|------------------|
| 0  | 338 | 14.73            |
| 1  | 342 | 3.11             |
| 2  | 345 | 14.47            |
| 3  | 351 | 15.01            |
| 4  | 352 | 2.95             |
| 5  | 353 | 13.06            |
| 7  | 360 | 13.06            |
| 9  | 367 | 9.75             |
| 10 | 372 | 7.48             |
| 11 | 374 | 10.49            |
| 12 | 375 | 11.13            |
| 13 | 376 | 0.85             |
| 14 | 380 | 2.10             |
| 15 | 384 | 13.35            |
| 16 | 386 | 6.08             |
| 17 | 389 | 1.34             |
| 18 | 390 | 9.08             |
| 19 | 401 | 1.82             |
| 20 | 406 | 9.92             |
| 21 | 407 | 11.57            |
| 22 | 408 | 10.56            |
| 23 | 415 | 12.12            |
| 24 | 417 | 1.85             |
| 25 | 418 | 0.75             |
| 26 | 419 | 9.40             |
| 27 | 423 | 11.18            |
| 28 | 426 | 12.12            |
| 29 | 432 | 9.76             |
| 30 | 433 | 2.91             |
| 31 | 436 | 8.23             |
| 32 | 438 | 11.46            |
| 33 | 439 | 0.76             |
| 34 | 440 | 12.67            |
| 36 | 450 | 11.18            |
| 37 | 455 | 9.52             |
| 38 | 456 | 6.84             |
| 39 | 460 | 12.37            |
| 40 | 461 | 1.98             |
| 41 | 462 | 12.16            |
| 42 | 465 | 8.54             |
| 43 | 467 | 8.80             |
| 44 | 468 | 2.01             |
| 45 | 470 | 10.60            |
| 46 | 476 | 3.05             |
| 47 | 480 | 9.37             |
| 48 | 483 | 11.74            |
| 49 | 487 | 11.13            |
| 50 | 490 | 7.67             |
| 51 | 506 | 5.37             |
| 52 | 507 | 4.83             |
| 53 | 508 | 1.07             |
| 54 | 509 | 13.70            |

|     |     |       |     |     |       |
|-----|-----|-------|-----|-----|-------|
| 52  | 509 | 9.07  | 55  | 511 | 8.65  |
| 53  | 511 | 9.50  | 56  | 515 | 8.03  |
| 54  | 515 | 4.71  | 57  | 516 | 9.12  |
| 55  | 516 | 8.85  | 58  | 517 | 2.21  |
| 56  | 517 | 17.11 | 59  | 518 | 13.32 |
| 57  | 518 | 21.49 | 60  | 523 | 2.05  |
| 58  | 523 | 14.93 | 61  | 525 | 11.54 |
| 59  | 525 | 15.16 | 62  | 530 | 9.61  |
| 60  | 530 | 11.83 | 63  | 532 | 7.84  |
| 61  | 532 | 9.30  | 64  | 534 | 8.18  |
| 62  | 534 | 12.61 | 65  | 536 | 2.86  |
| 63  | 536 | 13.48 | 66  | 537 | 10.34 |
| 64  | 537 | 9.64  | 67  | 538 | 7.37  |
| 65  | 538 | 7.84  | 68  | 540 | 9.22  |
| 66  | 540 | 7.61  | 69  | 541 | 3.39  |
| 67  | 541 | 17.41 | 70  | 547 | 8.12  |
| 68  | 547 | 7.57  | 71  | 550 | 9.60  |
| 69  | 550 | 15.41 | 72  | 557 | 8.60  |
| 70  | 557 | 8.05  | 73  | 558 | 9.48  |
| 71  | 558 | 7.14  | 74  | 559 | 9.00  |
| 72  | 559 | 11.81 | 75  | 560 | 2.40  |
| 73  | 560 | 13.37 | 76  | 565 | 0.90  |
| 74  | 565 | 15.75 | 77  | 567 | 10.02 |
| 75  | 567 | 11.60 | 78  | 570 | 11.92 |
| 76  | 570 | 13.60 | 79  | 576 | 7.61  |
| 77  | 576 | 9.97  | 80  | 578 | 8.34  |
| 78  | 578 | 8.20  | 81  | 579 | 10.65 |
| 79  | 579 | 10.90 | 82  | 583 | 0.99  |
| 80  | 583 | 17.69 | 83  | 586 | 10.07 |
| 81  | 586 | 7.92  | 84  | 587 | 8.63  |
| 82  | 587 | 8.99  | 85  | 590 | 9.61  |
| 83  | 590 | 12.13 | 86  | 591 | 10.47 |
| 84  | 591 | 8.38  | 87  | 593 | 2.59  |
| 85  | 593 | 12.54 | 88  | 595 | 8.94  |
| 86  | 595 | 8.36  | 89  | 599 | 7.51  |
| 87  | 599 | 11.13 | 90  | 600 | 11.83 |
| 88  | 600 | 12.25 | 91  | 602 | 10.29 |
| 89  | 610 | 9.42  | 92  | 610 | 9.88  |
| 90  | 613 | 10.24 | 93  | 613 | 11.62 |
| 91  | 614 | 12.15 | 94  | 614 | 12.20 |
| 92  | 619 | 15.66 | 95  | 619 | 10.11 |
| 93  | 620 | 12.91 | 96  | 620 | 11.05 |
| 94  | 623 | 14.12 | 97  | 623 | 9.38  |
| 95  | 624 | 15.13 | 98  | 624 | 12.29 |
| 96  | 627 | 10.10 | 99  | 627 | 9.46  |
| 97  | 628 | 16.73 | 100 | 628 | 15.96 |
| 98  | 633 | 11.45 | 101 | 633 | 9.73  |
| 99  | 641 | 10.86 | 102 | 641 | 12.28 |
| 100 | 642 | 11.85 | 103 | 642 | 10.95 |
| 101 | 644 | 12.77 | 104 | 644 | 9.59  |
| 102 | 647 | 14.60 | 105 | 647 | 8.38  |
| 103 | 649 | 14.99 | 106 | 649 | 1.59  |
| 104 | 650 | 12.87 | 107 | 650 | 10.11 |
| 105 | 652 | 14.91 | 108 | 652 | 13.44 |
| 106 | 653 | 13.39 | 109 | 653 | 1.95  |
| 107 | 655 | 14.01 | 110 | 655 | 3.42  |
| 108 | 661 | 26.83 | 111 | 661 | 13.69 |
| 109 | 663 | 16.50 | 112 | 663 | 2.39  |
| 110 | 665 | 13.10 | 113 | 665 | 2.41  |
| 111 | 666 | 15.84 | 115 | 667 | 3.51  |
| 112 | 667 | 14.03 | 116 | 672 | 0.34  |
| 113 | 672 | 15.99 | 117 | 676 | 7.95  |
| 114 | 676 | 16.84 | 118 | 677 | 2.42  |
| 115 | 677 | 14.23 | 119 | 678 | 11.32 |
| 116 | 678 | 17.70 | 120 | 679 | 3.24  |
| 117 | 679 | 14.71 | 121 | 688 | 1.19  |
| 118 | 688 | 14.80 | 124 | 722 | 4.36  |
| 119 | 708 | 19.86 | 125 | 728 | 11.55 |
| 120 | 715 | 17.33 | 126 | 729 | 1.66  |
| 121 | 722 | 17.46 | 127 | 732 | 3.07  |
| 122 | 728 | 15.40 | 128 | 734 | 6.03  |
| 123 | 729 | 15.86 | 130 | 753 | 2.80  |
| 124 | 732 | 16.95 | 131 | 759 | 13.93 |
| 125 | 734 | 16.24 | 132 | 762 | 7.32  |
| 126 | 746 | 19.48 | 133 | 763 | 7.44  |

|     |     |       |
|-----|-----|-------|
| 127 | 753 | 12.79 |
| 128 | 759 | 5.39  |
| 129 | 762 | 10.43 |
| 130 | 763 | 15.76 |
| 131 | 771 | 15.42 |
| 132 | 775 | 16.42 |
| 133 | 776 | 13.08 |
| 134 | 780 | 15.24 |
| 135 | 785 | 16.29 |
| 136 | 796 | 15.50 |
| 137 | 799 | 13.55 |
| 138 | 801 | 15.20 |
| 139 | 806 | 10.91 |
| 140 | 814 | 16.19 |
| 141 | 824 | 9.79  |
| 142 | 826 | 15.31 |
| 143 | 830 | 16.92 |
| 144 | 836 | 17.87 |
| 145 | 839 | 16.13 |
| 146 | 842 | 15.26 |
| 147 | 874 | 15.94 |
| 148 | 881 | 16.24 |
| 149 | 887 | 19.65 |
| 150 | 890 | 14.83 |
| 151 | 956 | 18.69 |
| 152 | 991 | 11.72 |

|     |      |       |
|-----|------|-------|
| 134 | 771  | 12.79 |
| 135 | 775  | 6.94  |
| 136 | 776  | 12.80 |
| 137 | 780  | 13.72 |
| 138 | 785  | 12.55 |
| 139 | 796  | 6.51  |
| 140 | 799  | 7.55  |
| 141 | 801  | 9.25  |
| 142 | 806  | 15.84 |
| 143 | 814  | 13.22 |
| 144 | 824  | 8.38  |
| 145 | 826  | 3.69  |
| 146 | 830  | 2.14  |
| 147 | 836  | 6.93  |
| 148 | 839  | 8.96  |
| 149 | 842  | 15.03 |
| 150 | 868  | 18.02 |
| 151 | 874  | 3.56  |
| 152 | 881  | 16.94 |
| 153 | 887  | 14.51 |
| 154 | 890  | 16.42 |
| 155 | 907  | 17.57 |
| 156 | 925  | 17.77 |
| 157 | 931  | 15.22 |
| 158 | 936  | 16.51 |
| 159 | 956  | 13.01 |
| 160 | 957  | 13.10 |
| 161 | 982  | 16.04 |
| 162 | 985  | 14.22 |
| 163 | 986  | 14.71 |
| 164 | 991  | 14.88 |
| 165 | 1060 | 11.92 |



## **Appendix D**

Peak Hour Intersection LOS Calculation Worksheets  
Vista GPU Conditions



# HCM 7th Signalized Intersection Summary

## 1: N. Santa Fe Avenue & Osborne Street

Future Year Conditions  
AM Peak Hour

|                                                                    |  |  |  |  |  |  |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Movement                                                           | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                               |
| Lane Configurations                                                |  |  |  |  |  |  |
| Traffic Volume (veh/h)                                             | 320                                                                               | 500                                                                               | 860                                                                               | 180                                                                               | 250                                                                               | 1100                                                                              |
| Future Volume (veh/h)                                              | 320                                                                               | 500                                                                               | 860                                                                               | 180                                                                               | 250                                                                               | 1100                                                                              |
| Initial Q (Qb), veh                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Lane Width Adj.                                                    | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.96                                                                              | 1.00                                                                              |
| Ped-Bike Adj(A_pbT)                                                | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   |
| Parking Bus, Adj                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Work Zone On Approach                                              | No                                                                                |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |
| Adj Sat Flow, veh/h/ln                                             | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1781                                                                              | 1856                                                                              |
| Adj Flow Rate, veh/h                                               | 337                                                                               | 421                                                                               | 905                                                                               | 147                                                                               | 263                                                                               | 1158                                                                              |
| Peak Hour Factor                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              |
| Percent Heavy Veh, %                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Cap, veh/h                                                         | 456                                                                               | 406                                                                               | 803                                                                               | 680                                                                               | 292                                                                               | 1201                                                                              |
| Arrive On Green                                                    | 0.26                                                                              | 0.26                                                                              | 0.43                                                                              | 0.43                                                                              | 0.17                                                                              | 0.65                                                                              |
| Sat Flow, veh/h                                                    | 1767                                                                              | 1572                                                                              | 1856                                                                              | 1571                                                                              | 1696                                                                              | 1856                                                                              |
| Grp Volume(v), veh/h                                               | 337                                                                               | 421                                                                               | 905                                                                               | 147                                                                               | 263                                                                               | 1158                                                                              |
| Grp Sat Flow(s),veh/h/ln                                           | 1767                                                                              | 1572                                                                              | 1856                                                                              | 1571                                                                              | 1696                                                                              | 1856                                                                              |
| Q Serve(g_s), s                                                    | 17.5                                                                              | 25.8                                                                              | 43.3                                                                              | 5.9                                                                               | 15.2                                                                              | 58.6                                                                              |
| Cycle Q Clear(g_c), s                                              | 17.5                                                                              | 25.8                                                                              | 43.3                                                                              | 5.9                                                                               | 15.2                                                                              | 58.6                                                                              |
| Prop In Lane                                                       | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   |
| Lane Grp Cap(c), veh/h                                             | 456                                                                               | 406                                                                               | 803                                                                               | 680                                                                               | 292                                                                               | 1201                                                                              |
| V/C Ratio(X)                                                       | 0.74                                                                              | 1.04                                                                              | 1.13                                                                              | 0.22                                                                              | 0.90                                                                              | 0.96                                                                              |
| Avail Cap(c_a), veh/h                                              | 456                                                                               | 406                                                                               | 803                                                                               | 680                                                                               | 302                                                                               | 1201                                                                              |
| HCM Platoon Ratio                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Upstream Filter(I)                                                 | 1.00                                                                              | 1.00                                                                              | 0.82                                                                              | 0.82                                                                              | 1.00                                                                              | 1.00                                                                              |
| Uniform Delay (d), s/veh                                           | 34.0                                                                              | 37.1                                                                              | 28.4                                                                              | 17.7                                                                              | 40.6                                                                              | 16.6                                                                              |
| Incr Delay (d2), s/veh                                             | 6.0                                                                               | 54.8                                                                              | 70.2                                                                              | 0.6                                                                               | 26.7                                                                              | 18.8                                                                              |
| Initial Q Delay(d3), s/veh                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |
| %ile BackOfQ(50%),veh/ln                                           | 8.2                                                                               | 25.8                                                                              | 32.9                                                                              | 2.1                                                                               | 8.2                                                                               | 25.6                                                                              |
| Unsig. Movement Delay, s/veh                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| LnGrp Delay(d), s/veh                                              | 40.0                                                                              | 91.9                                                                              | 98.6                                                                              | 18.3                                                                              | 67.3                                                                              | 35.3                                                                              |
| LnGrp LOS                                                          | D                                                                                 | F                                                                                 | F                                                                                 | B                                                                                 | E                                                                                 | D                                                                                 |
| Approach Vol, veh/h                                                | 758                                                                               |                                                                                   | 1052                                                                              |                                                                                   |                                                                                   | 1421                                                                              |
| Approach Delay, s/veh                                              | 68.8                                                                              |                                                                                   | 87.4                                                                              |                                                                                   |                                                                                   | 41.2                                                                              |
| Approach LOS                                                       | E                                                                                 |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | D                                                                                 |
| Timer - Assigned Phs                                               | 2                                                                                 |                                                                                   | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 |
| Phs Duration (G+Y+Rc), s                                           | 70.0                                                                              |                                                                                   | 30.0                                                                              |                                                                                   | 21.4                                                                              | 48.6                                                                              |
| Change Period (Y+Rc), s                                            | 5.3                                                                               |                                                                                   | 4.2                                                                               |                                                                                   | 4.2                                                                               | 5.3                                                                               |
| Max Green Setting (Gmax), s                                        | 64.7                                                                              |                                                                                   | 25.8                                                                              |                                                                                   | 17.8                                                                              | 42.7                                                                              |
| Max Q Clear Time (g_c+l1), s                                       | 60.6                                                                              |                                                                                   | 27.8                                                                              |                                                                                   | 17.2                                                                              | 45.3                                                                              |
| Green Ext Time (p_c), s                                            | 2.2                                                                               |                                                                                   | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               |
| Intersection Summary                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| HCM 7th Control Delay, s/veh                                       | 62.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| HCM 7th LOS                                                        | E                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Notes                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| User approved pedestrian interval to be less than phase max green. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |

# HCM 7th Signalized Intersection Summary 2: N. Santa Fe Avenue & Museum Way

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations          |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 260                                                                               | 410                                                                               | 330                                                                               | 600                                                                               | 890                                                                               | 480                                                                               |
| Future Volume (veh/h)        | 260                                                                               | 410                                                                               | 330                                                                               | 600                                                                               | 890                                                                               | 480                                                                               |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Lane Width Adj.              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.04                                                                              | 1.04                                                                              |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                | No                                                                                |                                                                                   |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1930                                                                              | 1930                                                                              |
| Adj Flow Rate, veh/h         | 274                                                                               | 343                                                                               | 347                                                                               | 632                                                                               | 937                                                                               | 400                                                                               |
| Peak Hour Factor             | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Cap, veh/h                   | 380                                                                               | 562                                                                               | 251                                                                               | 1311                                                                              | 946                                                                               | 801                                                                               |
| Arrive On Green              | 0.22                                                                              | 0.22                                                                              | 0.14                                                                              | 0.68                                                                              | 0.49                                                                              | 0.49                                                                              |
| Sat Flow, veh/h              | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1930                                                                              | 1930                                                                              | 1634                                                                              |
| Grp Volume(v), veh/h         | 274                                                                               | 343                                                                               | 347                                                                               | 632                                                                               | 937                                                                               | 400                                                                               |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1930                                                                              | 1930                                                                              | 1634                                                                              |
| Q Serve(g_s), s              | 13.0                                                                              | 16.1                                                                              | 12.8                                                                              | 14.1                                                                              | 43.3                                                                              | 14.9                                                                              |
| Cycle Q Clear(g_c), s        | 13.0                                                                              | 16.1                                                                              | 12.8                                                                              | 14.1                                                                              | 43.3                                                                              | 14.9                                                                              |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |
| Lane Grp Cap(c), veh/h       | 380                                                                               | 562                                                                               | 251                                                                               | 1311                                                                              | 946                                                                               | 801                                                                               |
| V/C Ratio(X)                 | 0.72                                                                              | 0.61                                                                              | 1.38                                                                              | 0.48                                                                              | 0.99                                                                              | 0.50                                                                              |
| Avail Cap(c_a), veh/h        | 546                                                                               | 709                                                                               | 251                                                                               | 1311                                                                              | 946                                                                               | 801                                                                               |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 0.70                                                                              | 0.70                                                                              | 0.26                                                                              | 0.26                                                                              |
| Uniform Delay (d), s/veh     | 32.8                                                                              | 23.8                                                                              | 38.6                                                                              | 6.9                                                                               | 22.7                                                                              | 15.5                                                                              |
| Incr Delay (d2), s/veh       | 2.0                                                                               | 0.8                                                                               | 187.9                                                                             | 0.9                                                                               | 12.8                                                                              | 0.6                                                                               |
| Initial Q Delay(d3), s/veh   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |
| %ile BackOfQ(50%),veh/ln     | 5.7                                                                               | 14.2                                                                              | 18.3                                                                              | 4.5                                                                               | 20.1                                                                              | 5.0                                                                               |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| LnGrp Delay(d), s/veh        | 34.8                                                                              | 24.6                                                                              | 226.5                                                                             | 7.8                                                                               | 35.6                                                                              | 16.1                                                                              |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | F                                                                                 | A                                                                                 | D                                                                                 | B                                                                                 |
| Approach Vol, veh/h          | 617                                                                               |                                                                                   |                                                                                   | 979                                                                               | 1337                                                                              |                                                                                   |
| Approach Delay, s/veh        | 29.1                                                                              |                                                                                   |                                                                                   | 85.3                                                                              | 29.7                                                                              |                                                                                   |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | F                                                                                 | C                                                                                 |                                                                                   |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 |
| Phs Duration (G+Y+Rc), s     | 66.4                                                                              |                                                                                   | 23.6                                                                              |                                                                                   | 17.0                                                                              | 49.4                                                                              |
| Change Period (Y+Rc), s      | 5.3                                                                               |                                                                                   | 4.2                                                                               |                                                                                   | 4.2                                                                               | 5.3                                                                               |
| Max Green Setting (Gmax), s  | 52.7                                                                              |                                                                                   | 27.8                                                                              |                                                                                   | 12.8                                                                              | 35.7                                                                              |
| Max Q Clear Time (g_c+l1), s | 16.1                                                                              |                                                                                   | 18.1                                                                              |                                                                                   | 14.8                                                                              | 45.3                                                                              |
| Green Ext Time (p_c), s      | 2.5                                                                               |                                                                                   | 1.2                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| HCM 7th Control Delay, s/veh |                                                                                   |                                                                                   | 48.1                                                                              |                                                                                   |                                                                                   |                                                                                   |
| HCM 7th LOS                  |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |

# HCM 7th Signalized Intersection Summary 3: N. Santa Fe Avenue & Adobe Estates Drive/Taylor Street

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL   | NBT  | NBR  | SBL   | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|-------|------|------|-------|------|------|
| Lane Configurations          |      | ↕    |      | ↕    | ↕    |      | ↕     | ↕    | ↕    | ↕     | ↕    | ↕    |
| Traffic Volume (veh/h)       | 20   | 20   | 70   | 250  | 60   | 280  | 100   | 630  | 80   | 170   | 1100 | 30   |
| Future Volume (veh/h)        | 20   | 20   | 70   | 250  | 60   | 280  | 100   | 630  | 80   | 170   | 1100 | 30   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0     | 0    | 0    |
| Lane Width Adj.              | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.04 | 1.04 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 0.85 | 1.00  |      | 0.98 | 1.00  |      | 0.89 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      | No   |      |      | No    |      |      | No    |      |      |
| Adj Sat Flow, veh/h/ln       | 1856 | 1930 | 1856 | 1856 | 1856 | 1856 | 1856  | 1856 | 1856 | 1856  | 1930 | 1930 |
| Adj Flow Rate, veh/h         | 21   | 21   | 63   | 263  | 63   | 263  | 105   | 663  | 63   | 179   | 1158 | 21   |
| Peak Hour Factor             | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95  | 0.95 | 0.95 | 0.95  | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3     | 3    | 3    | 3     | 3    | 3    |
| Cap, veh/h                   | 26   | 26   | 79   | 473  | 73   | 304  | 92    | 1343 | 586  | 110   | 1433 | 696  |
| Arrive On Green              | 0.08 | 0.08 | 0.08 | 0.27 | 0.27 | 0.27 | 0.05  | 0.38 | 0.38 | 0.06  | 0.39 | 0.39 |
| Sat Flow, veh/h              | 345  | 345  | 1036 | 1767 | 272  | 1136 | 1767  | 3526 | 1539 | 1767  | 3667 | 1460 |
| Grp Volume(v), veh/h         | 105  | 0    | 0    | 263  | 0    | 326  | 105   | 663  | 63   | 179   | 1158 | 21   |
| Grp Sat Flow(s),veh/h/ln     | 1726 | 0    | 0    | 1767 | 0    | 1408 | 1767  | 1763 | 1539 | 1767  | 1833 | 1460 |
| Q Serve(g_s), s              | 6.0  | 0.0  | 0.0  | 12.8 | 0.0  | 22.1 | 5.2   | 14.3 | 2.6  | 6.2   | 28.1 | 0.8  |
| Cycle Q Clear(g_c), s        | 6.0  | 0.0  | 0.0  | 12.8 | 0.0  | 22.1 | 5.2   | 14.3 | 2.6  | 6.2   | 28.1 | 0.8  |
| Prop In Lane                 | 0.20 |      | 0.60 | 1.00 |      | 0.81 | 1.00  |      | 1.00 | 1.00  |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 132  | 0    | 0    | 473  | 0    | 377  | 92    | 1343 | 586  | 110   | 1433 | 696  |
| V/C Ratio(X)                 | 0.79 | 0.00 | 0.00 | 0.56 | 0.00 | 0.87 | 1.14  | 0.49 | 0.11 | 1.63  | 0.81 | 0.03 |
| Avail Cap(c_a), veh/h        | 197  | 0    | 0    | 670  | 0    | 534  | 92    | 1343 | 586  | 110   | 1433 | 696  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00  | 1.00 | 1.00 | 0.09  | 0.09 | 0.09 |
| Uniform Delay (d), s/veh     | 45.4 | 0.0  | 0.0  | 31.5 | 0.0  | 34.9 | 47.4  | 23.6 | 20.0 | 46.9  | 27.1 | 14.4 |
| Incr Delay (d2), s/veh       | 10.3 | 0.0  | 0.0  | 0.8  | 0.0  | 9.2  | 137.5 | 1.3  | 0.4  | 288.9 | 0.5  | 0.0  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 2.9  | 0.0  | 0.0  | 5.4  | 0.0  | 8.3  | 5.8   | 6.0  | 1.0  | 11.5  | 11.8 | 0.3  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |       |      |      |       |      |      |
| LnGrp Delay(d), s/veh        | 55.7 | 0.0  | 0.0  | 32.3 | 0.0  | 44.1 | 184.9 | 24.9 | 20.3 | 335.8 | 27.6 | 14.4 |
| LnGrp LOS                    | E    |      |      | C    |      | D    | F     | C    | C    | F     | C    | B    |
| Approach Vol, veh/h          | 105  |      |      | 589  |      |      | 831   |      |      | 1358  |      |      |
| Approach Delay, s/veh        | 55.7 |      |      | 38.8 |      |      | 44.8  |      |      | 68.0  |      |      |
| Approach LOS                 | E    |      |      | D    |      |      | D     |      |      | E     |      |      |
| Timer - Assigned Phs         | 1    | 2    |      | 4    | 5    | 6    |       | 8    |      |       |      |      |
| Phs Duration (G+Y+Rc), s     | 2.0  | 43.9 |      | 12.3 | 11.0 | 44.9 |       | 31.8 |      |       |      |      |
| Change Period (Y+Rc), s      | 5.8  | 5.8  |      | 4.6  | 5.8  | 5.8  |       | 5.1  |      |       |      |      |
| Max Green Setting (Gmax), s  | 23.2 | 23.2 |      | 11.4 | 5.2  | 24.2 |       | 37.9 |      |       |      |      |
| Max Q Clear Time (g_c+I), s  | 16.3 | 16.3 |      | 8.0  | 7.2  | 30.1 |       | 24.1 |      |       |      |      |
| Green Ext Time (p_c), s      | 0.0  | 2.5  |      | 0.1  | 0.0  | 0.0  |       | 2.1  |      |       |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 54.9  
HCM 7th LOS D

## Notes

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

# HCM 7th Signalized Intersection Summary 4: N. Santa Fe Avenue & Bobier Drive

Future Year Conditions  
AM Peak Hour

|                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)                                             | 230                                                                               | 700                                                                               | 290                                                                               | 350                                                                               | 800                                                                               | 200                                                                               | 270                                                                               | 550                                                                               | 290                                                                               | 330                                                                                 | 850                                                                                 | 310                                                                                 |
| Future Volume (veh/h)                                              | 230                                                                               | 700                                                                               | 290                                                                               | 350                                                                               | 800                                                                               | 200                                                                               | 270                                                                               | 550                                                                               | 290                                                                               | 330                                                                                 | 850                                                                                 | 310                                                                                 |
| Initial Q (Qb), veh                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width 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                                                                                |
| Ped-Bike Adj(A_pbT)                                                | 1.00                                                                              |                                                                                   | 0.94                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.93                                                                                |
| Parking Bus, Adj                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                             | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h                                               | 242                                                                               | 737                                                                               | 242                                                                               | 368                                                                               | 842                                                                               | 169                                                                               | 284                                                                               | 579                                                                               | 242                                                                               | 347                                                                                 | 895                                                                                 | 258                                                                                 |
| Peak Hour Factor                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                         | 177                                                                               | 955                                                                               | 558                                                                               | 177                                                                               | 955                                                                               | 583                                                                               | 177                                                                               | 1213                                                                              | 697                                                                               | 177                                                                                 | 1213                                                                                | 658                                                                                 |
| Arrive On Green                                                    | 0.10                                                                              | 0.27                                                                              | 0.27                                                                              | 0.10                                                                              | 0.27                                                                              | 0.27                                                                              | 0.10                                                                              | 0.34                                                                              | 0.34                                                                              | 0.10                                                                                | 0.34                                                                                | 0.34                                                                                |
| Sat Flow, veh/h                                                    | 1767                                                                              | 3526                                                                              | 1478                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1567                                                                              | 1767                                                                                | 3526                                                                                | 1455                                                                                |
| Grp Volume(v), veh/h                                               | 242                                                                               | 737                                                                               | 242                                                                               | 368                                                                               | 842                                                                               | 169                                                                               | 284                                                                               | 579                                                                               | 242                                                                               | 347                                                                                 | 895                                                                                 | 258                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                           | 1767                                                                              | 1763                                                                              | 1478                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1567                                                                              | 1767                                                                                | 1763                                                                                | 1455                                                                                |
| Q Serve(g_s), s                                                    | 10.0                                                                              | 19.3                                                                              | 12.3                                                                              | 10.0                                                                              | 22.9                                                                              | 7.6                                                                               | 10.0                                                                              | 12.9                                                                              | 10.2                                                                              | 10.0                                                                                | 22.3                                                                                | 12.0                                                                                |
| Cycle Q Clear(g_c), s                                              | 10.0                                                                              | 19.3                                                                              | 12.3                                                                              | 10.0                                                                              | 22.9                                                                              | 7.6                                                                               | 10.0                                                                              | 12.9                                                                              | 10.2                                                                              | 10.0                                                                                | 22.3                                                                                | 12.0                                                                                |
| Prop In Lane                                                       | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                             | 177                                                                               | 955                                                                               | 558                                                                               | 177                                                                               | 955                                                                               | 583                                                                               | 177                                                                               | 1213                                                                              | 697                                                                               | 177                                                                                 | 1213                                                                                | 658                                                                                 |
| V/C Ratio(X)                                                       | 1.37                                                                              | 0.77                                                                              | 0.43                                                                              | 2.08                                                                              | 0.88                                                                              | 0.29                                                                              | 1.61                                                                              | 0.48                                                                              | 0.35                                                                              | 1.96                                                                                | 0.74                                                                                | 0.39                                                                                |
| Avail Cap(c_a), veh/h                                              | 177                                                                               | 1040                                                                              | 593                                                                               | 177                                                                               | 1040                                                                              | 621                                                                               | 177                                                                               | 1213                                                                              | 697                                                                               | 177                                                                                 | 1213                                                                                | 658                                                                                 |
| HCM Platoon Ratio                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                           | 45.0                                                                              | 33.6                                                                              | 23.7                                                                              | 45.0                                                                              | 34.9                                                                              | 22.2                                                                              | 45.0                                                                              | 25.7                                                                              | 18.3                                                                              | 45.0                                                                                | 28.8                                                                                | 18.8                                                                                |
| Incr Delay (d2), s/veh                                             | 197.9                                                                             | 3.2                                                                               | 0.4                                                                               | 506.0                                                                             | 8.3                                                                               | 0.2                                                                               | 296.8                                                                             | 1.3                                                                               | 1.3                                                                               | 453.5                                                                               | 4.0                                                                                 | 1.8                                                                                 |
| Initial Q Delay(d3), s/veh                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                           | 14.0                                                                              | 8.3                                                                               | 4.1                                                                               | 29.1                                                                              | 10.5                                                                              | 2.7                                                                               | 18.9                                                                              | 5.4                                                                               | 3.7                                                                               | 26.6                                                                                | 9.7                                                                                 | 4.1                                                                                 |
| Unsig. Movement Delay, s/veh                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                              | 242.9                                                                             | 36.8                                                                              | 24.1                                                                              | 551.0                                                                             | 43.2                                                                              | 22.4                                                                              | 341.8                                                                             | 27.0                                                                              | 19.6                                                                              | 498.5                                                                               | 32.9                                                                                | 20.5                                                                                |
| LnGrp LOS                                                          | F                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | C                                                                                 | B                                                                                 | F                                                                                   | C                                                                                   | C                                                                                   |
| Approach Vol, veh/h                                                | 1221                                                                              |                                                                                   |                                                                                   | 1379                                                                              |                                                                                   |                                                                                   | 1105                                                                              |                                                                                   |                                                                                   | 1500                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                              | 75.1                                                                              |                                                                                   |                                                                                   | 176.1                                                                             |                                                                                   |                                                                                   | 106.3                                                                             |                                                                                   |                                                                                   | 138.4                                                                               |                                                                                     |                                                                                     |
| Approach LOS                                                       | E                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | F                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                               | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                           | 4.0                                                                               | 39.5                                                                              | 14.0                                                                              | 32.5                                                                              | 14.0                                                                              | 39.5                                                                              | 14.0                                                                              | 32.5                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                            | 4.0                                                                               | 5.1                                                                               | 4.0                                                                               | 5.4                                                                               | 4.0                                                                               | 5.1                                                                               | 4.0                                                                               | 5.4                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                        | 10.0                                                                              | 32.0                                                                              | 10.0                                                                              | 29.5                                                                              | 10.0                                                                              | 32.0                                                                              | 10.0                                                                              | 29.5                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+1/2g), s                                     | 14.9                                                                              | 14.9                                                                              | 12.0                                                                              | 24.9                                                                              | 12.0                                                                              | 24.3                                                                              | 12.0                                                                              | 21.3                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                            | 0.0                                                                               | 3.5                                                                               | 0.0                                                                               | 2.1                                                                               | 0.0                                                                               | 3.6                                                                               | 0.0                                                                               | 3.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                       | 126.7                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                        | F                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| User approved pedestrian interval to be less than phase max green. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 5: E. Bobier Drive & Anza Avenue

Future Year Conditions  
AM Peak Hour



| Movement                      | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT | NBR | SBL                                                                                 | SBT  | SBR                                                                                 |
|-------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-----|-----|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|
| Lane Configurations           |  |  |      |  |  |      |      |     |     |  |      |  |
| Traffic Volume (veh/h)        | 100                                                                               | 800                                                                               | 0    | 0                                                                                 | 850                                                                               | 80   | 0    | 0   | 0   | 180                                                                                 | 0    | 180                                                                                 |
| Future Volume (veh/h)         | 100                                                                               | 800                                                                               | 0    | 0                                                                                 | 850                                                                               | 80   | 0    | 0   | 0   | 180                                                                                 | 0    | 180                                                                                 |
| Initial Q (Qb), veh           | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    |      |     |     | 0                                                                                   | 0    | 0                                                                                   |
| Lane Width Adj.               | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |      |     |     | 1.00                                                                                | 1.00 | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)           | 1.00                                                                              |                                                                                   | 1.00 | 1.00                                                                              |                                                                                   | 0.95 |      |     |     | 1.00                                                                                |      | 1.00                                                                                |
| Parking Bus, Adj              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |      |     |     | 1.00                                                                                | 1.00 | 1.00                                                                                |
| Work Zone On Approach         | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |      |      |     |     | No                                                                                  |      |                                                                                     |
| Adj Sat Flow, veh/h/ln        | 1856                                                                              | 1856                                                                              | 0    | 1856                                                                              | 1856                                                                              | 1856 |      |     |     | 1856                                                                                | 0    | 1856                                                                                |
| Adj Flow Rate, veh/h          | 105                                                                               | 842                                                                               | 0    | 0                                                                                 | 895                                                                               | 73   |      |     |     | 189                                                                                 | 0    | 147                                                                                 |
| Peak Hour Factor              | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95 |      |     |     | 0.95                                                                                | 0.95 | 0.95                                                                                |
| Percent Heavy Veh, %          | 3                                                                                 | 3                                                                                 | 0    | 3                                                                                 | 3                                                                                 | 3    |      |     |     | 3                                                                                   | 0    | 3                                                                                   |
| Cap, veh/h                    | 143                                                                               | 2220                                                                              | 0    | 4                                                                                 | 1474                                                                              | 120  |      |     |     | 282                                                                                 | 0    | 251                                                                                 |
| Arrive On Green               | 0.08                                                                              | 0.63                                                                              | 0.00 | 0.00                                                                              | 0.45                                                                              | 0.45 |      |     |     | 0.16                                                                                | 0.00 | 0.16                                                                                |
| Sat Flow, veh/h               | 1767                                                                              | 3618                                                                              | 0    | 1767                                                                              | 3284                                                                              | 268  |      |     |     | 1767                                                                                | 0    | 1572                                                                                |
| Grp Volume(v), veh/h          | 105                                                                               | 842                                                                               | 0    | 0                                                                                 | 480                                                                               | 488  |      |     |     | 189                                                                                 | 0    | 147                                                                                 |
| Grp Sat Flow(s),veh/h/ln      | 1767                                                                              | 1763                                                                              | 0    | 1767                                                                              | 1763                                                                              | 1790 |      |     |     | 1767                                                                                | 0    | 1572                                                                                |
| Q Serve(g_s), s               | 2.6                                                                               | 5.2                                                                               | 0.0  | 0.0                                                                               | 9.3                                                                               | 9.3  |      |     |     | 4.5                                                                                 | 0.0  | 3.9                                                                                 |
| Cycle Q Clear(g_c), s         | 2.6                                                                               | 5.2                                                                               | 0.0  | 0.0                                                                               | 9.3                                                                               | 9.3  |      |     |     | 4.5                                                                                 | 0.0  | 3.9                                                                                 |
| Prop In Lane                  | 1.00                                                                              |                                                                                   | 0.00 | 1.00                                                                              |                                                                                   | 0.15 |      |     |     | 1.00                                                                                |      | 1.00                                                                                |
| Lane Grp Cap(c), veh/h        | 143                                                                               | 2220                                                                              | 0    | 4                                                                                 | 791                                                                               | 803  |      |     |     | 282                                                                                 | 0    | 251                                                                                 |
| V/C Ratio(X)                  | 0.73                                                                              | 0.38                                                                              | 0.00 | 0.00                                                                              | 0.61                                                                              | 0.61 |      |     |     | 0.67                                                                                | 0.00 | 0.59                                                                                |
| Avail Cap(c_a), veh/h         | 216                                                                               | 2270                                                                              | 0    | 196                                                                               | 1115                                                                              | 1132 |      |     |     | 1059                                                                                | 0    | 943                                                                                 |
| HCM Platoon Ratio             | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |      |     |     | 1.00                                                                                | 1.00 | 1.00                                                                                |
| Upstream Filter(I)            | 1.00                                                                              | 1.00                                                                              | 0.00 | 0.00                                                                              | 1.00                                                                              | 1.00 |      |     |     | 1.00                                                                                | 0.00 | 1.00                                                                                |
| Uniform Delay (d), s/veh      | 20.2                                                                              | 4.1                                                                               | 0.0  | 0.0                                                                               | 9.4                                                                               | 9.4  |      |     |     | 17.8                                                                                | 0.0  | 17.6                                                                                |
| Incr Delay (d2), s/veh        | 2.7                                                                               | 0.2                                                                               | 0.0  | 0.0                                                                               | 1.1                                                                               | 1.1  |      |     |     | 2.1                                                                                 | 0.0  | 1.6                                                                                 |
| Initial Q Delay(d3), s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  |      |     |     | 0.0                                                                                 | 0.0  | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln      | 0.0                                                                               | 0.7                                                                               | 0.0  | 0.0                                                                               | 2.6                                                                               | 2.6  |      |     |     | 1.8                                                                                 | 0.0  | 0.1                                                                                 |
| Unsig. Movement Delay, s/veh  |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |      |     |     |                                                                                     |      |                                                                                     |
| LnGrp Delay(d), s/veh         | 22.9                                                                              | 4.2                                                                               | 0.0  | 0.0                                                                               | 10.5                                                                              | 10.5 |      |     |     | 19.9                                                                                | 0.0  | 19.2                                                                                |
| LnGrp LOS                     | C                                                                                 | A                                                                                 |      |                                                                                   | B                                                                                 | B    |      |     |     | B                                                                                   |      | B                                                                                   |
| Approach Vol, veh/h           | 947                                                                               |                                                                                   |      | 968                                                                               |                                                                                   |      | 336  |     |     |                                                                                     |      |                                                                                     |
| Approach Delay, s/veh         | 6.3                                                                               |                                                                                   |      | 10.5                                                                              |                                                                                   |      | 19.6 |     |     |                                                                                     |      |                                                                                     |
| Approach LOS                  | A                                                                                 |                                                                                   |      | B                                                                                 |                                                                                   |      | B    |     |     |                                                                                     |      |                                                                                     |
| Timer - Assigned Phs          | 1                                                                                 | 2                                                                                 |      | 4                                                                                 | 5                                                                                 | 6    |      |     |     |                                                                                     |      |                                                                                     |
| Phs Duration (G+Y+Rc), s      | 0.0                                                                               | 33.4                                                                              |      | 11.7                                                                              | 8.2                                                                               | 25.2 |      |     |     |                                                                                     |      |                                                                                     |
| Change Period (Y+Rc), s       | 4.5                                                                               | 5.0                                                                               |      | 4.5                                                                               | 4.5                                                                               | 5.0  |      |     |     |                                                                                     |      |                                                                                     |
| Max Green Setting (Gmax), s   | 5.0                                                                               | 29.0                                                                              |      | 27.0                                                                              | 5.5                                                                               | 28.5 |      |     |     |                                                                                     |      |                                                                                     |
| Max Q Clear Time (g_c+I10), s | 7.2                                                                               | 7.2                                                                               |      | 6.5                                                                               | 4.6                                                                               | 11.3 |      |     |     |                                                                                     |      |                                                                                     |
| Green Ext Time (p_c), s       | 0.0                                                                               | 7.8                                                                               |      | 0.8                                                                               | 0.0                                                                               | 7.6  |      |     |     |                                                                                     |      |                                                                                     |
| Intersection Summary          |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |      |     |     |                                                                                     |      |                                                                                     |
| HCM 7th Control Delay, s/veh  |                                                                                   |                                                                                   | 10.1 |                                                                                   |                                                                                   |      |      |     |     |                                                                                     |      |                                                                                     |
| HCM 7th LOS                   |                                                                                   |                                                                                   | B    |                                                                                   |                                                                                   |      |      |     |     |                                                                                     |      |                                                                                     |

# HCM 7th Signalized Intersection Summary

## 6: E. Vista Way & E. Bobier Drive/Foothill Drive

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR  | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Configurations          |  |  |  |  |  |      |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 180                                                                               | 260                                                                               | 130                                                                               | 310                                                                               | 350                                                                               | 90   | 100                                                                               | 580                                                                               | 170                                                                               | 90                                                                                | 1280                                                                                | 170                                                                                 |
| Future Volume (veh/h)        | 180                                                                               | 260                                                                               | 130                                                                               | 310                                                                               | 350                                                                               | 90   | 100                                                                               | 580                                                                               | 170                                                                               | 90                                                                                | 1280                                                                                | 170                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.96                                                                              | 1.00                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.96 | 1.00                                                                              |                                                                                   | 0.97                                                                              | 1.00                                                                              |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1856 | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1781                                                                              | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 189                                                                               | 274                                                                               | 105                                                                               | 326                                                                               | 368                                                                               | 84   | 105                                                                               | 611                                                                               | 142                                                                               | 95                                                                                | 1347                                                                                | 142                                                                                 |
| Peak Hour Factor             | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 223                                                                               | 317                                                                               | 267                                                                               | 385                                                                               | 650                                                                               | 146  | 536                                                                               | 1823                                                                              | 789                                                                               | 82                                                                                | 1419                                                                                | 624                                                                                 |
| Arrive On Green              | 0.07                                                                              | 0.17                                                                              | 0.17                                                                              | 0.11                                                                              | 0.22                                                                              | 0.22 | 0.16                                                                              | 0.52                                                                              | 0.52                                                                              | 0.05                                                                              | 0.40                                                                                | 0.40                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 1856                                                                              | 1563                                                                              | 3428                                                                              | 2947                                                                              | 663  | 3428                                                                              | 3526                                                                              | 1525                                                                              | 1696                                                                              | 3526                                                                                | 1550                                                                                |
| Grp Volume(v), veh/h         | 189                                                                               | 274                                                                               | 105                                                                               | 326                                                                               | 227                                                                               | 225  | 105                                                                               | 611                                                                               | 142                                                                               | 95                                                                                | 1347                                                                                | 142                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1856                                                                              | 1563                                                                              | 1714                                                                              | 1833                                                                              | 1777 | 1714                                                                              | 1763                                                                              | 1525                                                                              | 1696                                                                              | 1763                                                                                | 1550                                                                                |
| Q Serve(g_s), s              | 6.5                                                                               | 17.2                                                                              | 7.2                                                                               | 11.2                                                                              | 13.2                                                                              | 13.6 | 3.2                                                                               | 12.1                                                                              | 3.6                                                                               | 5.8                                                                               | 44.3                                                                                | 5.5                                                                                 |
| Cycle Q Clear(g_c), s        | 6.5                                                                               | 17.2                                                                              | 7.2                                                                               | 11.2                                                                              | 13.2                                                                              | 13.6 | 3.2                                                                               | 12.1                                                                              | 3.6                                                                               | 5.8                                                                               | 44.3                                                                                | 5.5                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.37 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 223                                                                               | 317                                                                               | 267                                                                               | 385                                                                               | 404                                                                               | 392  | 536                                                                               | 1823                                                                              | 789                                                                               | 82                                                                                | 1419                                                                                | 624                                                                                 |
| V/C Ratio(X)                 | 0.85                                                                              | 0.87                                                                              | 0.39                                                                              | 0.85                                                                              | 0.56                                                                              | 0.57 | 0.20                                                                              | 0.34                                                                              | 0.18                                                                              | 1.16                                                                              | 0.95                                                                                | 0.23                                                                                |
| Avail Cap(c_a), veh/h        | 223                                                                               | 433                                                                               | 365                                                                               | 509                                                                               | 581                                                                               | 563  | 536                                                                               | 1823                                                                              | 789                                                                               | 82                                                                                | 1419                                                                                | 624                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 55.5                                                                              | 48.4                                                                              | 44.2                                                                              | 52.2                                                                              | 41.6                                                                              | 41.7 | 44.1                                                                              | 16.9                                                                              | 5.6                                                                               | 57.1                                                                              | 34.7                                                                                | 13.7                                                                                |
| Incr Delay (d2), s/veh       | 24.0                                                                              | 11.8                                                                              | 0.7                                                                               | 7.9                                                                               | 0.9                                                                               | 1.0  | 0.1                                                                               | 0.5                                                                               | 0.5                                                                               | 148.5                                                                             | 14.5                                                                                | 0.8                                                                                 |
| Initial Q Delay(d3), s/veh   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 8.5                                                                               | 8.9                                                                               | 2.8                                                                               | 5.2                                                                               | 6.0                                                                               | 6.0  | 1.4                                                                               | 4.9                                                                               | 2.0                                                                               | 5.8                                                                               | 20.9                                                                                | 2.7                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh        | 79.6                                                                              | 60.2                                                                              | 44.9                                                                              | 60.1                                                                              | 42.5                                                                              | 42.7 | 44.1                                                                              | 17.4                                                                              | 6.1                                                                               | 205.6                                                                             | 49.2                                                                                | 14.6                                                                                |
| LnGrp LOS                    | E                                                                                 | E                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 | D    | D                                                                                 | B                                                                                 | A                                                                                 | F                                                                                 | D                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 568                                                                               |                                                                                   |                                                                                   | 778                                                                               |                                                                                   |      | 858                                                                               |                                                                                   |                                                                                   | 1584                                                                              |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 63.8                                                                              |                                                                                   |                                                                                   | 49.9                                                                              |                                                                                   |      | 18.8                                                                              |                                                                                   |                                                                                   | 55.4                                                                              |                                                                                     |                                                                                     |
| Approach LOS                 | E                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |      | B                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6    | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 60.0                                                                              | 67.0                                                                              | 18.0                                                                              | 25.0                                                                              | 23.7                                                                              | 53.3 | 12.0                                                                              | 31.0                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.2                                                                               | 5.0                                                                               | 4.5                                                                               | * 4.5                                                                             | 5.0                                                                               | * 5  | 4.2                                                                               | 4.5                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.8                                                                               | 50.5                                                                              | 17.8                                                                              | * 28                                                                              | 8.0                                                                               | * 48 | 7.8                                                                               | 38.0                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 17.8                                                                              | 14.1                                                                              | 13.2                                                                              | 19.2                                                                              | 5.2                                                                               | 46.3 | 8.5                                                                               | 15.6                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 3.1                                                                               | 0.3                                                                               | 1.0                                                                               | 0.0                                                                               | 1.3  | 0.0                                                                               | 2.1                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |

### Intersection Summary

HCM 7th Control Delay, s/veh 47.3  
HCM 7th LOS D

### Notes

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

\* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Vista GPU

# HCM 7th Signalized Intersection Summary 7: N Melrose Dr & North Ave

Future Year Conditions  
AM Peak Hour



| Movement                       | EBL  | EBT  | EBR  | WBL   | WBT  | WBR   | NBL   | NBT  | NBR  | SBL  | SBT  | SBR  |
|--------------------------------|------|------|------|-------|------|-------|-------|------|------|------|------|------|
| Lane Configurations            |      |      |      |       |      |       |       |      |      |      |      |      |
| Traffic Volume (veh/h)         | 190  | 260  | 180  | 230   | 310  | 140   | 230   | 770  | 150  | 200  | 1400 | 300  |
| Future Volume (veh/h)          | 190  | 260  | 180  | 230   | 310  | 140   | 230   | 770  | 150  | 200  | 1400 | 300  |
| Initial Q (Qb), veh            | 0    | 0    | 0    | 0     | 0    | 0     | 0     | 0    | 0    | 0    | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)            | 1.00 |      | 0.91 | 1.00  |      | 1.00  | 1.00  |      | 0.99 | 1.00 |      | 0.99 |
| Parking Bus, Adj               | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach          | No   |      |      | No    |      |       | No    |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln         | 1856 | 1856 | 1856 | 1856  | 1856 | 1856  | 1856  | 1856 | 1856 | 1856 | 1856 | 1856 |
| Adj Flow Rate, veh/h           | 200  | 274  | 147  | 242   | 326  | 131   | 242   | 811  | 142  | 211  | 1474 | 284  |
| Peak Hour Factor               | 0.95 | 0.95 | 0.95 | 0.95  | 0.95 | 0.95  | 0.95  | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %           | 3    | 3    | 3    | 3     | 3    | 3     | 3     | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                     | 346  | 363  | 280  | 330   | 235  | 94    | 195   | 1419 | 247  | 238  | 1459 | 280  |
| Arrive On Green                | 0.20 | 0.20 | 0.20 | 0.19  | 0.19 | 0.19  | 0.11  | 0.33 | 0.33 | 0.13 | 0.34 | 0.34 |
| Sat Flow, veh/h                | 1767 | 1856 | 1432 | 1767  | 1259 | 506   | 1767  | 4333 | 753  | 1767 | 4261 | 819  |
| Grp Volume(v), veh/h           | 200  | 274  | 147  | 242   | 0    | 457   | 242   | 631  | 322  | 211  | 1167 | 591  |
| Grp Sat Flow(s),veh/h/ln       | 1767 | 1856 | 1432 | 1767  | 0    | 1764  | 1767  | 1689 | 1709 | 1767 | 1689 | 1702 |
| Q Serve(g_s), s                | 12.3 | 16.7 | 11.0 | 15.5  | 0.0  | 22.4  | 13.2  | 18.5 | 18.8 | 14.1 | 41.1 | 41.1 |
| Cycle Q Clear(g_c), s          | 12.3 | 16.7 | 11.0 | 15.5  | 0.0  | 22.4  | 13.2  | 18.5 | 18.8 | 14.1 | 41.1 | 41.1 |
| Prop In Lane                   | 1.00 |      | 1.00 | 1.00  |      | 0.29  | 1.00  |      | 0.44 | 1.00 |      | 0.48 |
| Lane Grp Cap(c), veh/h         | 346  | 363  | 280  | 330   | 0    | 329   | 195   | 1106 | 560  | 238  | 1157 | 583  |
| V/C Ratio(X)                   | 0.58 | 0.75 | 0.52 | 0.73  | 0.00 | 1.39  | 1.24  | 0.57 | 0.58 | 0.89 | 1.01 | 1.01 |
| Avail Cap(c_a), veh/h          | 383  | 402  | 310  | 330   | 0    | 329   | 195   | 1106 | 560  | 265  | 1157 | 583  |
| HCM Platoon Ratio              | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)             | 1.00 | 1.00 | 1.00 | 1.00  | 0.00 | 1.00  | 0.72  | 0.72 | 0.72 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh       | 43.8 | 45.5 | 43.3 | 46.0  | 0.0  | 48.8  | 53.4  | 33.4 | 33.4 | 51.1 | 39.5 | 39.5 |
| Incr Delay (d2), s/veh         | 1.4  | 6.7  | 1.1  | 7.8   | 0.0  | 192.1 | 136.3 | 1.5  | 3.1  | 25.1 | 28.8 | 40.5 |
| Initial Q Delay(d3), s/veh     | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln       | 5.5  | 8.3  | 4.0  | 7.5   | 0.0  | 27.4  | 13.1  | 7.6  | 8.0  | 7.7  | 20.7 | 22.8 |
| Unsig. Movement Delay, s/veh   |      |      |      |       |      |       |       |      |      |      |      |      |
| LnGrp Delay(d), s/veh          | 45.2 | 52.2 | 44.4 | 53.8  | 0.0  | 240.9 | 189.7 | 34.9 | 36.5 | 76.2 | 68.2 | 80.0 |
| LnGrp LOS                      | D    | D    | D    | D     |      | F     | F     | C    | D    | E    | F    | F    |
| Approach Vol, veh/h            | 621  |      |      | 699   |      |       | 1195  |      |      | 1969 |      |      |
| Approach Delay, s/veh          | 48.1 |      |      | 176.1 |      |       | 66.7  |      |      | 72.6 |      |      |
| Approach LOS                   | D    |      |      | F     |      |       | E     |      |      | E    |      |      |
| Timer - Assigned Phs           | 1    | 2    |      | 4     | 5    | 6     |       | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s       | 20.3 | 44.6 |      | 28.1  | 18.5 | 46.4  |       | 27.0 |      |      |      |      |
| Change Period (Y+Rc), s        | 4.2  | 5.3  |      | 4.6   | 5.3  | * 5.3 |       | 4.6  |      |      |      |      |
| Max Green Setting (Gmax), s    | 10.0 | 34.9 |      | 26.0  | 11.8 | * 41  |       | 22.4 |      |      |      |      |
| Max Q Clear Time (g_c+11.0), s | 10.0 | 20.8 |      | 18.7  | 15.2 | 43.1  |       | 24.4 |      |      |      |      |
| Green Ext Time (p_c), s        | 0.1  | 5.0  |      | 1.4   | 0.0  | 0.0   |       | 0.0  |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 83.8  
HCM 7th LOS F

## Notes

\* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

# HCM 7th Signalized Intersection Summary 8: N. Santa Fe Avenue & E. California Avenue

Future Year Conditions  
AM Peak Hour



| Movement                      | EBL   | EBT  | EBR  | WBL   | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------------|-------|------|------|-------|------|------|------|------|------|------|------|------|
| Lane Configurations           |       | ↔    | ↔    |       | ↔    | ↔    | ↔    | ↕    | ↔    | ↔    | ↕    | ↔    |
| Traffic Volume (veh/h)        | 100   | 90   | 160  | 70    | 70   | 80   | 150  | 610  | 50   | 140  | 1200 | 80   |
| Future Volume (veh/h)         | 100   | 90   | 160  | 70    | 70   | 80   | 150  | 610  | 50   | 140  | 1200 | 80   |
| Initial Q (Qb), veh           | 0     | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)           | 1.00  |      | 0.86 | 1.00  |      | 0.86 | 1.00 |      | 0.97 | 1.00 |      | 0.96 |
| Parking Bus, Adj              | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach         | No    |      |      | No    |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln        | 1856  | 1856 | 1856 | 1856  | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 |
| Adj Flow Rate, veh/h          | 103   | 93   | 144  | 72    | 72   | 72   | 155  | 629  | 42   | 144  | 1237 | 61   |
| Peak Hour Factor              | 0.97  | 0.97 | 0.97 | 0.97  | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, %          | 3     | 3    | 3    | 3     | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                    | 55    | 34   | 345  | 54    | 37   | 345  | 186  | 1759 | 760  | 175  | 1737 | 746  |
| Arrive On Green               | 0.25  | 0.25 | 0.25 | 0.25  | 0.25 | 0.25 | 0.11 | 0.50 | 0.50 | 0.10 | 0.49 | 0.49 |
| Sat Flow, veh/h               | 0     | 132  | 1359 | 0     | 146  | 1359 | 1767 | 3526 | 1523 | 1767 | 3526 | 1513 |
| Grp Volume(v), veh/h          | 196   | 0    | 144  | 144   | 0    | 72   | 155  | 629  | 42   | 144  | 1237 | 61   |
| Grp Sat Flow(s),veh/h/ln      | 132   | 0    | 1359 | 146   | 0    | 1359 | 1767 | 1763 | 1523 | 1767 | 1763 | 1513 |
| Q Serve(g_s), s               | 0.0   | 0.0  | 8.8  | 0.0   | 0.0  | 4.2  | 8.6  | 10.9 | 1.4  | 8.0  | 27.4 | 2.1  |
| Cycle Q Clear(g_c), s         | 25.4  | 0.0  | 8.8  | 25.4  | 0.0  | 4.2  | 8.6  | 10.9 | 1.4  | 8.0  | 27.4 | 2.1  |
| Prop In Lane                  | 0.53  |      | 1.00 | 0.50  |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h        | 88    | 0    | 345  | 91    | 0    | 345  | 186  | 1759 | 760  | 175  | 1737 | 746  |
| V/C Ratio(X)                  | 2.22  | 0.00 | 0.42 | 1.58  | 0.00 | 0.21 | 0.83 | 0.36 | 0.06 | 0.82 | 0.71 | 0.08 |
| Avail Cap(c_a), veh/h         | 88    | 0    | 345  | 91    | 0    | 345  | 246  | 1759 | 760  | 297  | 1737 | 746  |
| HCM Platoon Ratio             | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)            | 1.00  | 0.00 | 1.00 | 1.00  | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.09 | 0.09 | 0.09 |
| Uniform Delay (d), s/veh      | 40.7  | 0.0  | 31.1 | 40.1  | 0.0  | 29.4 | 43.9 | 15.3 | 12.9 | 44.2 | 19.8 | 13.4 |
| Incr Delay (d2), s/veh        | 582.3 | 0.0  | 0.6  | 307.0 | 0.0  | 0.2  | 13.3 | 0.6  | 0.1  | 0.3  | 0.2  | 0.0  |
| Initial Q Delay(d3), s/veh    | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 16.5  | 0.0  | 3.0  | 10.1  | 0.0  | 1.4  | 4.4  | 4.3  | 0.5  | 3.4  | 10.5 | 0.7  |
| Unsig. Movement Delay, s/veh  |       |      |      |       |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh         | 623.1 | 0.0  | 31.7 | 347.1 | 0.0  | 29.6 | 57.1 | 15.8 | 13.0 | 44.5 | 20.0 | 13.4 |
| LnGrp LOS                     | F     |      | C    | F     |      | C    | E    | B    | B    | D    | C    | B    |
| Approach Vol, veh/h           | 340   |      |      | 216   |      |      | 826  |      |      | 1442 |      |      |
| Approach Delay, s/veh         | 372.6 |      |      | 241.3 |      |      | 23.5 |      |      | 22.2 |      |      |
| Approach LOS                  | F     |      |      | F     |      |      | C    |      |      | C    |      |      |
| Timer - Assigned Phs          | 1     | 2    |      | 4     | 5    | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s      | 5.0   | 55.0 |      | 30.0  | 15.6 | 54.4 |      | 30.0 |      |      |      |      |
| Change Period (Y+Rc), s       | 5.1   | 5.1  |      | 4.6   | 5.1  | 5.1  |      | 4.6  |      |      |      |      |
| Max Green Setting (Gmax), s   | 16.8  | 43.0 |      | 25.4  | 13.9 | 45.9 |      | 25.4 |      |      |      |      |
| Max Q Clear Time (g_c+I10), s | 11.0  | 12.9 |      | 27.4  | 10.6 | 29.4 |      | 27.4 |      |      |      |      |
| Green Ext Time (p_c), s       | 0.1   | 4.7  |      | 0.0   | 0.1  | 8.3  |      | 0.0  |      |      |      |      |
| <b>Intersection Summary</b>   |       |      |      |       |      |      |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh  | 81.5  |      |      |       |      |      |      |      |      |      |      |      |
| HCM 7th LOS                   | F     |      |      |       |      |      |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 9: Emerald Drive/North Avenue & Olive Drive/Olive Avenue

Future Year Conditions  
AM Peak Hour

|                                                                      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                                                             | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                  |  |  |  |  |  |                                                                                   |  |  |  |                                                                                     |    |    |
| Traffic Volume (veh/h)                                               | 150                                                                               | 300                                                                               | 480                                                                               | 170                                                                               | 390                                                                               | 30                                                                                | 550                                                                               | 300                                                                               | 80                                                                                | 50                                                                                  | 330                                                                                 | 140                                                                                 |
| Future Volume (veh/h)                                                | 150                                                                               | 300                                                                               | 480                                                                               | 170                                                                               | 390                                                                               | 30                                                                                | 550                                                                               | 300                                                                               | 80                                                                                | 50                                                                                  | 330                                                                                 | 140                                                                                 |
| Initial Q (Qb), veh                                                  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width 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                                                                                |
| Ped-Bike Adj(A_pbT)                                                  | 1.00                                                                              |                                                                                   | 0.97                                                                              | 1.00                                                                              |                                                                                   | 0.97                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj                                                     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                               | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                                | 1894                                                                                | 1894                                                                                |
| Adj Flow Rate, veh/h                                                 | 158                                                                               | 316                                                                               | 379                                                                               | 179                                                                               | 411                                                                               | 21                                                                                | 448                                                                               | 500                                                                               | 73                                                                                | 53                                                                                  | 347                                                                                 | 126                                                                                 |
| Peak Hour Factor                                                     | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                           | 186                                                                               | 377                                                                               | 783                                                                               | 186                                                                               | 692                                                                               | 35                                                                                | 533                                                                               | 559                                                                               | 467                                                                               | 53                                                                                  | 347                                                                                 | 340                                                                                 |
| Arrive On Green                                                      | 0.10                                                                              | 0.20                                                                              | 0.20                                                                              | 0.10                                                                              | 0.20                                                                              | 0.20                                                                              | 0.30                                                                              | 0.30                                                                              | 0.30                                                                              | 0.21                                                                                | 0.21                                                                                | 0.21                                                                                |
| Sat Flow, veh/h                                                      | 1804                                                                              | 1894                                                                              | 1552                                                                              | 1804                                                                              | 3478                                                                              | 177                                                                               | 1804                                                                              | 1894                                                                              | 1580                                                                              | 249                                                                                 | 1632                                                                                | 1602                                                                                |
| Grp Volume(v), veh/h                                                 | 158                                                                               | 316                                                                               | 379                                                                               | 179                                                                               | 212                                                                               | 220                                                                               | 448                                                                               | 500                                                                               | 73                                                                                | 400                                                                                 | 0                                                                                   | 126                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                             | 1804                                                                              | 1894                                                                              | 1552                                                                              | 1804                                                                              | 1800                                                                              | 1855                                                                              | 1804                                                                              | 1894                                                                              | 1580                                                                              | 1882                                                                                | 0                                                                                   | 1602                                                                                |
| Q Serve(g_s), s                                                      | 9.4                                                                               | 17.6                                                                              | 17.9                                                                              | 10.8                                                                              | 11.7                                                                              | 11.8                                                                              | 25.6                                                                              | 27.7                                                                              | 3.7                                                                               | 23.3                                                                                | 0.0                                                                                 | 7.4                                                                                 |
| Cycle Q Clear(g_c), s                                                | 9.4                                                                               | 17.6                                                                              | 17.9                                                                              | 10.8                                                                              | 11.7                                                                              | 11.8                                                                              | 25.6                                                                              | 27.7                                                                              | 3.7                                                                               | 23.3                                                                                | 0.0                                                                                 | 7.4                                                                                 |
| Prop In Lane                                                         | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.10                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.13                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                               | 186                                                                               | 377                                                                               | 783                                                                               | 186                                                                               | 358                                                                               | 369                                                                               | 533                                                                               | 559                                                                               | 467                                                                               | 400                                                                                 | 0                                                                                   | 340                                                                                 |
| V/C Ratio(X)                                                         | 0.85                                                                              | 0.84                                                                              | 0.48                                                                              | 0.96                                                                              | 0.59                                                                              | 0.60                                                                              | 0.84                                                                              | 0.89                                                                              | 0.16                                                                              | 1.00                                                                                | 0.00                                                                                | 0.37                                                                                |
| Avail Cap(c_a), veh/h                                                | 186                                                                               | 404                                                                               | 805                                                                               | 186                                                                               | 384                                                                               | 396                                                                               | 593                                                                               | 623                                                                               | 520                                                                               | 400                                                                                 | 0                                                                                   | 340                                                                                 |
| HCM Platoon Ratio                                                    | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                             | 48.4                                                                              | 42.3                                                                              | 18.6                                                                              | 49.0                                                                              | 39.9                                                                              | 39.9                                                                              | 36.3                                                                              | 37.0                                                                              | 28.6                                                                              | 43.2                                                                                | 0.0                                                                                 | 37.0                                                                                |
| Incr Delay (d2), s/veh                                               | 29.4                                                                              | 15.6                                                                              | 1.0                                                                               | 55.3                                                                              | 3.7                                                                               | 3.7                                                                               | 9.7                                                                               | 14.4                                                                              | 0.2                                                                               | 45.3                                                                                | 0.0                                                                                 | 0.5                                                                                 |
| Initial Q Delay(d3), s/veh                                           | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                             | 5.7                                                                               | 9.7                                                                               | 10.6                                                                              | 7.7                                                                               | 5.5                                                                               | 5.7                                                                               | 12.4                                                                              | 14.7                                                                              | 1.4                                                                               | 15.6                                                                                | 0.0                                                                                 | 2.9                                                                                 |
| Unsig. Movement Delay, s/veh                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                | 77.8                                                                              | 57.8                                                                              | 19.6                                                                              | 104.3                                                                             | 43.6                                                                              | 43.6                                                                              | 46.0                                                                              | 51.4                                                                              | 28.7                                                                              | 88.5                                                                                | 0.0                                                                                 | 37.5                                                                                |
| LnGrp LOS                                                            | E                                                                                 | E                                                                                 | B                                                                                 | F                                                                                 | D                                                                                 | D                                                                                 | D                                                                                 | D                                                                                 | C                                                                                 | F                                                                                   |                                                                                     | D                                                                                   |
| Approach Vol, veh/h                                                  | 853                                                                               |                                                                                   |                                                                                   |                                                                                   | 611                                                                               |                                                                                   | 1021                                                                              |                                                                                   |                                                                                   |                                                                                     | 526                                                                                 |                                                                                     |
| Approach Delay, s/veh                                                | 44.5                                                                              |                                                                                   |                                                                                   |                                                                                   | 61.4                                                                              |                                                                                   | 47.4                                                                              |                                                                                   |                                                                                   |                                                                                     | 76.3                                                                                |                                                                                     |
| Approach LOS                                                         | D                                                                                 |                                                                                   |                                                                                   |                                                                                   | E                                                                                 |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                     | E                                                                                   |                                                                                     |
| Timer - Assigned Phs                                                 | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                             | 6.0                                                                               | 27.2                                                                              | 37.8                                                                              |                                                                                   | 16.0                                                                              | 27.2                                                                              | 28.7                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                              | 4.7                                                                               | 5.4                                                                               | 5.4                                                                               |                                                                                   | 4.7                                                                               | 5.4                                                                               | 5.4                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                          | 1.3                                                                               | 23.4                                                                              | 36.1                                                                              |                                                                                   | 11.3                                                                              | 23.4                                                                              | 23.3                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+1/2g), s                                       | 11.2                                                                              | 19.9                                                                              | 29.7                                                                              |                                                                                   | 11.4                                                                              | 13.8                                                                              | 25.3                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                              | 0.0                                                                               | 1.8                                                                               | 2.7                                                                               |                                                                                   | 0.0                                                                               | 2.8                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                         |                                                                                   |                                                                                   | 54.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                          |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| User approved pedestrian interval to be less than phase max green.   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| User approved volume balancing among the lanes for turning movement. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 10: N Melrose Dr & Olive Ave

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                               | SBR                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 180                                                                               | 300                                                                               | 450                                                                               | 90                                                                                | 250                                                                               | 150                                                                               | 300                                                                               | 920                                                                               | 100                                                                               | 200                                                                               | 1700                                                                              | 190                                                                                 |
| Future Volume (veh/h)        | 180                                                                               | 300                                                                               | 450                                                                               | 90                                                                                | 250                                                                               | 150                                                                               | 300                                                                               | 920                                                                               | 100                                                                               | 200                                                                               | 1700                                                                              | 190                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   |
| Lane Width Adj.              | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 0.94                                                                              | 1.00                                                                              |                                                                                   | 0.97                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1856                                                                              | 1930                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                |
| Adj Flow Rate, veh/h         | 189                                                                               | 316                                                                               | 379                                                                               | 95                                                                                | 263                                                                               | 126                                                                               | 316                                                                               | 968                                                                               | 94                                                                                | 211                                                                               | 1789                                                                              | 179                                                                                 |
| Peak Hour Factor             | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   |
| Cap, veh/h                   | 129                                                                               | 501                                                                               | 414                                                                               | 119                                                                               | 511                                                                               | 623                                                                               | 177                                                                               | 1663                                                                              | 161                                                                               | 247                                                                               | 1880                                                                              | 187                                                                                 |
| Arrive On Green              | 0.07                                                                              | 0.27                                                                              | 0.27                                                                              | 0.07                                                                              | 0.26                                                                              | 0.26                                                                              | 0.10                                                                              | 0.35                                                                              | 0.35                                                                              | 0.14                                                                              | 0.40                                                                              | 0.40                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 1856                                                                              | 1532                                                                              | 1767                                                                              | 1930                                                                              | 1524                                                                              | 1767                                                                              | 4692                                                                              | 454                                                                               | 1767                                                                              | 4659                                                                              | 464                                                                                 |
| Grp Volume(v), veh/h         | 189                                                                               | 316                                                                               | 379                                                                               | 95                                                                                | 263                                                                               | 126                                                                               | 316                                                                               | 696                                                                               | 366                                                                               | 211                                                                               | 1294                                                                              | 674                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1856                                                                              | 1532                                                                              | 1767                                                                              | 1930                                                                              | 1524                                                                              | 1767                                                                              | 1689                                                                              | 1769                                                                              | 1767                                                                              | 1689                                                                              | 1746                                                                                |
| Q Serve(g_s), s              | 8.0                                                                               | 16.5                                                                              | 26.4                                                                              | 5.8                                                                               | 12.8                                                                              | 1.1                                                                               | 11.0                                                                              | 18.4                                                                              | 18.5                                                                              | 12.8                                                                              | 40.8                                                                              | 41.2                                                                                |
| Cycle Q Clear(g_c), s        | 8.0                                                                               | 16.5                                                                              | 26.4                                                                              | 5.8                                                                               | 12.8                                                                              | 1.1                                                                               | 11.0                                                                              | 18.4                                                                              | 18.5                                                                              | 12.8                                                                              | 40.8                                                                              | 41.2                                                                                |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.26                                                                              | 1.00                                                                              |                                                                                   | 0.27                                                                                |
| Lane Grp Cap(c), veh/h       | 129                                                                               | 501                                                                               | 414                                                                               | 119                                                                               | 511                                                                               | 623                                                                               | 177                                                                               | 1197                                                                              | 627                                                                               | 247                                                                               | 1363                                                                              | 704                                                                                 |
| V/C Ratio(X)                 | 1.47                                                                              | 0.63                                                                              | 0.92                                                                              | 0.80                                                                              | 0.51                                                                              | 0.20                                                                              | 1.79                                                                              | 0.58                                                                              | 0.58                                                                              | 0.85                                                                              | 0.95                                                                              | 0.96                                                                                |
| Avail Cap(c_a), veh/h        | 129                                                                               | 531                                                                               | 439                                                                               | 129                                                                               | 553                                                                               | 656                                                                               | 177                                                                               | 1197                                                                              | 627                                                                               | 247                                                                               | 1363                                                                              | 704                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.10                                                                              | 0.10                                                                              | 0.10                                                                                |
| Uniform Delay (d), s/veh     | 51.0                                                                              | 35.3                                                                              | 38.9                                                                              | 50.6                                                                              | 34.4                                                                              | 10.3                                                                              | 49.5                                                                              | 28.9                                                                              | 28.9                                                                              | 46.2                                                                              | 31.7                                                                              | 31.9                                                                                |
| Incr Delay (d2), s/veh       | 249.0                                                                             | 1.9                                                                               | 22.8                                                                              | 24.6                                                                              | 0.6                                                                               | 0.1                                                                               | 376.4                                                                             | 2.1                                                                               | 3.9                                                                               | 3.0                                                                               | 2.3                                                                               | 4.6                                                                                 |
| Initial Q Delay(d3), s/veh   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 12.4                                                                              | 7.6                                                                               | 12.5                                                                              | 3.4                                                                               | 6.1                                                                               | 1.3                                                                               | 23.2                                                                              | 7.5                                                                               | 8.2                                                                               | 5.7                                                                               | 16.1                                                                              | 17.2                                                                                |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| LnGrp Delay(d), s/veh        | 300.0                                                                             | 37.2                                                                              | 61.7                                                                              | 75.2                                                                              | 35.0                                                                              | 10.4                                                                              | 425.9                                                                             | 30.9                                                                              | 32.8                                                                              | 49.2                                                                              | 34.0                                                                              | 36.4                                                                                |
| LnGrp LOS                    | F                                                                                 | D                                                                                 | E                                                                                 | E                                                                                 | D                                                                                 | B                                                                                 | F                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | D                                                                                   |
| Approach Vol, veh/h          | 884                                                                               |                                                                                   |                                                                                   | 484                                                                               |                                                                                   |                                                                                   | 1378                                                                              |                                                                                   |                                                                                   | 2179                                                                              |                                                                                   |                                                                                     |
| Approach Delay, s/veh        | 103.9                                                                             |                                                                                   |                                                                                   | 36.5                                                                              |                                                                                   |                                                                                   | 122.0                                                                             |                                                                                   |                                                                                   | 36.2                                                                              |                                                                                   |                                                                                     |
| Approach LOS                 | F                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 30.4                                                                              | 44.0                                                                              | 11.4                                                                              | 34.2                                                                              | 15.0                                                                              | 49.4                                                                              | 12.0                                                                              | 33.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Change Period (Y+Rc), s      | 5.0                                                                               | * 5                                                                               | 4.0                                                                               | 4.5                                                                               | 4.0                                                                               | 5.0                                                                               | 4.0                                                                               | 4.5                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Max Green Setting (Gmax), s  | 14.0                                                                              | * 39                                                                              | 8.0                                                                               | 31.5                                                                              | 11.0                                                                              | 42.0                                                                              | 8.0                                                                               | 31.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Max Q Clear Time (g_c+Tb), s | 14.8                                                                              | 20.5                                                                              | 7.8                                                                               | 28.4                                                                              | 13.0                                                                              | 43.2                                                                              | 10.0                                                                              | 14.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 6.5                                                                               | 0.0                                                                               | 0.9                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 1.5                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |

## Intersection Summary

HCM 7th Control Delay, s/veh 72.4  
HCM 7th LOS E

## Notes

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

\* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

# HCM 7th Signalized Intersection Summary 11: N Santa Fe Avenue & Vista Village Drive

Future Year Conditions  
AM Peak Hour

|                                                                    |  |  |  |  |  |  |  |  |   |  |  |  |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)                                             | 320                                                                               | 720                                                                               | 180                                                                               | 80                                                                                | 1200                                                                              | 80                                                                                | 160                                                                               | 300                                                                               | 50                                                                                 | 200                                                                                 | 650                                                                                 | 590                                                                                 |
| Future Volume (veh/h)                                              | 320                                                                               | 720                                                                               | 180                                                                               | 80                                                                                | 1200                                                                              | 80                                                                                | 160                                                                               | 300                                                                               | 50                                                                                 | 200                                                                                 | 650                                                                                 | 590                                                                                 |
| Initial Q (Qb), veh                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.                                                    | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.96                                                                                | 1.00                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)                                                | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                               | 1.00                                                                                |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                             | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1781                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h                                               | 333                                                                               | 750                                                                               | 146                                                                               | 83                                                                                | 1250                                                                              | 73                                                                                | 167                                                                               | 312                                                                               | 47                                                                                 | 208                                                                                 | 677                                                                                 | 490                                                                                 |
| Peak Hour Factor                                                   | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                               | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                |
| Percent Heavy Veh, %                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                         | 396                                                                               | 870                                                                               | 571                                                                               | 225                                                                               | 1263                                                                              | 74                                                                                | 403                                                                               | 1183                                                                              | 176                                                                                | 262                                                                                 | 1222                                                                                | 720                                                                                 |
| Arrive On Green                                                    | 0.12                                                                              | 0.25                                                                              | 0.25                                                                              | 0.13                                                                              | 0.26                                                                              | 0.26                                                                              | 0.12                                                                              | 0.38                                                                              | 0.38                                                                               | 0.08                                                                                | 0.35                                                                                | 0.35                                                                                |
| Sat Flow, veh/h                                                    | 3428                                                                              | 3526                                                                              | 1563                                                                              | 1767                                                                              | 4888                                                                              | 285                                                                               | 3428                                                                              | 3074                                                                              | 458                                                                                | 3291                                                                                | 3526                                                                                | 1552                                                                                |
| Grp Volume(v), veh/h                                               | 333                                                                               | 750                                                                               | 146                                                                               | 83                                                                                | 864                                                                               | 459                                                                               | 167                                                                               | 177                                                                               | 182                                                                                | 208                                                                                 | 677                                                                                 | 490                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                           | 1714                                                                              | 1763                                                                              | 1563                                                                              | 1767                                                                              | 1689                                                                              | 1797                                                                              | 1714                                                                              | 1763                                                                              | 1770                                                                               | 1646                                                                                | 1763                                                                                | 1552                                                                                |
| Q Serve(g_s), s                                                    | 12.4                                                                              | 26.5                                                                              | 0.0                                                                               | 5.6                                                                               | 33.1                                                                              | 33.1                                                                              | 5.9                                                                               | 9.0                                                                               | 9.1                                                                                | 8.1                                                                                 | 20.2                                                                                | 18.0                                                                                |
| Cycle Q Clear(g_c), s                                              | 12.4                                                                              | 26.5                                                                              | 0.0                                                                               | 5.6                                                                               | 33.1                                                                              | 33.1                                                                              | 5.9                                                                               | 9.0                                                                               | 9.1                                                                                | 8.1                                                                                 | 20.2                                                                                | 18.0                                                                                |
| Prop In Lane                                                       | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.16                                                                              | 1.00                                                                              |                                                                                   | 0.26                                                                               | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                             | 396                                                                               | 870                                                                               | 571                                                                               | 225                                                                               | 873                                                                               | 464                                                                               | 403                                                                               | 678                                                                               | 681                                                                                | 262                                                                                 | 1222                                                                                | 720                                                                                 |
| V/C Ratio(X)                                                       | 0.84                                                                              | 0.86                                                                              | 0.26                                                                              | 0.37                                                                              | 0.99                                                                              | 0.99                                                                              | 0.41                                                                              | 0.26                                                                              | 0.27                                                                               | 0.79                                                                                | 0.55                                                                                | 0.68                                                                                |
| Avail Cap(c_a), veh/h                                              | 675                                                                               | 1454                                                                              | 829                                                                               | 225                                                                               | 873                                                                               | 464                                                                               | 403                                                                               | 678                                                                               | 681                                                                                | 428                                                                                 | 1222                                                                                | 720                                                                                 |
| HCM Platoon Ratio                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                           | 56.3                                                                              | 46.8                                                                              | 28.9                                                                              | 51.9                                                                              | 48.0                                                                              | 48.0                                                                              | 53.2                                                                              | 27.4                                                                              | 27.4                                                                               | 58.8                                                                                | 34.3                                                                                | 10.9                                                                                |
| Incr Delay (d2), s/veh                                             | 3.6                                                                               | 1.4                                                                               | 0.1                                                                               | 0.4                                                                               | 27.7                                                                              | 38.9                                                                              | 0.3                                                                               | 0.9                                                                               | 1.0                                                                                | 4.1                                                                                 | 0.3                                                                                 | 2.2                                                                                 |
| Initial Q Delay(d3), s/veh                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                           | 5.5                                                                               | 11.5                                                                              | 3.2                                                                               | 2.5                                                                               | 16.9                                                                              | 19.5                                                                              | 2.5                                                                               | 3.9                                                                               | 4.0                                                                                | 3.5                                                                                 | 8.6                                                                                 | 5.8                                                                                 |
| Unsig. Movement Delay, s/veh                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                              | 59.9                                                                              | 48.2                                                                              | 29.0                                                                              | 52.3                                                                              | 75.7                                                                              | 86.9                                                                              | 53.5                                                                              | 28.3                                                                              | 28.4                                                                               | 62.9                                                                                | 34.7                                                                                | 13.0                                                                                |
| LnGrp LOS                                                          | E                                                                                 | D                                                                                 | C                                                                                 | D                                                                                 | E                                                                                 | F                                                                                 | D                                                                                 | C                                                                                 | C                                                                                  | E                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h                                                | 1229                                                                              |                                                                                   |                                                                                   | 1406                                                                              |                                                                                   |                                                                                   | 526                                                                               |                                                                                   |                                                                                    | 1375                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                              | 49.1                                                                              |                                                                                   |                                                                                   | 78.0                                                                              |                                                                                   |                                                                                   | 36.3                                                                              |                                                                                   |                                                                                    | 31.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                                                       | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                    | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                               | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                           | 55.4                                                                              | 55.1                                                                              | 22.0                                                                              | 37.5                                                                              | 20.4                                                                              | 50.2                                                                              | 20.4                                                                              | 39.0                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                            | 5.1                                                                               | 5.1                                                                               | 5.4                                                                               | 5.4                                                                               | 5.1                                                                               | 5.1                                                                               | 5.4                                                                               | 5.4                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                        | 16.9                                                                              | 32.9                                                                              | 5.6                                                                               | 53.6                                                                              | 9.9                                                                               | 39.9                                                                              | 25.6                                                                              | 33.6                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I10), s                                      | 11.1                                                                              | 11.1                                                                              | 7.6                                                                               | 28.5                                                                              | 7.9                                                                               | 22.2                                                                              | 14.4                                                                              | 35.1                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                            | 0.3                                                                               | 1.2                                                                               | 0.0                                                                               | 3.5                                                                               | 0.1                                                                               | 3.8                                                                               | 0.7                                                                               | 0.0                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                       | 51.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                        | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| User approved pedestrian interval to be less than phase max green. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary

12: Civic Center Drive/Hillside Terrace & Vista Village Drive/E. Vista Way

Future Year Conditions

AM Peak Hour



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT   | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|-------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |      |       |      |      |      |      |
| Traffic Volume (veh/h)       | 50   | 600  | 270  | 1150 | 1100 | 50   | 150  | 70    | 600  | 50   | 100  | 50   |
| Future Volume (veh/h)        | 50   | 600  | 270  | 1150 | 1100 | 50   | 150  | 70    | 600  | 50   | 100  | 50   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 0.97 | 1.00 |      | 0.97 | 1.00 |       | 0.99 | 1.00 |      | 0.92 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      | No   |      |      | No   |       |      | No   |      |      |
| Adj Sat Flow, veh/h/ln       | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934  | 1934 | 1934 | 1934 | 1934 |
| Adj Flow Rate, veh/h         | 53   | 632  | 226  | 1211 | 1158 | 48   | 116  | 133   | 443  | 53   | 105  | 42   |
| Peak Hour Factor             | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95  | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3     | 3    | 3    | 3    | 3    |
| Cap, veh/h                   | 69   | 970  | 419  | 1119 | 1968 | 82   | 137  | 143   | 1268 | 81   | 160  | 64   |
| Arrive On Green              | 0.04 | 0.26 | 0.26 | 0.31 | 0.55 | 0.55 | 0.07 | 0.07  | 0.07 | 0.17 | 0.17 | 0.17 |
| Sat Flow, veh/h              | 1842 | 3674 | 1588 | 3573 | 3589 | 149  | 1842 | 1934  | 3255 | 478  | 947  | 379  |
| Grp Volume(v), veh/h         | 53   | 632  | 226  | 1211 | 592  | 614  | 116  | 133   | 443  | 200  | 0    | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1842 | 1837 | 1588 | 1786 | 1837 | 1901 | 1842 | 1934  | 1628 | 1803 | 0    | 0    |
| Q Serve(g_s), s              | 3.4  | 18.3 | 14.6 | 37.6 | 25.8 | 25.8 | 7.5  | 8.2   | 8.9  | 12.4 | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s        | 3.4  | 18.3 | 14.6 | 37.6 | 25.8 | 25.8 | 7.5  | 8.2   | 8.9  | 12.4 | 0.0  | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 | 1.00 |      | 0.08 | 1.00 |       | 1.00 | 0.26 |      | 0.21 |
| Lane Grp Cap(c), veh/h       | 69   | 970  | 419  | 1119 | 1007 | 1042 | 137  | 143   | 1268 | 305  | 0    | 0    |
| V/C Ratio(X)                 | 0.77 | 0.65 | 0.54 | 1.08 | 0.59 | 0.59 | 0.85 | 0.93  | 0.35 | 0.66 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h        | 86   | 970  | 419  | 1119 | 1007 | 1042 | 137  | 143   | 1268 | 397  | 0    | 0    |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh     | 57.2 | 39.2 | 37.9 | 41.2 | 18.1 | 18.1 | 54.9 | 55.2  | 26.1 | 46.6 | 0.0  | 0.0  |
| Incr Delay (d2), s/veh       | 21.2 | 3.4  | 4.9  | 51.9 | 2.5  | 2.4  | 36.2 | 53.4  | 0.1  | 1.9  | 0.0  | 0.0  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 2.0  | 8.5  | 6.2  | 24.2 | 11.2 | 11.5 | 4.8  | 6.1   | 4.5  | 5.8  | 0.0  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |       |      |      |      |      |
| LnGrp Delay(d), s/veh        | 78.4 | 42.6 | 42.8 | 93.1 | 20.6 | 20.5 | 91.1 | 108.7 | 26.2 | 48.4 | 0.0  | 0.0  |
| LnGrp LOS                    | E    | D    | D    | F    | C    | C    | F    | F     | C    | D    |      |      |
| Approach Vol, veh/h          | 911  |      |      | 2417 |      |      | 692  |       |      | 200  |      |      |
| Approach Delay, s/veh        | 44.8 |      |      | 56.9 |      |      | 52.9 |       |      | 48.4 |      |      |
| Approach LOS                 | D    |      |      | E    |      |      | D    |       |      | D    |      |      |
| Timer - Assigned Phs         | 1    | 2    |      | 4    | 5    | 6    |      | 8     |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 44.0 | 37.1 |      | 24.9 | 9.9  | 71.2 |      | 14.0  |      |      |      |      |
| Change Period (Y+Rc), s      | 6.4  | 5.4  |      | 4.6  | 5.4  | 5.4  |      | 5.1   |      |      |      |      |
| Max Green Setting (Gmax), s  | 37.6 | 25.6 |      | 26.4 | 5.6  | 58.6 |      | 8.9   |      |      |      |      |
| Max Q Clear Time (g_c+Q), s  | 20.3 | 20.3 |      | 14.4 | 5.4  | 27.8 |      | 10.9  |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 1.6  |      | 0.7  | 0.0  | 5.7  |      | 0.0   |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 53.2

HCM 7th LOS D

## Notes

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

User approved volume balancing among the lanes for turning movement.

Vista GPU

# HCM 7th Signalized Intersection Summary 13: E. Vista Way & Townsite Drive

Future Year Conditions  
AM Peak Hour

|                                                                                                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                                                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                                                |  |  |  |                                                                                   |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)                                                                             | 200                                                                               | 50                                                                                | 200                                                                               | 30                                                                                | 10                                                                                | 10                                                                                | 140                                                                               | 1030                                                                              | 50                                                                                | 30                                                                                  | 2100                                                                                | 150                                                                                 |
| Future Volume (veh/h)                                                                              | 200                                                                               | 50                                                                                | 200                                                                               | 30                                                                                | 10                                                                                | 10                                                                                | 140                                                                               | 1030                                                                              | 50                                                                                | 30                                                                                  | 2100                                                                                | 150                                                                                 |
| Initial Q (Qb), veh                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.                                                                                    | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.96                                                                              | 0.96                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)                                                                                | 0.98                                                                              |                                                                                   | 0.98                                                                              | 0.99                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.97                                                                              | 1.00                                                                                |                                                                                     | 0.97                                                                                |
| Parking Bus, Adj                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                                                             | 1930                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1781                                                                              | 1781                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h                                                                               | 211                                                                               | 53                                                                                | 169                                                                               | 32                                                                                | 11                                                                                | 9                                                                                 | 147                                                                               | 1084                                                                              | 48                                                                                | 32                                                                                  | 2211                                                                                | 142                                                                                 |
| Peak Hour Factor                                                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %                                                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                                                         | 292                                                                               | 385                                                                               | 320                                                                               | 225                                                                               | 70                                                                                | 307                                                                               | 124                                                                               | 3057                                                                              | 135                                                                               | 94                                                                                  | 2026                                                                                | 128                                                                                 |
| Arrive On Green                                                                                    | 0.21                                                                              | 0.21                                                                              | 0.21                                                                              | 0.21                                                                              | 0.21                                                                              | 0.21                                                                              | 0.07                                                                              | 0.62                                                                              | 0.62                                                                              | 0.05                                                                                | 0.60                                                                                | 0.60                                                                                |
| Sat Flow, veh/h                                                                                    | 1412                                                                              | 1856                                                                              | 1541                                                                              | 832                                                                               | 337                                                                               | 1479                                                                              | 1696                                                                              | 4965                                                                              | 220                                                                               | 1767                                                                                | 3360                                                                                | 213                                                                                 |
| Grp Volume(v), veh/h                                                                               | 211                                                                               | 53                                                                                | 169                                                                               | 43                                                                                | 0                                                                                 | 9                                                                                 | 147                                                                               | 737                                                                               | 395                                                                               | 32                                                                                  | 1146                                                                                | 1207                                                                                |
| Grp Sat Flow(s),veh/h/ln                                                                           | 1412                                                                              | 1856                                                                              | 1541                                                                              | 1169                                                                              | 0                                                                                 | 1479                                                                              | 1696                                                                              | 1689                                                                              | 1807                                                                              | 1767                                                                                | 1763                                                                                | 1810                                                                                |
| Q Serve(g_s), s                                                                                    | 17.6                                                                              | 2.8                                                                               | 11.7                                                                              | 2.4                                                                               | 0.0                                                                               | 0.6                                                                               | 8.8                                                                               | 12.9                                                                              | 12.9                                                                              | 2.1                                                                                 | 72.4                                                                                | 72.4                                                                                |
| Cycle Q Clear(g_c), s                                                                              | 22.8                                                                              | 2.8                                                                               | 11.7                                                                              | 5.2                                                                               | 0.0                                                                               | 0.6                                                                               | 8.8                                                                               | 12.9                                                                              | 12.9                                                                              | 2.1                                                                                 | 72.4                                                                                | 72.4                                                                                |
| Prop In Lane                                                                                       | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.74                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.12                                                                              | 1.00                                                                                |                                                                                     | 0.12                                                                                |
| Lane Grp Cap(c), veh/h                                                                             | 292                                                                               | 385                                                                               | 320                                                                               | 295                                                                               | 0                                                                                 | 307                                                                               | 124                                                                               | 2080                                                                              | 1113                                                                              | 94                                                                                  | 1063                                                                                | 1092                                                                                |
| V/C Ratio(X)                                                                                       | 0.72                                                                              | 0.14                                                                              | 0.53                                                                              | 0.15                                                                              | 0.00                                                                              | 0.03                                                                              | 1.18                                                                              | 0.35                                                                              | 0.35                                                                              | 0.34                                                                                | 1.08                                                                                | 1.11                                                                                |
| Avail Cap(c_a), veh/h                                                                              | 298                                                                               | 393                                                                               | 326                                                                               | 300                                                                               | 0                                                                                 | 313                                                                               | 124                                                                               | 2080                                                                              | 1113                                                                              | 100                                                                                 | 1063                                                                                | 1092                                                                                |
| HCM Platoon Ratio                                                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                                                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.13                                                                                | 0.13                                                                                | 0.13                                                                                |
| Uniform Delay (d), s/veh                                                                           | 49.3                                                                              | 38.8                                                                              | 42.3                                                                              | 40.0                                                                              | 0.0                                                                               | 37.9                                                                              | 55.6                                                                              | 11.3                                                                              | 11.3                                                                              | 54.8                                                                                | 23.8                                                                                | 23.8                                                                                |
| Incr Delay (d2), s/veh                                                                             | 7.7                                                                               | 0.1                                                                               | 1.2                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 137.6                                                                             | 0.5                                                                               | 0.9                                                                               | 0.1                                                                                 | 38.0                                                                                | 49.5                                                                                |
| Initial Q Delay(d3), s/veh                                                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                                                           | 6.9                                                                               | 1.3                                                                               | 4.6                                                                               | 1.1                                                                               | 0.0                                                                               | 0.2                                                                               | 8.5                                                                               | 4.7                                                                               | 5.2                                                                               | 0.9                                                                                 | 38.4                                                                                | 42.9                                                                                |
| Unsig. Movement Delay, s/veh                                                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                                              | 57.0                                                                              | 38.9                                                                              | 43.5                                                                              | 40.2                                                                              | 0.0                                                                               | 37.9                                                                              | 193.2                                                                             | 11.8                                                                              | 12.2                                                                              | 54.9                                                                                | 61.8                                                                                | 73.4                                                                                |
| LnGrp LOS                                                                                          | E                                                                                 | D                                                                                 | D                                                                                 | D                                                                                 |                                                                                   | D                                                                                 | F                                                                                 | B                                                                                 | B                                                                                 | D                                                                                   | F                                                                                   | F                                                                                   |
| Approach Vol, veh/h                                                                                | 433                                                                               |                                                                                   | 52                                                                                |                                                                                   |                                                                                   | 1279                                                                              |                                                                                   |                                                                                   | 2385                                                                              |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                                                              | 49.5                                                                              |                                                                                   | 39.8                                                                              |                                                                                   |                                                                                   | 32.8                                                                              |                                                                                   |                                                                                   | 67.5                                                                              |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                                                                                       | D                                                                                 |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                                                               | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                                                           | 15.0                                                                              | 79.0                                                                              |                                                                                   | 29.5                                                                              | 13.0                                                                              | 77.5                                                                              |                                                                                   | 29.5                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                                                            | 5.1                                                                               | * 5.1                                                                             |                                                                                   | 4.6                                                                               | 4.2                                                                               | 5.1                                                                               |                                                                                   | 4.6                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                                                        | 74.8                                                                              | * 74                                                                              |                                                                                   | 25.4                                                                              | 8.8                                                                               | 71.9                                                                              |                                                                                   | 25.4                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s                                                                       | 14.9                                                                              | 14.9                                                                              |                                                                                   | 24.8                                                                              | 10.8                                                                              | 74.4                                                                              |                                                                                   | 7.2                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                                                            | 0.0                                                                               | 5.7                                                                               |                                                                                   | 0.1                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.1                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                                                       | 54.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                                                        | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 14: Vale Terrace Drive/Anza Avenue & E. Vista Way

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               | SBR                                                                               |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations          |  |  |      |  |  |      |  |  |       |  |  |  |
| Traffic Volume (veh/h)       | 100                                                                               | 800                                                                               | 370  | 40                                                                                | 1700                                                                              | 20   | 340                                                                               | 150                                                                               | 50    | 30                                                                                | 180                                                                               | 260                                                                               |
| Future Volume (veh/h)        | 100                                                                               | 800                                                                               | 370  | 40                                                                                | 1700                                                                              | 20   | 340                                                                               | 150                                                                               | 50    | 30                                                                                | 180                                                                               | 260                                                                               |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0     | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Lane Width Adj.              | 0.96                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.04                                                                              | 1.00  | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 0.97 | 1.00                                                                              |                                                                                   | 0.97 | 1.00                                                                              |                                                                                   | 1.00  | 1.00                                                                              |                                                                                   | 0.99                                                                              |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Work Zone On Approach        | No                                                                                |                                                                                   |      |                                                                                   | No                                                                                |      |                                                                                   |                                                                                   | No    |                                                                                   |                                                                                   |                                                                                   |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1934                                                                              | 1934 | 1934                                                                              | 1934                                                                              | 1934 | 1934                                                                              | 2011                                                                              | 1934  | 1934                                                                              | 2011                                                                              | 1934                                                                              |
| Adj Flow Rate, veh/h         | 103                                                                               | 825                                                                               | 340  | 41                                                                                | 1753                                                                              | 16   | 351                                                                               | 155                                                                               | 47    | 31                                                                                | 186                                                                               | 216                                                                               |
| Peak Hour Factor             | 0.97                                                                              | 0.97                                                                              | 0.97 | 0.97                                                                              | 0.97                                                                              | 0.97 | 0.97                                                                              | 0.97                                                                              | 0.97  | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3     | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Cap, veh/h                   | 102                                                                               | 2011                                                                              | 823  | 57                                                                                | 1959                                                                              | 18   | 325                                                                               | 193                                                                               | 59    | 215                                                                               | 314                                                                               | 254                                                                               |
| Arrive On Green              | 0.06                                                                              | 0.55                                                                              | 0.55 | 0.03                                                                              | 0.53                                                                              | 0.53 | 0.09                                                                              | 0.13                                                                              | 0.13  | 0.12                                                                              | 0.16                                                                              | 0.16                                                                              |
| Sat Flow, veh/h              | 1768                                                                              | 3644                                                                              | 1492 | 1842                                                                              | 3729                                                                              | 34   | 3573                                                                              | 1480                                                                              | 449   | 1842                                                                              | 2011                                                                              | 1623                                                                              |
| Grp Volume(v), veh/h         | 103                                                                               | 797                                                                               | 368  | 41                                                                                | 862                                                                               | 907  | 351                                                                               | 0                                                                                 | 202   | 31                                                                                | 186                                                                               | 216                                                                               |
| Grp Sat Flow(s),veh/h/ln     | 1768                                                                              | 1760                                                                              | 1616 | 1842                                                                              | 1837                                                                              | 1926 | 1786                                                                              | 0                                                                                 | 1929  | 1842                                                                              | 2011                                                                              | 1623                                                                              |
| Q Serve(g_s), s              | 6.9                                                                               | 15.7                                                                              | 15.9 | 2.6                                                                               | 50.4                                                                              | 50.6 | 10.9                                                                              | 0.0                                                                               | 12.2  | 1.8                                                                               | 10.3                                                                              | 15.5                                                                              |
| Cycle Q Clear(g_c), s        | 6.9                                                                               | 15.7                                                                              | 15.9 | 2.6                                                                               | 50.4                                                                              | 50.6 | 10.9                                                                              | 0.0                                                                               | 12.2  | 1.8                                                                               | 10.3                                                                              | 15.5                                                                              |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.92 | 1.00                                                                              |                                                                                   | 0.02 | 1.00                                                                              |                                                                                   | 0.23  | 1.00                                                                              |                                                                                   | 1.00                                                                              |
| Lane Grp Cap(c), veh/h       | 102                                                                               | 1942                                                                              | 892  | 57                                                                                | 965                                                                               | 1012 | 325                                                                               | 0                                                                                 | 252   | 215                                                                               | 314                                                                               | 254                                                                               |
| V/C Ratio(X)                 | 1.01                                                                              | 0.41                                                                              | 0.41 | 0.72                                                                              | 0.89                                                                              | 0.90 | 1.08                                                                              | 0.00                                                                              | 0.80  | 0.14                                                                              | 0.59                                                                              | 0.85                                                                              |
| Avail Cap(c_a), veh/h        | 102                                                                               | 1942                                                                              | 892  | 91                                                                                | 965                                                                               | 1012 | 325                                                                               | 0                                                                                 | 437   | 215                                                                               | 385                                                                               | 311                                                                               |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Upstream Filter(I)           | 0.91                                                                              | 0.91                                                                              | 0.91 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 0.00                                                                              | 1.00  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Uniform Delay (d), s/veh     | 56.5                                                                              | 15.6                                                                              | 15.6 | 57.6                                                                              | 25.5                                                                              | 25.5 | 54.5                                                                              | 0.0                                                                               | 50.7  | 47.6                                                                              | 47.1                                                                              | 49.3                                                                              |
| Incr Delay (d2), s/veh       | 88.7                                                                              | 0.6                                                                               | 1.3  | 6.1                                                                               | 12.4                                                                              | 12.1 | 73.5                                                                              | 0.0                                                                               | 4.4   | 0.1                                                                               | 1.3                                                                               | 16.0                                                                              |
| Initial Q Delay(d3), s/veh   | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |
| %ile BackOfQ(50%),veh/ln     | 5.6                                                                               | 6.2                                                                               | 6.0  | 1.3                                                                               | 24.0                                                                              | 25.2 | 8.2                                                                               | 0.0                                                                               | 6.2   | 0.9                                                                               | 5.3                                                                               | 7.4                                                                               |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |                                                                                   |
| LnGrp Delay(d), s/veh        | 145.3                                                                             | 16.2                                                                              | 16.9 | 63.7                                                                              | 37.9                                                                              | 37.7 | 128.0                                                                             | 0.0                                                                               | 55.1  | 47.7                                                                              | 48.4                                                                              | 65.3                                                                              |
| LnGrp LOS                    | F                                                                                 | B                                                                                 | B    | E                                                                                 | D                                                                                 | D    | F                                                                                 |                                                                                   | E     | D                                                                                 | D                                                                                 | E                                                                                 |
| Approach Vol, veh/h          | 1268                                                                              |                                                                                   |      |                                                                                   | 1810                                                                              |      |                                                                                   |                                                                                   | 553   |                                                                                   | 433                                                                               |                                                                                   |
| Approach Delay, s/veh        | 26.9                                                                              |                                                                                   |      |                                                                                   | 38.4                                                                              |      |                                                                                   |                                                                                   | 101.4 |                                                                                   | 56.8                                                                              |                                                                                   |
| Approach LOS                 | C                                                                                 |                                                                                   |      |                                                                                   | D                                                                                 |      |                                                                                   |                                                                                   | F     |                                                                                   | E                                                                                 |                                                                                   |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3    | 4                                                                                 | 5                                                                                 | 6    | 7                                                                                 | 8                                                                                 |       |                                                                                   |                                                                                   |                                                                                   |
| Phs Duration (G+Y+Rc), s     | 8.8                                                                               | 71.3                                                                              | 16.0 | 23.9                                                                              | 12.0                                                                              | 68.1 | 19.1                                                                              | 20.8                                                                              |       |                                                                                   |                                                                                   |                                                                                   |
| Change Period (Y+Rc), s      | 5.1                                                                               | 5.1                                                                               | 5.1  | 5.1                                                                               | 5.1                                                                               | 5.1  | 5.1                                                                               | 5.1                                                                               |       |                                                                                   |                                                                                   |                                                                                   |
| Max Green Setting (Gmax), s  | 5.9                                                                               | 59.8                                                                              | 10.9 | 23.0                                                                              | 6.9                                                                               | 58.8 | 6.7                                                                               | 27.2                                                                              |       |                                                                                   |                                                                                   |                                                                                   |
| Max Q Clear Time (g_c+I), s  | 14.6                                                                              | 17.9                                                                              | 12.9 | 17.5                                                                              | 8.9                                                                               | 52.6 | 3.8                                                                               | 14.2                                                                              |       |                                                                                   |                                                                                   |                                                                                   |
| Green Ext Time (p_c), s      | 0.0                                                                               | 10.2                                                                              | 0.0  | 0.8                                                                               | 0.0                                                                               | 5.0  | 0.0                                                                               | 0.7                                                                               |       |                                                                                   |                                                                                   |                                                                                   |

## Intersection Summary

HCM 7th Control Delay, s/veh 45.3  
HCM 7th LOS D

## Notes

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

# HCM 7th Signalized Intersection Summary 15: Emerald Drive & 78 WB ON/78 WB OFF

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL | EBT  | EBR | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|-----|------|-----|------|-------|-------|------|------|------|------|------|------|
| Lane Configurations          |     |      |     | ↔    |       | ↔     | ↔    | ↔    |      |      | ↔    | ↔    |
| Traffic Volume (veh/h)       | 0   | 0    | 0   | 300  | 0     | 750   | 300  | 980  | 0    | 0    | 1470 | 450  |
| Future Volume (veh/h)        | 0   | 0    | 0   | 300  | 0     | 750   | 300  | 980  | 0    | 0    | 1470 | 450  |
| Initial Q (Qb), veh          |     |      |     | 0    | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              |     |      |     | 1.00 | 1.00  | 1.00  | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)          |     |      |     | 1.00 |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 0.97 |
| Parking Bus, Adj             |     |      |     | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |     |      |     | No   |       |       | No   |      |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       |     |      |     | 1856 | 0     | 1856  | 1856 | 1930 | 0    | 0    | 1856 | 1856 |
| Adj Flow Rate, veh/h         |     |      |     | 309  | 0     | 773   | 309  | 1010 | 0    | 0    | 1515 | 418  |
| Peak Hour Factor             |     |      |     | 0.97 | 0.97  | 0.97  | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, %         |     |      |     | 3    | 0     | 3     | 3    | 3    | 0    | 0    | 3    | 3    |
| Cap, veh/h                   |     |      |     | 711  | 0     | 574   | 654  | 2594 | 0    | 0    | 1865 | 509  |
| Arrive On Green              |     |      |     | 0.21 | 0.00  | 0.21  | 0.38 | 1.00 | 0.00 | 0.00 | 0.47 | 0.47 |
| Sat Flow, veh/h              |     |      |     | 3428 | 0     | 2768  | 3428 | 3763 | 0    | 0    | 4100 | 1073 |
| Grp Volume(v), veh/h         |     |      |     | 309  | 0     | 773   | 309  | 1010 | 0    | 0    | 1299 | 634  |
| Grp Sat Flow(s),veh/h/ln     |     |      |     | 1714 | 0     | 1384  | 1714 | 1833 | 0    | 0    | 1689 | 1629 |
| Q Serve(g_s), s              |     |      |     | 9.4  | 0.0   | 24.9  | 8.2  | 0.0  | 0.0  | 0.0  | 39.4 | 40.3 |
| Cycle Q Clear(g_c), s        |     |      |     | 9.4  | 0.0   | 24.9  | 8.2  | 0.0  | 0.0  | 0.0  | 39.4 | 40.3 |
| Prop In Lane                 |     |      |     | 1.00 |       | 1.00  | 1.00 |      | 0.00 | 0.00 |      | 0.66 |
| Lane Grp Cap(c), veh/h       |     |      |     | 711  | 0     | 574   | 654  | 2594 | 0    | 0    | 1601 | 772  |
| V/C Ratio(X)                 |     |      |     | 0.43 | 0.00  | 1.35  | 0.47 | 0.39 | 0.00 | 0.00 | 0.81 | 0.82 |
| Avail Cap(c_a), veh/h        |     |      |     | 711  | 0     | 574   | 666  | 2594 | 0    | 0    | 1601 | 772  |
| HCM Platoon Ratio            |     |      |     | 1.00 | 1.00  | 1.00  | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           |     |      |     | 1.00 | 0.00  | 1.00  | 0.85 | 0.85 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     |     |      |     | 41.4 | 0.0   | 47.6  | 32.5 | 0.0  | 0.0  | 0.0  | 27.0 | 27.2 |
| Incr Delay (d2), s/veh       |     |      |     | 0.4  | 0.0   | 167.1 | 0.5  | 0.4  | 0.0  | 0.0  | 4.6  | 9.6  |
| Initial Q Delay(d3), s/veh   |     |      |     | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |     |      |     | 4.0  | 0.0   | 21.8  | 3.1  | 0.1  | 0.0  | 0.0  | 16.2 | 17.0 |
| Unsig. Movement Delay, s/veh |     |      |     |      |       |       |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        |     |      |     | 41.8 | 0.0   | 214.6 | 33.0 | 0.4  | 0.0  | 0.0  | 31.5 | 36.8 |
| LnGrp LOS                    |     |      |     | D    |       | F     | C    | A    |      |      | C    | D    |
| Approach Vol, veh/h          |     |      |     |      | 1082  |       |      | 1319 |      |      | 1933 |      |
| Approach Delay, s/veh        |     |      |     |      | 165.3 |       |      | 8.0  |      |      | 33.2 |      |
| Approach LOS                 |     |      |     |      | F     |       |      | A    |      |      | C    |      |
| Timer - Assigned Phs         |     | 2    |     |      | 5     | 6     |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |     | 90.0 |     |      | 28.0  | 62.0  |      | 30.0 |      |      |      |      |
| Change Period (Y+Rc), s      |     | 5.1  |     |      | 5.1   | * 5.1 |      | 5.1  |      |      |      |      |
| Max Green Setting (Gmax), s  |     | 84.9 |     |      | 23.3  | * 57  |      | 24.9 |      |      |      |      |
| Max Q Clear Time (g_c+l1), s |     | 2.0  |     |      | 10.2  | 42.3  |      | 26.9 |      |      |      |      |
| Green Ext Time (p_c), s      |     | 9.2  |     |      | 0.9   | 10.9  |      | 0.0  |      |      |      |      |

|                              |  |  |  |      |  |  |  |  |  |  |  |  |
|------------------------------|--|--|--|------|--|--|--|--|--|--|--|--|
| <b>Intersection Summary</b>  |  |  |  |      |  |  |  |  |  |  |  |  |
| HCM 7th Control Delay, s/veh |  |  |  | 58.5 |  |  |  |  |  |  |  |  |
| HCM 7th LOS                  |  |  |  | E    |  |  |  |  |  |  |  |  |

|                                                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>Notes</b>                                                                                       |  |  |  |  |  |  |  |  |  |  |  |  |
| * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier. |  |  |  |  |  |  |  |  |  |  |  |  |

# HCM 7th Signalized Intersection Summary 16: Emerald Drive & 78 EB OFF/78 EB ON

Future Year Conditions  
AM Peak Hour



| Movement                      | EBL   | EBT  | EBR   | WBL  | WBT | WBR | NBL   | NBT  | NBR  | SBL   | SBT  | SBR  |
|-------------------------------|-------|------|-------|------|-----|-----|-------|------|------|-------|------|------|
| Lane Configurations           | ↰↱    |      | ↱     |      |     |     |       | ↰↱↲  |      | ↰↱    | ↰↱   |      |
| Traffic Volume (veh/h)        | 330   | 0    | 230   | 0    | 0   | 0   | 0     | 950  | 180  | 750   | 1020 | 0    |
| Future Volume (veh/h)         | 330   | 0    | 230   | 0    | 0   | 0   | 0     | 950  | 180  | 750   | 1020 | 0    |
| Initial Q (Qb), veh           | 0     | 0    | 0     |      |     |     | 0     | 0    | 0    | 0     | 0    | 0    |
| Lane Width Adj.               | 1.04  | 1.00 | 1.04  |      |     |     | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)           | 1.00  |      | 1.00  |      |     |     | 1.00  |      | 1.00 | 1.00  |      | 1.00 |
| Parking Bus, Adj              | 1.00  | 1.00 | 1.00  |      |     |     | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Work Zone On Approach         | No    |      |       |      |     |     | No    |      |      | No    |      |      |
| Adj Sat Flow, veh/h/ln        | 1930  | 0    | 1930  |      |     |     | 0     | 1856 | 1856 | 1856  | 1856 | 0    |
| Adj Flow Rate, veh/h          | 347   | 0    | 189   |      |     |     | 0     | 1000 | 168  | 789   | 1074 | 0    |
| Peak Hour Factor              | 0.95  | 0.95 | 0.95  |      |     |     | 0.95  | 0.95 | 0.95 | 0.95  | 0.95 | 0.95 |
| Percent Heavy Veh, %          | 3     | 0    | 3     |      |     |     | 0     | 3    | 3    | 3     | 3    | 0    |
| Cap, veh/h                    | 383   | 0    | 176   |      |     |     | 0     | 2726 | 457  | 494   | 2847 | 0    |
| Arrive On Green               | 0.11  | 0.00 | 0.11  |      |     |     | 0.00  | 1.00 | 1.00 | 0.29  | 1.00 | 0.00 |
| Sat Flow, veh/h               | 3565  | 0    | 1635  |      |     |     | 0     | 4535 | 732  | 3428  | 3618 | 0    |
| Grp Volume(v), veh/h          | 347   | 0    | 189   |      |     |     | 0     | 773  | 395  | 789   | 1074 | 0    |
| Grp Sat Flow(s), veh/h/ln     | 1783  | 0    | 1635  |      |     |     | 0     | 1689 | 1723 | 1714  | 1763 | 0    |
| Q Serve(g_s), s               | 11.5  | 0.0  | 12.9  |      |     |     | 0.0   | 0.0  | 0.0  | 17.3  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s         | 11.5  | 0.0  | 12.9  |      |     |     | 0.0   | 0.0  | 0.0  | 17.3  | 0.0  | 0.0  |
| Prop In Lane                  | 1.00  |      | 1.00  |      |     |     | 0.00  |      | 0.42 | 1.00  |      | 0.00 |
| Lane Grp Cap(c), veh/h        | 383   | 0    | 176   |      |     |     | 0     | 2108 | 1075 | 494   | 2847 | 0    |
| V/C Ratio(X)                  | 0.91  | 0.00 | 1.08  |      |     |     | 0.00  | 0.37 | 0.37 | 1.60  | 0.38 | 0.00 |
| Avail Cap(c_a), veh/h         | 383   | 0    | 176   |      |     |     | 0     | 2108 | 1075 | 494   | 2847 | 0    |
| HCM Platoon Ratio             | 1.00  | 1.00 | 1.00  |      |     |     | 1.00  | 2.00 | 2.00 | 2.00  | 2.00 | 1.00 |
| Upstream Filter(I)            | 1.00  | 0.00 | 1.00  |      |     |     | 0.00  | 0.82 | 0.82 | 0.47  | 0.47 | 0.00 |
| Uniform Delay (d), s/veh      | 52.9  | 0.0  | 53.6  |      |     |     | 0.0   | 0.0  | 0.0  | 42.7  | 0.0  | 0.0  |
| Incr Delay (d2), s/veh        | 23.8  | 0.0  | 89.3  |      |     |     | 0.0   | 0.4  | 0.8  | 272.9 | 0.2  | 0.0  |
| Initial Q Delay(d3), s/veh    | 0.0   | 0.0  | 0.0   |      |     |     | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 6.4   | 0.0  | 9.6   |      |     |     | 0.0   | 0.1  | 0.2  | 24.8  | 0.1  | 0.0  |
| Unsig. Movement Delay, s/veh  |       |      |       |      |     |     |       |      |      |       |      |      |
| LnGrp Delay(d), s/veh         | 76.7  | 0.0  | 142.8 |      |     |     | 0.0   | 0.4  | 0.8  | 315.6 | 0.2  | 0.0  |
| LnGrp LOS                     | E     |      | F     |      |     |     |       | A    | A    | F     | A    |      |
| Approach Vol, veh/h           | 536   |      |       |      |     |     | 1168  |      |      | 1863  |      |      |
| Approach Delay, s/veh         | 100.0 |      |       |      |     |     | 0.5   |      |      | 133.7 |      |      |
| Approach LOS                  | F     |      |       |      |     |     | A     |      |      | F     |      |      |
| Timer - Assigned Phs          | 1     | 2    |       | 4    |     |     | 6     |      |      |       |      |      |
| Phs Duration (G+Y+Rc), s      | 22.0  | 80.0 |       | 18.0 |     |     | 102.0 |      |      |       |      |      |
| Change Period (Y+Rc), s       | 4.7   | 5.1  |       | 5.1  |     |     | 5.1   |      |      |       |      |      |
| Max Green Setting (Gmax), s   | 7.3   | 74.9 |       | 12.9 |     |     | 96.9  |      |      |       |      |      |
| Max Q Clear Time (g_c+119, s) | 119.3 | 2.0  |       | 14.9 |     |     | 2.0   |      |      |       |      |      |
| Green Ext Time (p_c), s       | 0.0   | 6.0  |       | 0.0  |     |     | 6.0   |      |      |       |      |      |
| <b>Intersection Summary</b>   |       |      |       |      |     |     |       |      |      |       |      |      |
| HCM 7th Control Delay, s/veh  | 85.1  |      |       |      |     |     |       |      |      |       |      |      |
| HCM 7th LOS                   | F     |      |       |      |     |     |       |      |      |       |      |      |

# HCM 7th Signalized Intersection Summary 17: Emerald Drive & Hacienda Drive

Future Year Conditions  
AM Peak Hour

|                                                                                                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                                                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                                                |  |  |                                                                                   |  |  |  |  |  |                                                                                    |  |  |  |
| Traffic Volume (veh/h)                                                                             | 170                                                                               | 140                                                                               | 50                                                                                | 60                                                                                | 200                                                                               | 300                                                                               | 90                                                                                | 660                                                                               | 120                                                                                | 300                                                                                 | 580                                                                                 | 370                                                                                 |
| Future Volume (veh/h)                                                                              | 170                                                                               | 140                                                                               | 50                                                                                | 60                                                                                | 200                                                                               | 300                                                                               | 90                                                                                | 660                                                                               | 120                                                                                | 300                                                                                 | 580                                                                                 | 370                                                                                 |
| Initial Q (Qb), veh                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.                                                                                    | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.96                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.04                                                                                |
| Ped-Bike Adj(A_pbT)                                                                                | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                                                             | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1781                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1930                                                                                |
| Adj Flow Rate, veh/h                                                                               | 125                                                                               | 223                                                                               | 48                                                                                | 63                                                                                | 211                                                                               | 221                                                                               | 95                                                                                | 695                                                                               | 110                                                                                | 316                                                                                 | 611                                                                                 | 321                                                                                 |
| Peak Hour Factor                                                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                               | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %                                                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                                                         | 180                                                                               | 303                                                                               | 64                                                                                | 235                                                                               | 247                                                                               | 368                                                                               | 117                                                                               | 818                                                                               | 129                                                                                | 1103                                                                                | 1855                                                                                | 849                                                                                 |
| Arrive On Green                                                                                    | 0.10                                                                              | 0.10                                                                              | 0.10                                                                              | 0.13                                                                              | 0.13                                                                              | 0.13                                                                              | 0.07                                                                              | 0.27                                                                              | 0.27                                                                               | 0.11                                                                                | 0.17                                                                                | 0.17                                                                                |
| Sat Flow, veh/h                                                                                    | 1767                                                                              | 2968                                                                              | 626                                                                               | 1767                                                                              | 1856                                                                              | 2768                                                                              | 1696                                                                              | 3048                                                                              | 482                                                                                | 3428                                                                                | 3526                                                                                | 1614                                                                                |
| Grp Volume(v), veh/h                                                                               | 125                                                                               | 138                                                                               | 133                                                                               | 63                                                                                | 211                                                                               | 221                                                                               | 95                                                                                | 402                                                                               | 403                                                                                | 316                                                                                 | 611                                                                                 | 321                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                                                           | 1767                                                                              | 1856                                                                              | 1739                                                                              | 1767                                                                              | 1856                                                                              | 1384                                                                              | 1696                                                                              | 1763                                                                              | 1768                                                                               | 1714                                                                                | 1763                                                                                | 1614                                                                                |
| Q Serve(g_s), s                                                                                    | 8.2                                                                               | 8.6                                                                               | 9.0                                                                               | 3.8                                                                               | 13.3                                                                              | 9.0                                                                               | 6.6                                                                               | 25.9                                                                              | 26.0                                                                               | 10.2                                                                                | 18.2                                                                                | 21.1                                                                                |
| Cycle Q Clear(g_c), s                                                                              | 8.2                                                                               | 8.6                                                                               | 9.0                                                                               | 3.8                                                                               | 13.3                                                                              | 9.0                                                                               | 6.6                                                                               | 25.9                                                                              | 26.0                                                                               | 10.2                                                                                | 18.2                                                                                | 21.1                                                                                |
| Prop In Lane                                                                                       | 1.00                                                                              |                                                                                   | 0.36                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.27                                                                               | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                                                             | 180                                                                               | 189                                                                               | 177                                                                               | 235                                                                               | 247                                                                               | 368                                                                               | 117                                                                               | 473                                                                               | 474                                                                                | 1103                                                                                | 1855                                                                                | 849                                                                                 |
| V/C Ratio(X)                                                                                       | 0.69                                                                              | 0.73                                                                              | 0.75                                                                              | 0.27                                                                              | 0.86                                                                              | 0.60                                                                              | 0.81                                                                              | 0.85                                                                              | 0.85                                                                               | 0.29                                                                                | 0.33                                                                                | 0.38                                                                                |
| Avail Cap(c_a), veh/h                                                                              | 303                                                                               | 319                                                                               | 298                                                                               | 274                                                                               | 288                                                                               | 429                                                                               | 134                                                                               | 615                                                                               | 617                                                                                | 1103                                                                                | 1855                                                                                | 849                                                                                 |
| HCM Platoon Ratio                                                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.33                                                                                | 0.33                                                                                | 0.33                                                                                |
| Upstream Filter(I)                                                                                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                |
| Uniform Delay (d), s/veh                                                                           | 52.1                                                                              | 52.3                                                                              | 52.4                                                                              | 46.8                                                                              | 50.9                                                                              | 49.0                                                                              | 55.1                                                                              | 41.6                                                                              | 41.6                                                                               | 40.9                                                                                | 31.0                                                                                | 32.2                                                                                |
| Incr Delay (d2), s/veh                                                                             | 3.5                                                                               | 4.0                                                                               | 4.8                                                                               | 0.4                                                                               | 18.6                                                                              | 1.4                                                                               | 25.9                                                                              | 17.1                                                                              | 17.2                                                                               | 0.1                                                                                 | 0.4                                                                                 | 1.2                                                                                 |
| Initial Q Delay(d3), s/veh                                                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                                                           | 8.8                                                                               | 4.2                                                                               | 4.1                                                                               | 1.7                                                                               | 7.4                                                                               | 3.1                                                                               | 3.7                                                                               | 13.3                                                                              | 13.4                                                                               | 4.6                                                                                 | 8.7                                                                                 | 9.4                                                                                 |
| Unsig. Movement Delay, s/veh                                                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                                              | 55.6                                                                              | 56.2                                                                              | 57.2                                                                              | 47.2                                                                              | 69.4                                                                              | 50.4                                                                              | 81.0                                                                              | 58.7                                                                              | 58.8                                                                               | 41.0                                                                                | 31.5                                                                                | 33.4                                                                                |
| LnGrp LOS                                                                                          | E                                                                                 | E                                                                                 | E                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 | F                                                                                 | E                                                                                 | E                                                                                  | D                                                                                   | C                                                                                   | C                                                                                   |
| Approach Vol, veh/h                                                                                | 396                                                                               |                                                                                   |                                                                                   | 495                                                                               |                                                                                   |                                                                                   | 900                                                                               |                                                                                   |                                                                                    | 1248                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                                                              | 56.3                                                                              |                                                                                   |                                                                                   | 58.1                                                                              |                                                                                   |                                                                                   | 61.1                                                                              |                                                                                   |                                                                                    | 34.4                                                                                |                                                                                     |                                                                                     |
| Approach LOS                                                                                       | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                                                               | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |                                                                                   | 8                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                                                           | 43.7                                                                              | 37.3                                                                              |                                                                                   | 21.4                                                                              | 12.8                                                                              | 68.2                                                                              |                                                                                   | 17.6                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                                                            | 5.1                                                                               | * 5.1                                                                             |                                                                                   | 5.4                                                                               | 4.5                                                                               | 5.1                                                                               |                                                                                   | 5.4                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                                                        | 43.5                                                                              | * 42                                                                              |                                                                                   | 18.6                                                                              | 9.5                                                                               | 50.9                                                                              |                                                                                   | 20.6                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I), s                                                                        | 112.2                                                                             | 28.0                                                                              |                                                                                   | 15.3                                                                              | 8.6                                                                               | 23.1                                                                              |                                                                                   | 11.0                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                                                            | 0.5                                                                               | 4.2                                                                               |                                                                                   | 0.6                                                                               | 0.0                                                                               | 5.7                                                                               |                                                                                   | 1.0                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                                                       | 49.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                                                        | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| User approved volume balancing among the lanes for turning movement.                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 18: SR-78 WB On-Ramp & W Vista Way

Future Year Conditions  
AM Peak Hour



| Movement                                                                                                 | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL | NBT | NBR | SBL | SBT | SBR |
|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|
| Lane Configurations                                                                                      |  |  |      |  |  |      |     |     |     |     |     |     |
| Traffic Volume (veh/h)                                                                                   | 0                                                                                 | 570                                                                               | 180  | 800                                                                               | 550                                                                               | 0    | 0   | 0   | 0   | 0   | 0   | 0   |
| Future Volume (veh/h)                                                                                    | 0                                                                                 | 570                                                                               | 180  | 800                                                                               | 550                                                                               | 0    | 0   | 0   | 0   | 0   | 0   | 0   |
| Initial Q (Qb), veh                                                                                      | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    |     |     |     |     |     |     |
| Lane Width Adj.                                                                                          | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |     |     |     |     |     |     |
| Ped-Bike Adj(A_pbT)                                                                                      | 1.00                                                                              |                                                                                   | 1.00 | 1.00                                                                              |                                                                                   | 1.00 |     |     |     |     |     |     |
| Parking Bus, Adj                                                                                         | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |     |     |     |     |     |     |
| Work Zone On Approach                                                                                    | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |      |     |     |     |     |     |     |
| Adj Sat Flow, veh/h/ln                                                                                   | 1856                                                                              | 1856                                                                              | 1856 | 1856                                                                              | 1856                                                                              | 0    |     |     |     |     |     |     |
| Adj Flow Rate, veh/h                                                                                     | 0                                                                                 | 600                                                                               | 0    | 842                                                                               | 579                                                                               | 0    |     |     |     |     |     |     |
| Peak Hour Factor                                                                                         | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95 |     |     |     |     |     |     |
| Percent Heavy Veh, %                                                                                     | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 0    |     |     |     |     |     |     |
| Cap, veh/h                                                                                               | 512                                                                               | 1022                                                                              |      | 1555                                                                              | 816                                                                               | 0    |     |     |     |     |     |     |
| Arrive On Green                                                                                          | 0.00                                                                              | 0.29                                                                              | 0.00 | 0.44                                                                              | 0.44                                                                              | 0.00 |     |     |     |     |     |     |
| Sat Flow, veh/h                                                                                          | 1767                                                                              | 3618                                                                              | 0    | 3534                                                                              | 1856                                                                              | 0    |     |     |     |     |     |     |
| Grp Volume(v), veh/h                                                                                     | 0                                                                                 | 600                                                                               | 0    | 842                                                                               | 579                                                                               | 0    |     |     |     |     |     |     |
| Grp Sat Flow(s),veh/h/ln                                                                                 | 1767                                                                              | 1763                                                                              | 0    | 1767                                                                              | 1856                                                                              | 0    |     |     |     |     |     |     |
| Q Serve(g_s), s                                                                                          | 0.0                                                                               | 5.8                                                                               | 0.0  | 7.0                                                                               | 10.2                                                                              | 0.0  |     |     |     |     |     |     |
| Cycle Q Clear(g_c), s                                                                                    | 0.0                                                                               | 5.8                                                                               | 0.0  | 7.0                                                                               | 10.2                                                                              | 0.0  |     |     |     |     |     |     |
| Prop In Lane                                                                                             | 1.00                                                                              |                                                                                   | 0.00 | 1.00                                                                              |                                                                                   | 0.00 |     |     |     |     |     |     |
| Lane Grp Cap(c), veh/h                                                                                   | 512                                                                               | 1022                                                                              |      | 1555                                                                              | 816                                                                               | 0    |     |     |     |     |     |     |
| V/C Ratio(X)                                                                                             | 0.00                                                                              | 0.59                                                                              |      | 0.54                                                                              | 0.71                                                                              | 0.00 |     |     |     |     |     |     |
| Avail Cap(c_a), veh/h                                                                                    | 512                                                                               | 1022                                                                              |      | 1555                                                                              | 816                                                                               | 0    |     |     |     |     |     |     |
| HCM Platoon Ratio                                                                                        | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |     |     |     |     |     |     |
| Upstream Filter(I)                                                                                       | 0.00                                                                              | 1.00                                                                              | 0.00 | 0.36                                                                              | 0.36                                                                              | 0.00 |     |     |     |     |     |     |
| Uniform Delay (d), s/veh                                                                                 | 0.0                                                                               | 12.1                                                                              | 0.0  | 8.2                                                                               | 9.1                                                                               | 0.0  |     |     |     |     |     |     |
| Incr Delay (d2), s/veh                                                                                   | 0.0                                                                               | 0.8                                                                               | 0.0  | 0.5                                                                               | 1.9                                                                               | 0.0  |     |     |     |     |     |     |
| Initial Q Delay(d3), s/veh                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  |     |     |     |     |     |     |
| %ile BackOfQ(50%),veh/ln                                                                                 | 0.0                                                                               | 1.7                                                                               | 0.0  | 1.6                                                                               | 2.7                                                                               | 0.0  |     |     |     |     |     |     |
| Unsig. Movement Delay, s/veh                                                                             |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| LnGrp Delay(d), s/veh                                                                                    | 0.0                                                                               | 12.9                                                                              | 0.0  | 8.7                                                                               | 11.0                                                                              | 0.0  |     |     |     |     |     |     |
| LnGrp LOS                                                                                                | B                                                                                 |                                                                                   |      | A                                                                                 |                                                                                   | B    |     |     |     |     |     |     |
| Approach Vol, veh/h                                                                                      | 600                                                                               |                                                                                   |      | 1421                                                                              |                                                                                   |      |     |     |     |     |     |     |
| Approach Delay, s/veh                                                                                    | 12.9                                                                              |                                                                                   |      | 9.7                                                                               |                                                                                   |      |     |     |     |     |     |     |
| Approach LOS                                                                                             | B                                                                                 |                                                                                   |      | A                                                                                 |                                                                                   |      |     |     |     |     |     |     |
| Timer - Assigned Phs                                                                                     | 2                                                                                 |                                                                                   |      | 6                                                                                 |                                                                                   |      |     |     |     |     |     |     |
| Phs Duration (G+Y+Rc), s                                                                                 | 17.0                                                                              |                                                                                   |      | 23.0                                                                              |                                                                                   |      |     |     |     |     |     |     |
| Change Period (Y+Rc), s                                                                                  | 5.4                                                                               |                                                                                   |      | 5.4                                                                               |                                                                                   |      |     |     |     |     |     |     |
| Max Green Setting (Gmax), s                                                                              | 11.6                                                                              |                                                                                   |      | 17.6                                                                              |                                                                                   |      |     |     |     |     |     |     |
| Max Q Clear Time (g_c+l1), s                                                                             | 7.8                                                                               |                                                                                   |      | 12.2                                                                              |                                                                                   |      |     |     |     |     |     |     |
| Green Ext Time (p_c), s                                                                                  | 1.1                                                                               |                                                                                   |      | 2.2                                                                               |                                                                                   |      |     |     |     |     |     |     |
| Intersection Summary                                                                                     |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| HCM 7th Control Delay, s/veh                                                                             |                                                                                   |                                                                                   | 10.6 |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| HCM 7th LOS                                                                                              |                                                                                   |                                                                                   | B    |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| Notes                                                                                                    |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| User approved volume balancing among the lanes for turning movement.                                     |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay. |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |

Vista GPU

# HCM 7th Signalized Intersection Summary 19: S Melrose Dr & W Vista Way

Future Year Conditions  
AM Peak Hour

|                                                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                                                |  |  |                                                                                   |  |  |  |  |  |                                                                                    |  |  |  |
| Traffic Volume (veh/h)                                                                             | 100                                                                               | 260                                                                               | 210                                                                               | 240                                                                               | 350                                                                               | 420                                                                               | 400                                                                               | 1060                                                                              | 190                                                                                | 210                                                                                 | 1700                                                                                | 600                                                                                 |
| Future Volume (veh/h)                                                                              | 100                                                                               | 260                                                                               | 210                                                                               | 240                                                                               | 350                                                                               | 420                                                                               | 400                                                                               | 1060                                                                              | 190                                                                                | 210                                                                                 | 1700                                                                                | 600                                                                                 |
| Initial Q (Qb), veh                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.                                                                                    | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)                                                                                | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                               | 1.00                                                                                |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                                                             | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h                                                                               | 105                                                                               | 274                                                                               | 195                                                                               | 253                                                                               | 368                                                                               | 353                                                                               | 421                                                                               | 1116                                                                              | 179                                                                                | 221                                                                                 | 1789                                                                                | 506                                                                                 |
| Peak Hour Factor                                                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                               | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %                                                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                                                         | 122                                                                               | 391                                                                               | 270                                                                               | 308                                                                               | 764                                                                               | 441                                                                               | 940                                                                               | 2958                                                                              | 474                                                                                | 96                                                                                  | 2263                                                                                | 692                                                                                 |
| Arrive On Green                                                                                    | 0.07                                                                              | 0.20                                                                              | 0.20                                                                              | 0.09                                                                              | 0.22                                                                              | 0.22                                                                              | 0.55                                                                              | 1.00                                                                              | 1.00                                                                               | 0.05                                                                                | 0.45                                                                                | 0.45                                                                                |
| Sat Flow, veh/h                                                                                    | 1767                                                                              | 1996                                                                              | 1375                                                                              | 3428                                                                              | 3526                                                                              | 1626                                                                              | 3428                                                                              | 4387                                                                              | 703                                                                                | 1767                                                                                | 5066                                                                                | 1549                                                                                |
| Grp Volume(v), veh/h                                                                               | 105                                                                               | 241                                                                               | 228                                                                               | 253                                                                               | 368                                                                               | 353                                                                               | 421                                                                               | 859                                                                               | 436                                                                                | 221                                                                                 | 1789                                                                                | 506                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                                                           | 1767                                                                              | 1763                                                                              | 1608                                                                              | 1714                                                                              | 1763                                                                              | 1626                                                                              | 1714                                                                              | 1689                                                                              | 1713                                                                               | 1767                                                                                | 1689                                                                                | 1549                                                                                |
| Q Serve(g_s), s                                                                                    | 7.1                                                                               | 15.3                                                                              | 15.9                                                                              | 8.7                                                                               | 11.0                                                                              | 24.3                                                                              | 8.8                                                                               | 0.0                                                                               | 0.0                                                                                | 6.5                                                                                 | 36.3                                                                                | 34.0                                                                                |
| Cycle Q Clear(g_c), s                                                                              | 7.1                                                                               | 15.3                                                                              | 15.9                                                                              | 8.7                                                                               | 11.0                                                                              | 24.3                                                                              | 8.8                                                                               | 0.0                                                                               | 0.0                                                                                | 6.5                                                                                 | 36.3                                                                                | 34.0                                                                                |
| Prop In Lane                                                                                       | 1.00                                                                              |                                                                                   | 0.86                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.41                                                                               | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                                                             | 122                                                                               | 345                                                                               | 315                                                                               | 308                                                                               | 764                                                                               | 441                                                                               | 940                                                                               | 2277                                                                              | 1155                                                                               | 96                                                                                  | 2263                                                                                | 692                                                                                 |
| V/C Ratio(X)                                                                                       | 0.86                                                                              | 0.70                                                                              | 0.72                                                                              | 0.82                                                                              | 0.48                                                                              | 0.80                                                                              | 0.45                                                                              | 0.38                                                                              | 0.38                                                                               | 2.31                                                                                | 0.79                                                                                | 0.73                                                                                |
| Avail Cap(c_a), veh/h                                                                              | 122                                                                               | 345                                                                               | 315                                                                               | 351                                                                               | 764                                                                               | 441                                                                               | 940                                                                               | 2277                                                                              | 1155                                                                               | 96                                                                                  | 2263                                                                                | 692                                                                                 |
| HCM Platoon Ratio                                                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 2.00                                                                              | 2.00                                                                              | 2.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                                                 | 0.52                                                                              | 0.52                                                                              | 0.52                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 0.85                                                                              | 0.85                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                                                           | 55.3                                                                              | 44.9                                                                              | 45.2                                                                              | 53.7                                                                              | 41.1                                                                              | 40.7                                                                              | 21.7                                                                              | 0.0                                                                               | 0.0                                                                                | 56.8                                                                                | 28.4                                                                                | 30.4                                                                                |
| Incr Delay (d2), s/veh                                                                             | 24.8                                                                              | 3.4                                                                               | 4.4                                                                               | 11.4                                                                              | 0.6                                                                               | 10.4                                                                              | 0.3                                                                               | 0.4                                                                               | 0.8                                                                                | 620.4                                                                               | 2.9                                                                                 | 6.7                                                                                 |
| Initial Q Delay(d3), s/veh                                                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                                                           | 8.9                                                                               | 6.8                                                                               | 6.6                                                                               | 4.2                                                                               | 4.7                                                                               | 10.7                                                                              | 3.0                                                                               | 0.1                                                                               | 0.3                                                                                | 19.3                                                                                | 14.5                                                                                | 13.4                                                                                |
| Unsig. Movement Delay, s/veh                                                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                                              | 80.1                                                                              | 48.3                                                                              | 49.6                                                                              | 65.1                                                                              | 41.7                                                                              | 51.1                                                                              | 21.9                                                                              | 0.4                                                                               | 0.8                                                                                | 677.2                                                                               | 31.3                                                                                | 37.1                                                                                |
| LnGrp LOS                                                                                          | F                                                                                 | D                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 | D                                                                                 | C                                                                                 | A                                                                                 | A                                                                                  | F                                                                                   | C                                                                                   | D                                                                                   |
| Approach Vol, veh/h                                                                                | 574                                                                               |                                                                                   |                                                                                   | 974                                                                               |                                                                                   |                                                                                   | 1716                                                                              |                                                                                   |                                                                                    | 2516                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                                                              | 54.6                                                                              |                                                                                   |                                                                                   | 51.2                                                                              |                                                                                   |                                                                                   | 5.8                                                                               |                                                                                   |                                                                                    | 89.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                                                                                       | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                    | F                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                                                               | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                                                           | 1.0                                                                               | 86.3                                                                              | 15.3                                                                              | 29.3                                                                              | 38.3                                                                              | 59.0                                                                              | 12.8                                                                              | 31.8                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                                                            | 4.5                                                                               | 5.4                                                                               | 4.5                                                                               | 5.8                                                                               | 5.4                                                                               | * 5.4                                                                             | 4.5                                                                               | 5.8                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                                                        | 6.5                                                                               | 59.0                                                                              | 12.3                                                                              | 22.0                                                                              | 11.9                                                                              | * 54                                                                              | 8.3                                                                               | 26.0                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I), s                                                                        | 19.5                                                                              | 2.0                                                                               | 10.7                                                                              | 17.9                                                                              | 10.8                                                                              | 38.3                                                                              | 9.1                                                                               | 26.3                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                                                            | 0.0                                                                               | 14.6                                                                              | 0.1                                                                               | 1.1                                                                               | 0.2                                                                               | 12.7                                                                              | 0.0                                                                               | 0.0                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                                                       | 54.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                                                        | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| User approved pedestrian interval to be less than phase max green.                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |

Vista GPU

# HCM 7th Signalized Intersection Summary 20: S Melrose Dr & 78 EB OFF

Future Year Conditions  
AM Peak Hour



| Movement                                                             | EBL  | EBR  | NBL  | NBT  | SBT  | SBR  |
|----------------------------------------------------------------------|------|------|------|------|------|------|
| Lane Configurations                                                  |      |      |      |      |      |      |
| Traffic Volume (veh/h)                                               | 400  | 180  | 0    | 1250 | 2150 | 0    |
| Future Volume (veh/h)                                                | 400  | 180  | 0    | 1250 | 2150 | 0    |
| Initial Q (Qb), veh                                                  | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.                                                      | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)                                                  | 1.00 | 1.00 | 1.00 |      |      | 1.00 |
| Parking Bus, Adj                                                     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach                                                | No   |      |      | No   | No   |      |
| Adj Sat Flow, veh/h/ln                                               | 1856 | 1930 | 0    | 1856 | 1856 | 0    |
| Adj Flow Rate, veh/h                                                 | 421  | 105  | 0    | 1316 | 2263 | 0    |
| Peak Hour Factor                                                     | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %                                                 | 3    | 3    | 0    | 3    | 3    | 0    |
| Cap, veh/h                                                           | 439  | 203  | 0    | 3951 | 4979 | 0    |
| Arrive On Green                                                      | 0.12 | 0.12 | 0.00 | 1.00 | 1.00 | 0.00 |
| Sat Flow, veh/h                                                      | 3534 | 1635 | 0    | 5400 | 6903 | 0    |
| Grp Volume(v), veh/h                                                 | 421  | 105  | 0    | 1316 | 2263 | 0    |
| Grp Sat Flow(s), veh/h/ln                                            | 1767 | 1635 | 0    | 1689 | 1596 | 0    |
| Q Serve(g_s), s                                                      | 14.2 | 7.2  | 0.0  | 0.0  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s                                                | 14.2 | 7.2  | 0.0  | 0.0  | 0.0  | 0.0  |
| Prop In Lane                                                         | 1.00 | 1.00 | 0.00 |      |      | 0.00 |
| Lane Grp Cap(c), veh/h                                               | 439  | 203  | 0    | 3951 | 4979 | 0    |
| V/C Ratio(X)                                                         | 0.96 | 0.52 | 0.00 | 0.33 | 0.45 | 0.00 |
| Avail Cap(c_a), veh/h                                                | 439  | 203  | 0    | 3951 | 4979 | 0    |
| HCM Platoon Ratio                                                    | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 |
| Upstream Filter(I)                                                   | 1.00 | 1.00 | 0.00 | 0.68 | 0.55 | 0.00 |
| Uniform Delay (d), s/veh                                             | 52.2 | 49.2 | 0.0  | 0.0  | 0.0  | 0.0  |
| Incr Delay (d2), s/veh                                               | 32.3 | 1.1  | 0.0  | 0.2  | 0.2  | 0.0  |
| Initial Q Delay(d3), s/veh                                           | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln                                             | 8.1  | 3.0  | 0.0  | 0.1  | 0.1  | 0.0  |
| Unsig. Movement Delay, s/veh                                         |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh                                                | 84.6 | 50.2 | 0.0  | 0.2  | 0.2  | 0.0  |
| LnGrp LOS                                                            | F    | D    |      | A    | A    |      |
| Approach Vol, veh/h                                                  | 526  |      |      | 1316 | 2263 |      |
| Approach Delay, s/veh                                                | 77.7 |      |      | 0.2  | 0.2  |      |
| Approach LOS                                                         | E    |      |      | A    | A    |      |
| Timer - Assigned Phs                                                 | 2    |      |      | 4    |      | 6    |
| Phs Duration (G+Y+Rc), s                                             | 99.0 |      |      | 21.0 |      | 99.0 |
| Change Period (Y+Rc), s                                              | 5.4  |      |      | 6.1  |      | 5.4  |
| Max Green Setting (Gmax), s                                          | 93.6 |      |      | 14.9 |      | 93.6 |
| Max Q Clear Time (g_c+l1), s                                         | 2.0  |      |      | 16.2 |      | 2.0  |
| Green Ext Time (p_c), s                                              |      | 13.0 |      | 0.0  |      | 40.1 |
| <b>Intersection Summary</b>                                          |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh                                         |      | 10.1 |      |      |      |      |
| HCM 7th LOS                                                          |      | B    |      |      |      |      |
| <b>Notes</b>                                                         |      |      |      |      |      |      |
| User approved volume balancing among the lanes for turning movement. |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 21: S Melrose Dr & Hacienda Dr

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          | ↔↔   | ↑↑   |      | ↔↔↔  | ↑↑   |      | ↔    | ↑↑↑  | ↔    | ↔↔   | ↑↑↑  |      |
| Traffic Volume (veh/h)       | 240  | 280  | 70   | 510  | 270  | 90   | 100  | 920  | 300  | 600  | 1550 | 180  |
| Future Volume (veh/h)        | 240  | 280  | 70   | 510  | 270  | 90   | 100  | 920  | 300  | 600  | 1550 | 180  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 0.97 | 1.00 |      | 1.00 | 1.00 |      | 0.98 | 1.00 |      | 0.97 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      | No   |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln       | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 |
| Adj Flow Rate, veh/h         | 253  | 295  | 63   | 537  | 284  | 84   | 105  | 968  | 253  | 632  | 1632 | 147  |
| Peak Hour Factor             | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                   | 313  | 404  | 85   | 615  | 463  | 134  | 323  | 1827 | 750  | 671  | 1760 | 158  |
| Arrive On Green              | 0.09 | 0.13 | 0.13 | 0.12 | 0.17 | 0.17 | 0.18 | 0.35 | 0.35 | 0.38 | 0.72 | 0.72 |
| Sat Flow, veh/h              | 3573 | 3004 | 631  | 5193 | 2808 | 814  | 1842 | 5279 | 1606 | 3573 | 4913 | 442  |
| Grp Volume(v), veh/h         | 253  | 178  | 180  | 537  | 184  | 184  | 105  | 968  | 253  | 632  | 1168 | 611  |
| Grp Sat Flow(s),veh/h/ln     | 1786 | 1837 | 1798 | 1731 | 1837 | 1785 | 1842 | 1760 | 1606 | 1786 | 1760 | 1836 |
| Q Serve(g_s), s              | 8.3  | 11.2 | 11.5 | 12.2 | 11.1 | 11.5 | 6.0  | 17.6 | 12.0 | 20.5 | 33.6 | 33.9 |
| Cycle Q Clear(g_c), s        | 8.3  | 11.2 | 11.5 | 12.2 | 11.1 | 11.5 | 6.0  | 17.6 | 12.0 | 20.5 | 33.6 | 33.9 |
| Prop In Lane                 | 1.00 |      | 0.35 | 1.00 |      | 0.46 | 1.00 |      | 1.00 | 1.00 |      | 0.24 |
| Lane Grp Cap(c), veh/h       | 313  | 247  | 242  | 615  | 303  | 295  | 323  | 1827 | 750  | 671  | 1261 | 658  |
| V/C Ratio(X)                 | 0.81 | 0.72 | 0.74 | 0.87 | 0.61 | 0.62 | 0.32 | 0.53 | 0.34 | 0.94 | 0.93 | 0.93 |
| Avail Cap(c_a), veh/h        | 435  | 413  | 405  | 615  | 407  | 396  | 323  | 1827 | 750  | 673  | 1337 | 698  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 2.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 0.87 | 0.87 |
| Uniform Delay (d), s/veh     | 53.7 | 49.8 | 49.9 | 52.0 | 46.5 | 46.6 | 43.2 | 31.4 | 20.4 | 36.8 | 15.7 | 15.7 |
| Incr Delay (d2), s/veh       | 5.2  | 1.5  | 1.7  | 12.7 | 0.7  | 0.8  | 0.2  | 1.1  | 1.2  | 19.4 | 11.6 | 19.4 |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 8.9  | 5.1  | 5.2  | 6.0  | 5.2  | 5.2  | 2.7  | 7.5  | 4.7  | 8.7  | 7.5  | 9.3  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        | 59.0 | 51.3 | 51.6 | 64.7 | 47.2 | 47.5 | 43.5 | 32.5 | 21.6 | 56.2 | 27.3 | 35.1 |
| LnGrp LOS                    | E    | D    | D    | E    | D    | D    | D    | C    | C    | E    | C    | D    |
| Approach Vol, veh/h          | 611  |      | 905  |      |      | 1326 |      |      | 2411 |      |      |      |
| Approach Delay, s/veh        | 54.6 |      | 57.7 |      |      | 31.3 |      |      | 36.9 |      |      |      |
| Approach LOS                 | D    |      | E    |      |      | C    |      |      | D    |      |      |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 28.9 | 47.9 | 20.6 | 22.5 | 27.5 | 49.4 | 16.9 | 26.2 |      |      |      |      |
| Change Period (Y+Rc), s      | 6.4  | 6.4  | 6.4  | 6.4  | 6.4  | 6.4  | 6.4  | 6.4  |      |      |      |      |
| Max Green Setting (Gmax), s  | 22.6 | 30.6 | 14.2 | 27.0 | 7.6  | 45.6 | 14.6 | 26.6 |      |      |      |      |
| Max Q Clear Time (g_c+Q), s  | 22.5 | 19.6 | 14.2 | 13.5 | 8.0  | 35.9 | 10.3 | 13.5 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 5.3  | 0.0  | 1.0  | 0.0  | 7.1  | 0.2  | 1.2  |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 41.1  
HCM 7th LOS D

## Notes

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

# HCM 7th Signalized Intersection Summary 22: Vista Village Drive & 78 WB ON RAMP/78 WB OFF RAMP

Future Year Conditions  
AM Peak Hour



| Movement                                                             | EBL | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|----------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|
| Lane Configurations                                                  |     |      |     | ↰    | ↱    | ↰↱   | ↰    | ↰↱   |      |      | ↰↱↱  | ↰    |
| Traffic Volume (veh/h)                                               | 0   | 0    | 0   | 520  | 10   | 670  | 90   | 690  | 0    | 0    | 1180 | 790  |
| Future Volume (veh/h)                                                | 0   | 0    | 0   | 520  | 10   | 670  | 90   | 690  | 0    | 0    | 1180 | 790  |
| Initial Q (Qb), veh                                                  |     |      |     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.                                                      |     |      |     | 1.04 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 |
| Ped-Bike Adj(A_pbT)                                                  |     |      |     | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj                                                     |     |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach                                                |     |      |     | No   |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln                                               |     |      |     | 1930 | 1930 | 1856 | 1856 | 1856 | 0    | 0    | 1856 | 1930 |
| Adj Flow Rate, veh/h                                                 |     |      |     | 555  | 0    | 489  | 95   | 726  | 0    | 0    | 1242 | 664  |
| Peak Hour Factor                                                     |     |      |     | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %                                                 |     |      |     | 3    | 3    | 3    | 3    | 3    | 0    | 0    | 3    | 3    |
| Cap, veh/h                                                           |     |      |     | 707  | 0    | 605  | 141  | 2481 | 0    | 0    | 2919 | 940  |
| Arrive On Green                                                      |     |      |     | 0.19 | 0.00 | 0.19 | 0.16 | 1.00 | 0.00 | 0.00 | 0.58 | 0.58 |
| Sat Flow, veh/h                                                      |     |      |     | 3676 | 0    | 3145 | 1767 | 3618 | 0    | 0    | 5233 | 1631 |
| Grp Volume(v), veh/h                                                 |     |      |     | 555  | 0    | 489  | 95   | 726  | 0    | 0    | 1242 | 664  |
| Grp Sat Flow(s),veh/h/ln                                             |     |      |     | 1838 | 0    | 1572 | 1767 | 1763 | 0    | 0    | 1689 | 1631 |
| Q Serve(g_s), s                                                      |     |      |     | 17.2 | 0.0  | 17.8 | 6.1  | 0.0  | 0.0  | 0.0  | 16.5 | 34.9 |
| Cycle Q Clear(g_c), s                                                |     |      |     | 17.2 | 0.0  | 17.8 | 6.1  | 0.0  | 0.0  | 0.0  | 16.5 | 34.9 |
| Prop In Lane                                                         |     |      |     | 1.00 |      | 1.00 | 1.00 |      | 0.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h                                               |     |      |     | 707  | 0    | 605  | 141  | 2481 | 0    | 0    | 2919 | 940  |
| V/C Ratio(X)                                                         |     |      |     | 0.79 | 0.00 | 0.81 | 0.67 | 0.29 | 0.00 | 0.00 | 0.43 | 0.71 |
| Avail Cap(c_a), veh/h                                                |     |      |     | 916  | 0    | 784  | 200  | 2481 | 0    | 0    | 2919 | 940  |
| HCM Platoon Ratio                                                    |     |      |     | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)                                                   |     |      |     | 1.00 | 0.00 | 1.00 | 0.73 | 0.73 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh                                             |     |      |     | 46.1 | 0.0  | 46.4 | 48.9 | 0.0  | 0.0  | 0.0  | 14.3 | 18.2 |
| Incr Delay (d2), s/veh                                               |     |      |     | 3.4  | 0.0  | 4.9  | 4.0  | 0.2  | 0.0  | 0.0  | 0.5  | 4.5  |
| Initial Q Delay(d3), s/veh                                           |     |      |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln                                             |     |      |     | 8.2  | 0.0  | 7.4  | 2.7  | 0.1  | 0.0  | 0.0  | 6.0  | 13.2 |
| Unsig. Movement Delay, s/veh                                         |     |      |     |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh                                                |     |      |     | 49.6 | 0.0  | 51.3 | 53.0 | 0.2  | 0.0  | 0.0  | 14.7 | 22.6 |
| LnGrp LOS                                                            |     |      |     | D    |      | D    | D    | A    |      |      | B    | C    |
| Approach Vol, veh/h                                                  |     |      |     |      | 1044 |      |      | 821  |      |      | 1906 |      |
| Approach Delay, s/veh                                                |     |      |     |      | 50.4 |      |      | 6.3  |      |      | 17.5 |      |
| Approach LOS                                                         |     |      |     |      | D    |      |      | A    |      |      | B    |      |
| Timer - Assigned Phs                                                 |     | 2    |     |      | 5    | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s                                             |     | 90.8 |     |      | 15.3 | 75.6 |      | 29.2 |      |      |      |      |
| Change Period (Y+Rc), s                                              |     | 6.4  |     |      | 5.7  | 6.4  |      | 6.1  |      |      |      |      |
| Max Green Setting (Gmax), s                                          |     | 77.6 |     |      | 13.6 | 58.3 |      | 29.9 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s                                         |     | 2.0  |     |      | 8.1  | 36.9 |      | 19.8 |      |      |      |      |
| Green Ext Time (p_c), s                                              |     | 5.5  |     |      | 0.1  | 11.9 |      | 3.2  |      |      |      |      |
| Intersection Summary                                                 |     |      |     |      |      |      |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh                                         |     |      |     | 24.2 |      |      |      |      |      |      |      |      |
| HCM 7th LOS                                                          |     |      |     | C    |      |      |      |      |      |      |      |      |
| Notes                                                                |     |      |     |      |      |      |      |      |      |      |      |      |
| User approved volume balancing among the lanes for turning movement. |     |      |     |      |      |      |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 23: Vista Village Drive & 78 EB OFF RAMP/78 EB ON RAMP

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT | WBR | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|-----|-----|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |     |     |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 410  | 10   | 50   | 0    | 0   | 0   | 0    | 370  | 970  | 770  | 930  | 0    |
| Future Volume (veh/h)        | 410  | 10   | 50   | 0    | 0   | 0   | 0    | 370  | 970  | 770  | 930  | 0    |
| Initial Q (Qb), veh          | 0    | 0    | 0    |      |     |     | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              | 1.00 | 1.00 | 1.04 |      |     |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 |      |     |     | 1.00 |      | 0.99 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 |      |     |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      |      |     |     | No   |      |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1856 | 1856 | 1930 |      |     |     | 0    | 1856 | 1856 | 1856 | 1856 | 0    |
| Adj Flow Rate, veh/h         | 440  | 0    | 42   |      |     |     | 0    | 389  | 816  | 811  | 979  | 0    |
| Peak Hour Factor             | 0.95 | 0.95 | 0.95 |      |     |     | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3    | 3    | 3    |      |     |     | 0    | 3    | 3    | 3    | 3    | 0    |
| Cap, veh/h                   | 520  | 0    | 241  |      |     |     | 0    | 894  | 1506 | 751  | 2639 | 0    |
| Arrive On Green              | 0.15 | 0.00 | 0.15 |      |     |     | 0.00 | 0.48 | 0.48 | 0.44 | 1.00 | 0.00 |
| Sat Flow, veh/h              | 3534 | 0    | 1635 |      |     |     | 0    | 1856 | 3125 | 3428 | 3618 | 0    |
| Grp Volume(v), veh/h         | 440  | 0    | 42   |      |     |     | 0    | 389  | 816  | 811  | 979  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1767 | 0    | 1635 |      |     |     | 0    | 1856 | 1563 | 1714 | 1763 | 0    |
| Q Serve(g_s), s              | 14.6 | 0.0  | 2.7  |      |     |     | 0.0  | 16.5 | 22.0 | 26.3 | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s        | 14.6 | 0.0  | 2.7  |      |     |     | 0.0  | 16.5 | 22.0 | 26.3 | 0.0  | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 |      |     |     | 0.00 |      | 1.00 | 1.00 |      | 0.00 |
| Lane Grp Cap(c), veh/h       | 520  | 0    | 241  |      |     |     | 0    | 894  | 1506 | 751  | 2639 | 0    |
| V/C Ratio(X)                 | 0.85 | 0.00 | 0.17 |      |     |     | 0.00 | 0.43 | 0.54 | 1.08 | 0.37 | 0.00 |
| Avail Cap(c_a), veh/h        | 704  | 0    | 326  |      |     |     | 0    | 894  | 1506 | 751  | 2639 | 0    |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 |      |     |     | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 |      |     |     | 0.00 | 1.00 | 1.00 | 0.86 | 0.86 | 0.00 |
| Uniform Delay (d), s/veh     | 49.8 | 0.0  | 44.8 |      |     |     | 0.0  | 20.4 | 21.8 | 33.7 | 0.0  | 0.0  |
| Incr Delay (d2), s/veh       | 7.1  | 0.0  | 0.3  |      |     |     | 0.0  | 1.5  | 1.4  | 54.2 | 0.3  | 0.0  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  |      |     |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 6.9  | 0.0  | 1.1  |      |     |     | 0.0  | 7.2  | 8.0  | 13.7 | 0.1  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |     |     |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        | 56.9 | 0.0  | 45.1 |      |     |     | 0.0  | 21.9 | 23.2 | 87.9 | 0.3  | 0.0  |
| LnGrp LOS                    | E    |      | D    |      |     |     |      | C    | C    | F    | A    |      |
| Approach Vol, veh/h          | 482  |      |      |      |     |     | 1205 |      |      | 1790 |      |      |
| Approach Delay, s/veh        | 55.9 |      |      |      |     |     | 22.8 |      |      | 40.0 |      |      |
| Approach LOS                 | E    |      |      |      |     |     | C    |      |      | D    |      |      |
| Timer - Assigned Phs         | 1    | 2    |      | 4    |     |     | 6    |      |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 32.0 | 64.2 |      | 23.8 |     |     | 96.2 |      |      |      |      |      |
| Change Period (Y+Rc), s      | 5.7  | 6.4  |      | 6.1  |     |     | 6.4  |      |      |      |      |      |
| Max Green Setting (Gmax), s  | 26.3 | 51.6 |      | 23.9 |     |     | 83.6 |      |      |      |      |      |
| Max Q Clear Time (g_c+20), s | 20.3 | 24.0 |      | 16.6 |     |     | 2.0  |      |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 6.5  |      | 1.1  |     |     | 8.4  |      |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 36.2  
HCM 7th LOS D

## Notes

User approved volume balancing among the lanes for turning movement.

# HCM 7th Signalized Intersection Summary 24: Civic Center Drive & S. Santa Fe Avenue

Future Year Conditions  
AM Peak Hour



| Movement                      | EBL   | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT   | NBR  | SBL  | SBT  | SBR  |
|-------------------------------|-------|------|------|------|------|------|------|-------|------|------|------|------|
| Lane Configurations           |       |      |      |      |      |      |      |       |      |      |      |      |
| Traffic Volume (veh/h)        | 100   | 550  | 150  | 200  | 350  | 250  | 80   | 650   | 140  | 500  | 1300 | 80   |
| Future Volume (veh/h)         | 100   | 550  | 150  | 200  | 350  | 250  | 80   | 650   | 140  | 500  | 1300 | 80   |
| Initial Q (Qb), veh           | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0    |
| Lane Width Adj.               | 1.00  | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 0.96 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)           | 1.00  |      | 0.99 | 1.00 |      | 0.98 | 1.00 |       | 0.98 | 1.00 |      | 0.98 |
| Parking Bus, Adj              | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach         | No    |      |      | No   |      |      | No   |       |      | No   |      |      |
| Adj Sat Flow, veh/h/ln        | 1934  | 1934 | 2011 | 1934 | 1934 | 1934 | 1856 | 1934  | 1934 | 1934 | 1934 | 1934 |
| Adj Flow Rate, veh/h          | 104   | 573  | 125  | 208  | 365  | 208  | 83   | 677   | 130  | 521  | 1354 | 73   |
| Peak Hour Factor              | 0.96  | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96  | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, %          | 3     | 3    | 3    | 3    | 3    | 3    | 3    | 3     | 3    | 3    | 3    | 3    |
| Cap, veh/h                    | 235   | 929  | 426  | 236  | 909  | 664  | 134  | 873   | 167  | 583  | 1449 | 78   |
| Arrive On Green               | 0.13  | 0.25 | 0.25 | 0.13 | 0.25 | 0.25 | 0.04 | 0.29  | 0.29 | 0.16 | 0.41 | 0.41 |
| Sat Flow, veh/h               | 1842  | 3674 | 1686 | 1842 | 3674 | 1604 | 3430 | 3063  | 587  | 3573 | 3542 | 191  |
| Grp Volume(v), veh/h          | 104   | 573  | 125  | 208  | 365  | 208  | 83   | 406   | 401  | 521  | 701  | 726  |
| Grp Sat Flow(s),veh/h/ln      | 1842  | 1837 | 1686 | 1842 | 1837 | 1604 | 1715 | 1837  | 1813 | 1786 | 1837 | 1896 |
| Q Serve(g_s), s               | 6.3   | 16.6 | 7.2  | 13.3 | 10.0 | 5.9  | 2.9  | 24.3  | 24.4 | 17.1 | 43.7 | 44.0 |
| Cycle Q Clear(g_c), s         | 6.3   | 16.6 | 7.2  | 13.3 | 10.0 | 5.9  | 2.9  | 24.3  | 24.4 | 17.1 | 43.7 | 44.0 |
| Prop In Lane                  | 1.00  |      | 1.00 | 1.00 |      | 1.00 | 1.00 |       | 0.32 | 1.00 |      | 0.10 |
| Lane Grp Cap(c), veh/h        | 235   | 929  | 426  | 236  | 909  | 664  | 134  | 524   | 517  | 583  | 752  | 776  |
| V/C Ratio(X)                  | 0.44  | 0.62 | 0.29 | 0.88 | 0.40 | 0.31 | 0.62 | 0.77  | 0.78 | 0.89 | 0.93 | 0.94 |
| Avail Cap(c_a), veh/h         | 235   | 929  | 426  | 267  | 909  | 664  | 146  | 524   | 517  | 670  | 776  | 801  |
| HCM Platoon Ratio             | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)            | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh      | 48.4  | 39.7 | 36.2 | 51.4 | 37.7 | 9.5  | 56.8 | 39.4  | 39.4 | 49.2 | 33.9 | 33.9 |
| Incr Delay (d2), s/veh        | 0.5   | 3.1  | 1.7  | 23.4 | 1.3  | 1.2  | 4.4  | 6.9   | 7.0  | 12.3 | 17.5 | 17.7 |
| Initial Q Delay(d3), s/veh    | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 2.9   | 7.8  | 3.1  | 7.6  | 4.6  | 2.7  | 1.3  | 11.8  | 11.7 | 8.6  | 22.4 | 23.3 |
| Unsig. Movement Delay, s/veh  |       |      |      |      |      |      |      |       |      |      |      |      |
| LnGrp Delay(d), s/veh         | 48.9  | 42.8 | 37.9 | 74.9 | 39.0 | 10.7 | 61.2 | 46.2  | 46.4 | 61.4 | 51.4 | 51.7 |
| LnGrp LOS                     | D     | D    | D    | E    | D    | B    | E    | D     | D    | E    | D    | D    |
| Approach Vol, veh/h           | 802   |      | 781  |      |      | 890  |      |       | 1948 |      |      |      |
| Approach Delay, s/veh         | 42.8  |      | 41.0 |      |      | 47.7 |      |       | 54.2 |      |      |      |
| Approach LOS                  | D     |      | D    |      |      | D    |      |       | D    |      |      |      |
| Timer - Assigned Phs          | 1     | 2    | 3    | 4    | 5    | 6    | 7    | 8     |      |      |      |      |
| Phs Duration (G+Y+Rc), s      | 24.9  | 39.5 | 20.0 | 35.6 | 10.0 | 54.4 | 20.6 | 35.0  |      |      |      |      |
| Change Period (Y+Rc), s       | 5.3   | 5.3  | 4.6  | 5.3  | 5.3  | 5.3  | 5.3  | * 5.3 |      |      |      |      |
| Max Green Setting (Gmax), s   | 22.5  | 33.3 | 17.4 | 26.3 | 5.1  | 50.7 | 14.0 | * 30  |      |      |      |      |
| Max Q Clear Time (g_c+119, s) | 119.1 | 26.4 | 15.3 | 18.6 | 4.9  | 46.0 | 8.3  | 12.0  |      |      |      |      |
| Green Ext Time (p_c), s       | 0.4   | 2.4  | 0.1  | 2.2  | 0.0  | 3.1  | 0.1  | 2.3   |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 48.5  
HCM 7th LOS D

## Notes

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

\* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

# HCM 7th Signalized Intersection Summary 25: Civic Center Drive & 78 WB OFF

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |     |      |     |      | ↕    | ↕↕   | ↕    | ↕↕   |      |      | ↕↕   | ↕    |
| Traffic Volume (veh/h)       | 0   | 0    | 0   | 280  | 10   | 560  | 320  | 400  | 0    | 0    | 1300 | 680  |
| Future Volume (veh/h)        | 0   | 0    | 0   | 280  | 10   | 560  | 320  | 400  | 0    | 0    | 1300 | 680  |
| Initial Q (Qb), veh          |     |      |     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              |     |      |     | 1.00 | 1.00 | 1.04 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)          |     |      |     | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             |     |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |     |      |     | No   |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln       |     |      |     | 1856 | 1856 | 1930 | 1930 | 1856 | 0    | 0    | 1856 | 1856 |
| Adj Flow Rate, veh/h         |     |      |     | 295  | 11   | 589  | 337  | 421  | 0    | 0    | 1368 | 569  |
| Peak Hour Factor             |     |      |     | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         |     |      |     | 3    | 3    | 3    | 3    | 3    | 0    | 0    | 3    | 3    |
| Cap, veh/h                   |     |      |     | 375  | 14   | 633  | 357  | 2421 | 0    | 0    | 1599 | 713  |
| Arrive On Green              |     |      |     | 0.22 | 0.22 | 0.22 | 0.19 | 0.69 | 0.00 | 0.00 | 0.45 | 0.45 |
| Sat Flow, veh/h              |     |      |     | 1707 | 64   | 2878 | 1838 | 3618 | 0    | 0    | 3618 | 1572 |
| Grp Volume(v), veh/h         |     |      |     | 306  | 0    | 589  | 337  | 421  | 0    | 0    | 1368 | 569  |
| Grp Sat Flow(s),veh/h/ln     |     |      |     | 1770 | 0    | 1439 | 1838 | 1763 | 0    | 0    | 1763 | 1572 |
| Q Serve(g_s), s              |     |      |     | 19.6 | 0.0  | 24.1 | 21.7 | 5.1  | 0.0  | 0.0  | 41.6 | 37.2 |
| Cycle Q Clear(g_c), s        |     |      |     | 19.6 | 0.0  | 24.1 | 21.7 | 5.1  | 0.0  | 0.0  | 41.6 | 37.2 |
| Prop In Lane                 |     |      |     | 0.96 |      | 1.00 | 1.00 |      | 0.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       |     |      |     | 389  | 0    | 633  | 357  | 2421 | 0    | 0    | 1599 | 713  |
| V/C Ratio(X)                 |     |      |     | 0.79 | 0.00 | 0.93 | 0.94 | 0.17 | 0.00 | 0.00 | 0.86 | 0.80 |
| Avail Cap(c_a), veh/h        |     |      |     | 397  | 0    | 645  | 357  | 2421 | 0    | 0    | 1599 | 713  |
| HCM Platoon Ratio            |     |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           |     |      |     | 1.00 | 0.00 | 1.00 | 0.09 | 0.09 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     |     |      |     | 44.1 | 0.0  | 45.9 | 47.7 | 6.7  | 0.0  | 0.0  | 29.3 | 28.1 |
| Incr Delay (d2), s/veh       |     |      |     | 9.0  | 0.0  | 19.6 | 5.6  | 0.0  | 0.0  | 0.0  | 6.1  | 9.1  |
| Initial Q Delay(d3), s/veh   |     |      |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |     |      |     | 9.4  | 0.0  | 10.2 | 10.4 | 1.8  | 0.0  | 0.0  | 18.2 | 15.3 |
| Unsig. Movement Delay, s/veh |     |      |     |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        |     |      |     | 53.1 | 0.0  | 65.5 | 53.4 | 6.7  | 0.0  | 0.0  | 35.4 | 37.2 |
| LnGrp LOS                    |     |      |     | D    |      | E    | D    | A    |      |      | D    | D    |
| Approach Vol, veh/h          |     |      |     |      | 895  |      |      | 758  |      |      | 1937 |      |
| Approach Delay, s/veh        |     |      |     |      | 61.3 |      |      | 27.4 |      |      | 35.9 |      |
| Approach LOS                 |     |      |     |      | E    |      |      | C    |      |      | D    |      |
| Timer - Assigned Phs         |     | 2    |     |      | 5    | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |     | 88.5 |     |      | 28.0 | 60.5 |      | 31.5 |      |      |      |      |
| Change Period (Y+Rc), s      |     | 6.1  |     |      | 4.7  | 6.1  |      | 5.1  |      |      |      |      |
| Max Green Setting (Gmax), s  |     | 81.9 |     |      | 23.3 | 53.9 |      | 26.9 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |     | 7.1  |     |      | 23.7 | 43.6 |      | 26.1 |      |      |      |      |
| Green Ext Time (p_c), s      |     | 1.9  |     |      | 0.0  | 5.9  |      | 0.3  |      |      |      |      |
| <b>Intersection Summary</b>  |     |      |     |      |      |      |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh |     |      |     |      | 40.5 |      |      |      |      |      |      |      |
| HCM 7th LOS                  |     |      |     |      | D    |      |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 26: Civic Center Drive & SR-78 EB Ramps

Future Year Conditions  
AM Peak Hour



| Movement                                                             | EBL  | EBR  | NBL   | NBT   | SBT  | SBR   |
|----------------------------------------------------------------------|------|------|-------|-------|------|-------|
| Lane Configurations                                                  |      |      |       |       |      |       |
| Traffic Volume (veh/h)                                               | 290  | 70   | 110   | 430   | 480  | 1100  |
| Future Volume (veh/h)                                                | 290  | 70   | 110   | 430   | 480  | 1100  |
| Initial Q (Qb), veh                                                  | 0    | 0    | 0     | 0     | 0    | 0     |
| Lane Width Adj.                                                      | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  |
| Ped-Bike Adj(A_pbT)                                                  | 1.00 | 1.00 | 1.00  |       |      | 1.00  |
| Parking Bus, Adj                                                     | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  |
| Work Zone On Approach                                                | No   |      |       | No    | No   |       |
| Adj Sat Flow, veh/h/ln                                               | 1856 | 1856 | 1856  | 1856  | 1856 | 1856  |
| Adj Flow Rate, veh/h                                                 | 364  | 0    | 116   | 453   | 505  | 811   |
| Peak Hour Factor                                                     | 0.95 | 0.95 | 0.95  | 0.95  | 0.95 | 0.95  |
| Percent Heavy Veh, %                                                 | 3    | 3    | 3     | 3     | 3    | 3     |
| Cap, veh/h                                                           | 452  | 180  | 231   | 243   | 1261 | 2234  |
| Arrive On Green                                                      | 0.13 | 0.00 | 0.13  | 0.13  | 0.68 | 0.68  |
| Sat Flow, veh/h                                                      | 3534 | 1572 | 1767  | 1856  | 1856 | 2768  |
| Grp Volume(v), veh/h                                                 | 364  | 0    | 116   | 453   | 505  | 811   |
| Grp Sat Flow(s), veh/h/ln                                            | 1767 | 1572 | 1767  | 1856  | 1856 | 1384  |
| Q Serve(g_s), s                                                      | 15.0 | 0.0  | 9.2   | 19.6  | 18.0 | 12.0  |
| Cycle Q Clear(g_c), s                                                | 15.0 | 0.0  | 9.2   | 19.6  | 18.0 | 12.0  |
| Prop In Lane                                                         | 1.00 | 1.00 | 1.00  |       |      | 1.00  |
| Lane Grp Cap(c), veh/h                                               | 452  | 180  | 231   | 243   | 1261 | 2234  |
| V/C Ratio(X)                                                         | 0.81 | 0.00 | 0.50  | 1.87  | 0.40 | 0.36  |
| Avail Cap(c_a), veh/h                                                | 492  | 198  | 231   | 243   | 1261 | 2234  |
| HCM Platoon Ratio                                                    | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  |
| Upstream Filter(I)                                                   | 1.00 | 0.00 | 0.73  | 0.73  | 0.36 | 0.36  |
| Uniform Delay (d), s/veh                                             | 63.6 | 0.0  | 60.6  | 65.2  | 10.6 | 3.9   |
| Incr Delay (d2), s/veh                                               | 7.9  | 0.0  | 5.6   | 401.4 | 0.3  | 0.2   |
| Initial Q Delay(d3), s/veh                                           | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   |
| %ile BackOfQ(50%),veh/ln                                             | 7.2  | 0.0  | 4.5   | 36.3  | 7.2  | 5.9   |
| Unsig. Movement Delay, s/veh                                         |      |      |       |       |      |       |
| LnGrp Delay(d), s/veh                                                | 71.5 | 0.0  | 66.2  | 466.6 | 10.9 | 4.1   |
| LnGrp LOS                                                            | E    |      | E     | F     | B    | A     |
| Approach Vol, veh/h                                                  | 364  |      |       | 569   | 1316 |       |
| Approach Delay, s/veh                                                | 71.5 |      |       | 385.0 | 6.7  |       |
| Approach LOS                                                         | E    |      |       | F     | A    |       |
| Timer - Assigned Phs                                                 | 2    |      |       | 4     |      | 6     |
| Phs Duration (G+Y+Rc), s                                             | 22.7 |      |       | 22.3  |      | 105.0 |
| Change Period (Y+Rc), s                                              | 5.1  |      |       | 5.1   |      | 5.1   |
| Max Green Setting (Gmax), s                                          | 15.9 |      |       | 18.9  |      | 99.9  |
| Max Q Clear Time (g_c+l1), s                                         | 21.6 |      |       | 17.0  |      | 20.0  |
| Green Ext Time (p_c), s                                              | 0.0  |      |       | 0.2   |      | 4.4   |
| <b>Intersection Summary</b>                                          |      |      |       |       |      |       |
| HCM 7th Control Delay, s/veh                                         |      |      | 112.9 |       |      |       |
| HCM 7th LOS                                                          |      |      | F     |       |      |       |
| <b>Notes</b>                                                         |      |      |       |       |      |       |
| User approved volume balancing among the lanes for turning movement. |      |      |       |       |      |       |

# HCM 7th Signalized Intersection Summary 27: Civic Center Drive & Sea View Place/Crest View Road

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      | ↔    |      |      | ↔    |      |      | ↔    |      |      | ↕    | ↗    |
| Traffic Volume (veh/h)       | 20   | 10   | 10   | 50   | 10   | 90   | 10   | 430  | 70   | 50   | 490  | 10   |
| Future Volume (veh/h)        | 20   | 10   | 10   | 50   | 10   | 90   | 10   | 430  | 70   | 50   | 490  | 10   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      |      | No   |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 |
| Adj Flow Rate, veh/h         | 21   | 11   | 10   | 53   | 11   | 84   | 11   | 453  | 63   | 53   | 516  | 9    |
| Peak Hour Factor             | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                   | 101  | 55   | 38   | 92   | 23   | 108  | 18   | 724  | 101  | 61   | 591  | 555  |
| Arrive On Green              | 0.11 | 0.12 | 0.11 | 0.11 | 0.12 | 0.11 | 0.45 | 0.46 | 0.45 | 0.23 | 0.24 | 0.24 |
| Sat Flow, veh/h              | 539  | 449  | 309  | 491  | 189  | 892  | 38   | 1560 | 217  | 172  | 1675 | 1572 |
| Grp Volume(v), veh/h         | 42   | 0    | 0    | 148  | 0    | 0    | 527  | 0    | 0    | 569  | 0    | 9    |
| Grp Sat Flow(s),veh/h/ln     | 1298 | 0    | 0    | 1571 | 0    | 0    | 1815 | 0    | 0    | 1847 | 0    | 1572 |
| Q Serve(g_s), s              | 0.0  | 0.0  | 0.0  | 9.9  | 0.0  | 0.0  | 33.0 | 0.0  | 0.0  | 44.5 | 0.0  | 0.7  |
| Cycle Q Clear(g_c), s        | 3.9  | 0.0  | 0.0  | 13.8 | 0.0  | 0.0  | 33.0 | 0.0  | 0.0  | 44.5 | 0.0  | 0.7  |
| Prop In Lane                 | 0.50 |      | 0.24 | 0.36 |      | 0.57 | 0.02 |      | 0.12 | 0.09 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 176  | 0    | 0    | 202  | 0    | 0    | 842  | 0    | 0    | 651  | 0    | 555  |
| V/C Ratio(X)                 | 0.24 | 0.00 | 0.00 | 0.73 | 0.00 | 0.00 | 0.63 | 0.00 | 0.00 | 0.87 | 0.00 | 0.02 |
| Avail Cap(c_a), veh/h        | 310  | 0    | 0    | 341  | 0    | 0    | 842  | 0    | 0    | 651  | 0    | 555  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.67 | 0.67 | 0.67 |
| Upstream Filter(I)           | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.92 | 0.00 | 0.92 |
| Uniform Delay (d), s/veh     | 60.1 | 0.0  | 0.0  | 64.7 | 0.0  | 0.0  | 30.5 | 0.0  | 0.0  | 54.1 | 0.0  | 37.3 |
| Incr Delay (d2), s/veh       | 0.3  | 0.0  | 0.0  | 1.9  | 0.0  | 0.0  | 3.5  | 0.0  | 0.0  | 14.1 | 0.0  | 0.0  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 1.5  | 0.0  | 0.0  | 5.8  | 0.0  | 0.0  | 15.2 | 0.0  | 0.0  | 23.9 | 0.0  | 0.3  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        | 60.3 | 0.0  | 0.0  | 66.6 | 0.0  | 0.0  | 34.0 | 0.0  | 0.0  | 68.2 | 0.0  | 37.4 |
| LnGrp LOS                    | E    |      |      | E    |      |      | C    |      |      | E    |      | D    |
| Approach Vol, veh/h          |      | 42   |      |      | 148  |      |      | 527  |      |      | 578  |      |
| Approach Delay, s/veh        |      | 60.3 |      |      | 66.6 |      |      | 34.0 |      |      | 67.7 |      |
| Approach LOS                 |      | E    |      |      | E    |      |      | C    |      |      | E    |      |
| Timer - Assigned Phs         |      | 2    |      | 4    |      | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |      | 72.7 |      | 21.3 |      | 56.0 |      | 21.3 |      |      |      |      |
| Change Period (Y+Rc), s      |      | 5.1  |      | 5.1  |      | 5.1  |      | 5.1  |      |      |      |      |
| Max Green Setting (Gmax), s  |      | 53.9 |      | 29.9 |      | 50.9 |      | 29.9 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |      | 35.0 |      | 5.9  |      | 46.5 |      | 15.8 |      |      |      |      |
| Green Ext Time (p_c), s      |      | 2.6  |      | 0.1  |      | 1.0  |      | 0.4  |      |      |      |      |
| Intersection Summary         |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh |      | 53.6 |      |      |      |      |      |      |      |      |      |      |
| HCM 7th LOS                  |      | D    |      |      |      |      |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 28: S Melrose Dr & Sunset Dr

Future Year Conditions  
AM Peak Hour



| Movement                      | EBL   | EBT  | EBR   | WBL  | WBT  | WBR  | NBL   | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------------|-------|------|-------|------|------|------|-------|------|------|------|------|------|
| Lane Configurations           |       | ↔    | ↔     |      | ↔    |      | ↔     | ↕    | ↔    | ↔    | ↕    | ↔    |
| Traffic Volume (veh/h)        | 50    | 80   | 250   | 200  | 40   | 100  | 200   | 1150 | 140  | 50   | 1750 | 90   |
| Future Volume (veh/h)         | 50    | 80   | 250   | 200  | 40   | 100  | 200   | 1150 | 140  | 50   | 1750 | 90   |
| Initial Q (Qb), veh           | 0     | 0    | 0     | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.               | 1.00  | 1.00 | 1.00  | 1.00 | 1.04 | 1.00 | 1.00  | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)           | 1.00  |      | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 0.98 | 1.00 |      | 0.98 |
| Parking Bus, Adj              | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach         | No    |      |       | No   |      |      | No    |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln        | 1856  | 1856 | 1856  | 1856 | 1930 | 1856 | 1856  | 1856 | 1930 | 1856 | 1856 | 1856 |
| Adj Flow Rate, veh/h          | 51    | 82   | 229   | 204  | 41   | 97   | 204   | 1173 | 112  | 51   | 1786 | 72   |
| Peak Hour Factor              | 0.98  | 0.98 | 0.98  | 0.98 | 0.98 | 0.98 | 0.98  | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, %          | 3     | 3    | 3     | 3    | 3    | 3    | 3     | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                    | 70    | 112  | 157   | 228  | 46   | 108  | 147   | 1774 | 804  | 66   | 1611 | 702  |
| Arrive On Green               | 0.10  | 0.10 | 0.10  | 0.21 | 0.21 | 0.21 | 0.08  | 0.50 | 0.50 | 0.04 | 0.46 | 0.46 |
| Sat Flow, veh/h               | 698   | 1122 | 1572  | 1064 | 214  | 506  | 1767  | 3526 | 1598 | 1767 | 3526 | 1536 |
| Grp Volume(v), veh/h          | 133   | 0    | 229   | 342  | 0    | 0    | 204   | 1173 | 112  | 51   | 1786 | 72   |
| Grp Sat Flow(s),veh/h/ln      | 1821  | 0    | 1572  | 1783 | 0    | 0    | 1767  | 1763 | 1598 | 1767 | 1763 | 1536 |
| Q Serve(g_s), s               | 8.5   | 0.0  | 12.0  | 22.4 | 0.0  | 0.0  | 10.0  | 29.7 | 4.5  | 3.4  | 54.8 | 3.2  |
| Cycle Q Clear(g_c), s         | 8.5   | 0.0  | 12.0  | 22.4 | 0.0  | 0.0  | 10.0  | 29.7 | 4.5  | 3.4  | 54.8 | 3.2  |
| Prop In Lane                  | 0.38  |      | 1.00  | 0.60 |      | 0.28 | 1.00  |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h        | 182   | 0    | 157   | 382  | 0    | 0    | 147   | 1774 | 804  | 66   | 1611 | 702  |
| V/C Ratio(X)                  | 0.73  | 0.00 | 1.46  | 0.90 | 0.00 | 0.00 | 1.39  | 0.66 | 0.14 | 0.78 | 1.11 | 0.10 |
| Avail Cap(c_a), veh/h         | 182   | 0    | 157   | 505  | 0    | 0    | 147   | 1774 | 804  | 147  | 1611 | 702  |
| HCM Platoon Ratio             | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)            | 1.00  | 0.00 | 1.00  | 1.00 | 0.00 | 0.00 | 0.71  | 0.71 | 0.71 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh      | 52.4  | 0.0  | 54.0  | 45.9 | 0.0  | 0.0  | 55.0  | 22.2 | 15.9 | 57.3 | 32.6 | 18.6 |
| Incr Delay (d2), s/veh        | 13.2  | 0.0  | 237.0 | 14.3 | 0.0  | 0.0  | 200.4 | 1.4  | 0.3  | 7.2  | 58.5 | 0.3  |
| Initial Q Delay(d3), s/veh    | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 4.6   | 0.0  | 15.1  | 11.5 | 0.0  | 0.0  | 12.5  | 11.8 | 1.6  | 1.6  | 34.7 | 1.2  |
| Unsig. Movement Delay, s/veh  |       |      |       |      |      |      |       |      |      |      |      |      |
| LnGrp Delay(d), s/veh         | 65.7  | 0.0  | 291.0 | 60.2 | 0.0  | 0.0  | 255.4 | 23.6 | 16.2 | 64.5 | 91.1 | 18.9 |
| LnGrp LOS                     | E     |      | F     | E    |      |      | F     | C    | B    | E    | F    | B    |
| Approach Vol, veh/h           | 362   |      |       | 342  |      |      | 1489  |      |      | 1909 |      |      |
| Approach Delay, s/veh         | 208.2 |      |       | 60.2 |      |      | 54.8  |      |      | 87.7 |      |      |
| Approach LOS                  | F     |      |       | E    |      |      | D     |      |      | F    |      |      |
| Timer - Assigned Phs          | 1     | 2    |       | 4    | 5    | 6    |       | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s      | 8.5   | 65.9 |       | 16.0 | 14.0 | 60.3 |       | 29.7 |      |      |      |      |
| Change Period (Y+Rc), s       | 4.0   | 5.5  |       | 4.0  | 4.0  | 5.5  |       | 4.0  |      |      |      |      |
| Max Green Setting (Gmax), s   | 10.0  | 46.5 |       | 12.0 | 10.0 | 46.5 |       | 34.0 |      |      |      |      |
| Max Q Clear Time (g_c+1.5), s | 15.4  | 31.7 |       | 14.0 | 12.0 | 56.8 |       | 24.4 |      |      |      |      |
| Green Ext Time (p_c), s       | 0.0   | 4.9  |       | 0.0  | 0.0  | 0.0  |       | 1.3  |      |      |      |      |
| <b>Intersection Summary</b>   |       |      |       |      |      |      |       |      |      |      |      |      |
| HCM 7th Control Delay, s/veh  | 84.1  |      |       |      |      |      |       |      |      |      |      |      |
| HCM 7th LOS                   | F     |      |       |      |      |      |       |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 29: S Melrose Dr & Canon Rd

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                               | SBR                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 400                                                                               | 40                                                                                | 530                                                                               | 150                                                                               | 50                                                                                | 100                                                                               | 470                                                                               | 1170                                                                              | 50                                                                                | 50                                                                                | 1900                                                                              | 280                                                                                 |
| Future Volume (veh/h)        | 400                                                                               | 40                                                                                | 530                                                                               | 150                                                                               | 50                                                                                | 100                                                                               | 470                                                                               | 1170                                                                              | 50                                                                                | 50                                                                                | 1900                                                                              | 280                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   |
| Lane Width Adj.              | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.04                                                                                |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.97                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1934                                                                              | 1934                                                                              | 2011                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 2011                                                                                |
| Adj Flow Rate, veh/h         | 421                                                                               | 42                                                                                | 305                                                                               | 158                                                                               | 53                                                                                | 63                                                                                | 495                                                                               | 1232                                                                              | 32                                                                                | 53                                                                                | 2000                                                                              | 190                                                                                 |
| Peak Hour Factor             | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   |
| Cap, veh/h                   | 409                                                                               | 419                                                                               | 363                                                                               | 217                                                                               | 597                                                                               | 264                                                                               | 401                                                                               | 2659                                                                              | 69                                                                                | 141                                                                               | 2269                                                                              | 906                                                                                 |
| Arrive On Green              | 0.11                                                                              | 0.22                                                                              | 0.22                                                                              | 0.06                                                                              | 0.16                                                                              | 0.16                                                                              | 0.11                                                                              | 0.50                                                                              | 0.50                                                                              | 0.04                                                                              | 0.43                                                                              | 0.43                                                                                |
| Sat Flow, veh/h              | 3573                                                                              | 1934                                                                              | 1676                                                                              | 3573                                                                              | 3674                                                                              | 1627                                                                              | 3573                                                                              | 5288                                                                              | 137                                                                               | 3573                                                                              | 5279                                                                              | 1654                                                                                |
| Grp Volume(v), veh/h         | 421                                                                               | 42                                                                                | 305                                                                               | 158                                                                               | 53                                                                                | 63                                                                                | 495                                                                               | 820                                                                               | 444                                                                               | 53                                                                                | 2000                                                                              | 190                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1786                                                                              | 1934                                                                              | 1676                                                                              | 1786                                                                              | 1837                                                                              | 1627                                                                              | 1786                                                                              | 1760                                                                              | 1906                                                                              | 1786                                                                              | 1760                                                                              | 1654                                                                                |
| Q Serve(g_s), s              | 14.9                                                                              | 2.3                                                                               | 22.7                                                                              | 5.7                                                                               | 1.6                                                                               | 4.4                                                                               | 14.6                                                                              | 19.6                                                                              | 19.6                                                                              | 1.9                                                                               | 45.2                                                                              | 7.7                                                                                 |
| Cycle Q Clear(g_c), s        | 14.9                                                                              | 2.3                                                                               | 22.7                                                                              | 5.7                                                                               | 1.6                                                                               | 4.4                                                                               | 14.6                                                                              | 19.6                                                                              | 19.6                                                                              | 1.9                                                                               | 45.2                                                                              | 7.7                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.07                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 409                                                                               | 419                                                                               | 363                                                                               | 217                                                                               | 597                                                                               | 264                                                                               | 401                                                                               | 1769                                                                              | 958                                                                               | 141                                                                               | 2269                                                                              | 906                                                                                 |
| V/C Ratio(X)                 | 1.03                                                                              | 0.10                                                                              | 0.84                                                                              | 0.73                                                                              | 0.09                                                                              | 0.24                                                                              | 1.23                                                                              | 0.46                                                                              | 0.46                                                                              | 0.38                                                                              | 0.88                                                                              | 0.21                                                                                |
| Avail Cap(c_a), veh/h        | 409                                                                               | 583                                                                               | 505                                                                               | 409                                                                               | 1108                                                                              | 490                                                                               | 401                                                                               | 1769                                                                              | 958                                                                               | 561                                                                               | 2269                                                                              | 906                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.09                                                                              | 0.09                                                                              | 0.09                                                                                |
| Uniform Delay (d), s/veh     | 57.5                                                                              | 40.8                                                                              | 48.8                                                                              | 60.0                                                                              | 46.3                                                                              | 47.4                                                                              | 57.7                                                                              | 21.0                                                                              | 21.0                                                                              | 60.9                                                                              | 34.0                                                                              | 15.2                                                                                |
| Incr Delay (d2), s/veh       | 51.9                                                                              | 0.1                                                                               | 8.8                                                                               | 4.7                                                                               | 0.1                                                                               | 0.5                                                                               | 125.1                                                                             | 0.9                                                                               | 1.6                                                                               | 0.2                                                                               | 0.5                                                                               | 0.0                                                                                 |
| Initial Q Delay(d3), s/veh   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 9.7                                                                               | 1.1                                                                               | 10.1                                                                              | 2.7                                                                               | 0.7                                                                               | 1.8                                                                               | 13.4                                                                              | 7.9                                                                               | 8.8                                                                               | 0.8                                                                               | 18.4                                                                              | 2.8                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| LnGrp Delay(d), s/veh        | 109.4                                                                             | 40.9                                                                              | 57.6                                                                              | 64.7                                                                              | 46.3                                                                              | 47.9                                                                              | 182.8                                                                             | 21.8                                                                              | 22.6                                                                              | 61.0                                                                              | 34.5                                                                              | 15.3                                                                                |
| LnGrp LOS                    | F                                                                                 | D                                                                                 | E                                                                                 | E                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | C                                                                                 | C                                                                                 | E                                                                                 | C                                                                                 | B                                                                                   |
| Approach Vol, veh/h          | 768                                                                               |                                                                                   |                                                                                   | 274                                                                               |                                                                                   |                                                                                   | 1759                                                                              |                                                                                   |                                                                                   | 2243                                                                              |                                                                                   |                                                                                     |
| Approach Delay, s/veh        | 85.1                                                                              |                                                                                   |                                                                                   | 57.3                                                                              |                                                                                   |                                                                                   | 67.3                                                                              |                                                                                   |                                                                                   | 33.5                                                                              |                                                                                   |                                                                                     |
| Approach LOS                 | F                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 33.0                                                                              | 33.9                                                                              | 20.0                                                                              | 63.1                                                                              | 20.0                                                                              | 26.9                                                                              | 10.5                                                                              | 72.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Change Period (Y+Rc), s      | 5.1                                                                               | 5.8                                                                               | 5.4                                                                               | 7.2                                                                               | 5.1                                                                               | 5.8                                                                               | 5.4                                                                               | 7.2                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Max Green Setting (Gmax), s  | 14.9                                                                              | 39.2                                                                              | 14.6                                                                              | 37.8                                                                              | 14.9                                                                              | 39.2                                                                              | 20.4                                                                              | 32.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Max Q Clear Time (g_c+I), s  | 17.5                                                                              | 24.7                                                                              | 16.6                                                                              | 47.2                                                                              | 16.9                                                                              | 6.4                                                                               | 3.9                                                                               | 21.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Green Ext Time (p_c), s      | 0.3                                                                               | 1.1                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.5                                                                               | 0.1                                                                               | 6.7                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |

## Intersection Summary

HCM 7th Control Delay, s/veh 54.5  
HCM 7th LOS D

## Notes

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

# HCM 7th Signalized Intersection Summary 30: S Melrose Dr & Longhorn Dr/Live Oak Rd

Future Year Conditions  
AM Peak Hour



| Movement                                                             | EBL                                                                               | EBT                                                                               | EBR  | WBL  | WBT  | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                                                                                                                 | SBL                                                                                 | SBT                                                                                                                                                                     | SBR                                                                                 |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Configurations                                                  |  |  |      |      |      |  |  |  |   |  |   |  |
| Traffic Volume (veh/h)                                               | 400                                                                               | 50                                                                                | 150  | 100  | 80   | 180                                                                               | 120                                                                               | 800                                                                               | 70                                                                                                                                                                  | 200                                                                                 | 2100                                                                                                                                                                    | 300                                                                                 |
| Future Volume (veh/h)                                                | 400                                                                               | 50                                                                                | 150  | 100  | 80   | 180                                                                               | 120                                                                               | 800                                                                               | 70                                                                                                                                                                  | 200                                                                                 | 2100                                                                                                                                                                    | 300                                                                                 |
| Initial Q (Qb), veh                                                  | 0                                                                                 | 0                                                                                 | 0    | 0    | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                   | 0                                                                                                                                                                       | 0                                                                                   |
| Lane Width Adj.                                                      | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00 | 1.00 | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)                                                  | 1.00                                                                              |                                                                                   | 0.78 | 1.00 |      | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.86                                                                                                                                                                | 1.00                                                                                |                                                                                                                                                                         | 0.78                                                                                |
| Parking Bus, Adj                                                     | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00 | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Work Zone On Approach                                                | No                                                                                |                                                                                   |      |      | No   |                                                                                   |                                                                                   |                                                                                   | No                                                                                                                                                                  |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Adj Sat Flow, veh/h/ln                                               | 1856                                                                              | 1856                                                                              | 1856 | 1856 | 1856 | 1930                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                                                                                                | 1856                                                                                | 1856                                                                                                                                                                    | 1856                                                                                |
| Adj Flow Rate, veh/h                                                 | 308                                                                               | 211                                                                               | 142  | 105  | 84   | 147                                                                               | 126                                                                               | 842                                                                               | 63                                                                                                                                                                  | 211                                                                                 | 2211                                                                                                                                                                    | 253                                                                                 |
| Peak Hour Factor                                                     | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95 | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                                                                                                | 0.95                                                                                | 0.95                                                                                                                                                                    | 0.95                                                                                |
| Percent Heavy Veh, %                                                 | 3                                                                                 | 3                                                                                 | 3    | 3    | 3    | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                                                                                                   | 3                                                                                   | 3                                                                                                                                                                       | 3                                                                                   |
| Cap, veh/h                                                           | 408                                                                               | 212                                                                               | 143  | 122  | 97   | 198                                                                               | 106                                                                               | 1765                                                                              | 131                                                                                                                                                                 | 237                                                                                 | 2258                                                                                                                                                                    | 912                                                                                 |
| Arrive On Green                                                      | 0.23                                                                              | 0.23                                                                              | 0.23 | 0.12 | 0.12 | 0.12                                                                              | 0.12                                                                              | 0.74                                                                              | 0.74                                                                                                                                                                | 0.13                                                                                | 0.45                                                                                                                                                                    | 0.45                                                                                |
| Sat Flow, veh/h                                                      | 1767                                                                              | 918                                                                               | 618  | 1003 | 802  | 1635                                                                              | 1767                                                                              | 4750                                                                              | 353                                                                                                                                                                 | 1767                                                                                | 5066                                                                                                                                                                    | 1233                                                                                |
| Grp Volume(v), veh/h                                                 | 308                                                                               | 0                                                                                 | 353  | 189  | 0    | 147                                                                               | 126                                                                               | 597                                                                               | 308                                                                                                                                                                 | 211                                                                                 | 2211                                                                                                                                                                    | 253                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                             | 1767                                                                              | 0                                                                                 | 1536 | 1805 | 0    | 1635                                                                              | 1767                                                                              | 1689                                                                              | 1726                                                                                                                                                                | 1767                                                                                | 1689                                                                                                                                                                    | 1233                                                                                |
| Q Serve(g_s), s                                                      | 21.1                                                                              | 0.0                                                                               | 29.8 | 13.4 | 0.0  | 11.3                                                                              | 7.8                                                                               | 9.1                                                                               | 9.3                                                                                                                                                                 | 15.3                                                                                | 55.8                                                                                                                                                                    | 10.9                                                                                |
| Cycle Q Clear(g_c), s                                                | 21.1                                                                              | 0.0                                                                               | 29.8 | 13.4 | 0.0  | 11.3                                                                              | 7.8                                                                               | 9.1                                                                               | 9.3                                                                                                                                                                 | 15.3                                                                                | 55.8                                                                                                                                                                    | 10.9                                                                                |
| Prop In Lane                                                         | 1.00                                                                              |                                                                                   | 0.40 | 0.56 |      | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.20                                                                                                                                                                | 1.00                                                                                |                                                                                                                                                                         | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                               | 408                                                                               | 0                                                                                 | 354  | 219  | 0    | 198                                                                               | 106                                                                               | 1255                                                                              | 641                                                                                                                                                                 | 237                                                                                 | 2258                                                                                                                                                                    | 912                                                                                 |
| V/C Ratio(X)                                                         | 0.76                                                                              | 0.00                                                                              | 1.00 | 0.86 | 0.00 | 0.74                                                                              | 1.19                                                                              | 0.48                                                                              | 0.48                                                                                                                                                                | 0.89                                                                                | 0.98                                                                                                                                                                    | 0.28                                                                                |
| Avail Cap(c_a), veh/h                                                | 408                                                                               | 0                                                                                 | 354  | 254  | 0    | 230                                                                               | 106                                                                               | 1255                                                                              | 641                                                                                                                                                                 | 364                                                                                 | 2258                                                                                                                                                                    | 912                                                                                 |
| HCM Platoon Ratio                                                    | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00 | 1.00 | 1.00                                                                              | 2.00                                                                              | 2.00                                                                              | 2.00                                                                                                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Upstream Filter(I)                                                   | 1.00                                                                              | 0.00                                                                              | 1.00 | 1.00 | 0.00 | 1.00                                                                              | 0.84                                                                              | 0.84                                                                              | 0.84                                                                                                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Uniform Delay (d), s/veh                                             | 46.6                                                                              | 0.0                                                                               | 49.9 | 56.1 | 0.0  | 55.2                                                                              | 57.2                                                                              | 11.7                                                                              | 11.7                                                                                                                                                                | 55.3                                                                                | 35.4                                                                                                                                                                    | 8.6                                                                                 |
| Incr Delay (d2), s/veh                                               | 7.5                                                                               | 0.0                                                                               | 46.6 | 21.9 | 0.0  | 9.5                                                                               | 139.4                                                                             | 1.1                                                                               | 2.2                                                                                                                                                                 | 11.3                                                                                | 14.6                                                                                                                                                                    | 0.8                                                                                 |
| Initial Q Delay(d3), s/veh                                           | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0  | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                                                                                                 | 0.0                                                                                 | 0.0                                                                                                                                                                     | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                             | 0.0                                                                               | 0.0                                                                               | 15.9 | 7.5  | 0.0  | 5.2                                                                               | 7.3                                                                               | 2.7                                                                               | 3.0                                                                                                                                                                 | 7.4                                                                                 | 24.6                                                                                                                                                                    | 5.4                                                                                 |
| Unsig. Movement Delay, s/veh                                         |                                                                                   |                                                                                   |      |      |      |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| LnGrp Delay(d), s/veh                                                | 54.1                                                                              | 0.0                                                                               | 96.6 | 78.0 | 0.0  | 64.6                                                                              | 196.6                                                                             | 12.7                                                                              | 13.8                                                                                                                                                                | 66.6                                                                                | 50.1                                                                                                                                                                    | 9.3                                                                                 |
| LnGrp LOS                                                            | D                                                                                 |                                                                                   | F    | E    |      | E                                                                                 | F                                                                                 | B                                                                                 | B                                                                                                                                                                   | E                                                                                   | D                                                                                                                                                                       | A                                                                                   |
| Approach Vol, veh/h                                                  | 661                                                                               |                                                                                   |      |      | 336  |                                                                                   |                                                                                   |                                                                                   | 1031                                                                                                                                                                |                                                                                     | 2675                                                                                                                                                                    |                                                                                     |
| Approach Delay, s/veh                                                | 76.8                                                                              |                                                                                   |      |      | 72.2 |                                                                                   |                                                                                   |                                                                                   | 35.5                                                                                                                                                                |                                                                                     | 47.5                                                                                                                                                                    |                                                                                     |
| Approach LOS                                                         | E                                                                                 |                                                                                   |      |      | E    |                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                   |                                                                                     | D                                                                                                                                                                       |                                                                                     |
| Timer - Assigned Phs                                                 | 1                                                                                 | 2                                                                                 | 4    |      | 5    | 6                                                                                 | 8                                                                                 |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Phs Duration (G+Y+Rc), s                                             | 21.6                                                                              | 53.8                                                                              | 34.6 |      | 12.0 | 63.4                                                                              | 20.0                                                                              |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Change Period (Y+Rc), s                                              | 4.2                                                                               | 5.5                                                                               | 4.6  |      | 4.2  | 5.5                                                                               | 4.2                                                                               |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Max Green Setting (Gmax), s                                          | 26.8                                                                              | 36.4                                                                              | 30.0 |      | 7.8  | 55.4                                                                              | 18.3                                                                              |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Max Q Clear Time (g_c+I1), s                                         | 11.3                                                                              | 11.3                                                                              | 31.8 |      | 9.8  | 57.8                                                                              | 15.4                                                                              |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Green Ext Time (p_c), s                                              | 0.2                                                                               | 3.6                                                                               | 0.0  |      | 0.0  | 0.0                                                                               | 0.4                                                                               |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Intersection Summary                                                 |                                                                                   |                                                                                   |      |      |      |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| HCM 7th Control Delay, s/veh                                         | 50.8                                                                              |                                                                                   |      |      |      |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| HCM 7th LOS                                                          | D                                                                                 |                                                                                   |      |      |      |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Notes                                                                |                                                                                   |                                                                                   |      |      |      |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| User approved volume balancing among the lanes for turning movement. |                                                                                   |                                                                                   |      |      |      |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |

# HCM 7th Signalized Intersection Summary 31: S Melrose Dr & Shadowridge Dr

Future Year Conditions  
AM Peak Hour

|                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                |  |  |  |  |  |  |  |  |   |   |  |  |
| Traffic Volume (veh/h)                                             | 100                                                                               | 270                                                                               | 470                                                                               | 450                                                                               | 210                                                                               | 300                                                                               | 150                                                                               | 650                                                                               | 150                                                                                | 300                                                                                 | 2050                                                                                | 80                                                                                  |
| Future Volume (veh/h)                                              | 100                                                                               | 270                                                                               | 470                                                                               | 450                                                                               | 210                                                                               | 300                                                                               | 150                                                                               | 650                                                                               | 150                                                                                | 300                                                                                 | 2050                                                                                | 80                                                                                  |
| Initial Q (Qb), veh                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width 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                                                                                |
| Ped-Bike Adj(A_pbT)                                                | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                               | 1.00                                                                                |                                                                                     | 0.98                                                                                |
| Parking Bus, Adj                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                             | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h                                               | 105                                                                               | 284                                                                               | 406                                                                               | 474                                                                               | 221                                                                               | 253                                                                               | 158                                                                               | 684                                                                               | 142                                                                                | 316                                                                                 | 2158                                                                                | 73                                                                                  |
| Peak Hour Factor                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                               | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                         | 128                                                                               | 428                                                                               | 362                                                                               | 406                                                                               | 513                                                                               | 427                                                                               | 79                                                                                | 1448                                                                              | 297                                                                                | 469                                                                                 | 2197                                                                                | 74                                                                                  |
| Arrive On Green                                                    | 0.07                                                                              | 0.23                                                                              | 0.23                                                                              | 0.12                                                                              | 0.28                                                                              | 0.28                                                                              | 0.04                                                                              | 0.34                                                                              | 0.34                                                                               | 0.27                                                                                | 0.87                                                                                | 0.87                                                                                |
| Sat Flow, veh/h                                                    | 1767                                                                              | 1856                                                                              | 1568                                                                              | 3428                                                                              | 1856                                                                              | 1542                                                                              | 1767                                                                              | 4203                                                                              | 861                                                                                | 3428                                                                                | 5028                                                                                | 169                                                                                 |
| Grp Volume(v), veh/h                                               | 105                                                                               | 284                                                                               | 406                                                                               | 474                                                                               | 221                                                                               | 253                                                                               | 158                                                                               | 548                                                                               | 278                                                                                | 316                                                                                 | 1447                                                                                | 784                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                           | 1767                                                                              | 1856                                                                              | 1568                                                                              | 1714                                                                              | 1856                                                                              | 1542                                                                              | 1767                                                                              | 1689                                                                              | 1687                                                                               | 1714                                                                                | 1689                                                                                | 1820                                                                                |
| Q Serve(g_s), s                                                    | 7.6                                                                               | 18.1                                                                              | 30.0                                                                              | 15.4                                                                              | 12.7                                                                              | 12.8                                                                              | 5.8                                                                               | 16.5                                                                              | 16.8                                                                               | 10.7                                                                                | 49.1                                                                                | 51.0                                                                                |
| Cycle Q Clear(g_c), s                                              | 7.6                                                                               | 18.1                                                                              | 30.0                                                                              | 15.4                                                                              | 12.7                                                                              | 12.8                                                                              | 5.8                                                                               | 16.5                                                                              | 16.8                                                                               | 10.7                                                                                | 49.1                                                                                | 51.0                                                                                |
| Prop In Lane                                                       | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.51                                                                               | 1.00                                                                                |                                                                                     | 0.09                                                                                |
| Lane Grp Cap(c), veh/h                                             | 128                                                                               | 428                                                                               | 362                                                                               | 406                                                                               | 513                                                                               | 427                                                                               | 79                                                                                | 1164                                                                              | 581                                                                                | 469                                                                                 | 1476                                                                                | 795                                                                                 |
| V/C Ratio(X)                                                       | 0.82                                                                              | 0.66                                                                              | 1.12                                                                              | 1.17                                                                              | 0.43                                                                              | 0.59                                                                              | 2.00                                                                              | 0.47                                                                              | 0.48                                                                               | 0.67                                                                                | 0.98                                                                                | 0.99                                                                                |
| Avail Cap(c_a), veh/h                                              | 167                                                                               | 428                                                                               | 362                                                                               | 406                                                                               | 513                                                                               | 427                                                                               | 79                                                                                | 1164                                                                              | 581                                                                                | 469                                                                                 | 1476                                                                                | 795                                                                                 |
| HCM Platoon Ratio                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 2.00                                                                                | 2.00                                                                                | 2.00                                                                                |
| Upstream Filter(I)                                                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.09                                                                                | 0.09                                                                                | 0.09                                                                                |
| Uniform Delay (d), s/veh                                           | 59.4                                                                              | 45.4                                                                              | 50.0                                                                              | 57.3                                                                              | 38.6                                                                              | 19.5                                                                              | 62.1                                                                              | 33.3                                                                              | 33.4                                                                               | 44.6                                                                                | 7.7                                                                                 | 7.8                                                                                 |
| Incr Delay (d2), s/veh                                             | 16.7                                                                              | 3.5                                                                               | 84.5                                                                              | 98.8                                                                              | 0.4                                                                               | 1.9                                                                               | 493.5                                                                             | 1.4                                                                               | 2.8                                                                                | 0.3                                                                                 | 3.9                                                                                 | 6.8                                                                                 |
| Initial Q Delay(d3), s/veh                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                           | 0.0                                                                               | 8.6                                                                               | 20.0                                                                              | 12.1                                                                              | 5.8                                                                               | 4.7                                                                               | 13.3                                                                              | 6.7                                                                               | 7.1                                                                                | 4.0                                                                                 | 3.8                                                                                 | 4.8                                                                                 |
| Unsig. Movement Delay, s/veh                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                              | 76.1                                                                              | 48.9                                                                              | 134.5                                                                             | 156.1                                                                             | 39.0                                                                              | 21.4                                                                              | 555.6                                                                             | 34.7                                                                              | 36.2                                                                               | 44.9                                                                                | 11.6                                                                                | 14.7                                                                                |
| LnGrp LOS                                                          | E                                                                                 | D                                                                                 | F                                                                                 | F                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | C                                                                                 | D                                                                                  | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h                                                | 795                                                                               |                                                                                   |                                                                                   | 948                                                                               |                                                                                   |                                                                                   | 984                                                                               |                                                                                   |                                                                                    | 2547                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                              | 96.2                                                                              |                                                                                   |                                                                                   | 92.8                                                                              |                                                                                   |                                                                                   | 118.8                                                                             |                                                                                   |                                                                                    | 16.7                                                                                |                                                                                     |                                                                                     |
| Approach LOS                                                       | F                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                    | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                               | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                           | 2.0                                                                               | 63.0                                                                              | 14.0                                                                              | 41.0                                                                              | 24.0                                                                              | 51.0                                                                              | 20.0                                                                              | 35.0                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                            | 6.2                                                                               | 6.2                                                                               | 4.6                                                                               | 5.0                                                                               | 6.2                                                                               | 6.2                                                                               | 4.6                                                                               | 5.0                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                        | 5.8                                                                               | 56.8                                                                              | 12.3                                                                              | 33.1                                                                              | 17.8                                                                              | 44.8                                                                              | 15.4                                                                              | 30.0                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s                                       | 5.8                                                                               | 53.0                                                                              | 9.6                                                                               | 14.8                                                                              | 12.7                                                                              | 18.8                                                                              | 17.4                                                                              | 32.0                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                            | 0.0                                                                               | 3.5                                                                               | 0.0                                                                               | 1.5                                                                               | 0.3                                                                               | 6.2                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                       | 61.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                        | E                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| User approved pedestrian interval to be less than phase max green. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |

HCM 7th AWSC  
32: Thibodo Road & Mar Vista Drive

Future Year Conditions  
AM Peak Hour

Intersection

Intersection Delay, s/veh 64.9

Intersection LOS F

| Movement            | EBT                                                                               | EBR  | WBL  | WBT                                                                               | NBL                                                                               | NBR                                                                               |
|---------------------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations |  |      |      |  |  |  |
| Traffic Vol, veh/h  | 180                                                                               | 40   | 430  | 250                                                                               | 50                                                                                | 340                                                                               |
| Future Vol, veh/h   | 180                                                                               | 40   | 430  | 250                                                                               | 50                                                                                | 340                                                                               |
| Peak Hour Factor    | 0.95                                                                              | 0.95 | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              |
| Heavy Vehicles, %   | 3                                                                                 | 3    | 3    | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Mvmt Flow           | 189                                                                               | 42   | 453  | 263                                                                               | 53                                                                                | 358                                                                               |
| Number of Lanes     | 1                                                                                 | 0    | 0    | 1                                                                                 | 1                                                                                 | 1                                                                                 |

| Approach                   | EB   | WB    | NB   |
|----------------------------|------|-------|------|
| Opposing Approach          | WB   | EB    |      |
| Opposing Lanes             | 1    | 1     | 0    |
| Conflicting Approach Left  |      | NB    | EB   |
| Conflicting Lanes Left     | 0    | 2     | 1    |
| Conflicting Approach Right | NB   |       | WB   |
| Conflicting Lanes Right    | 2    | 0     | 1    |
| HCM Control Delay, s/veh   | 13.5 | 108.4 | 18.2 |
| HCM LOS                    | B    | F     | C    |

| Lane                     | NBLn1 | NBLn2 | EBLn1 | WBLn1 |
|--------------------------|-------|-------|-------|-------|
| Vol Left, %              | 100%  | 0%    | 0%    | 63%   |
| Vol Thru, %              | 0%    | 0%    | 82%   | 37%   |
| Vol Right, %             | 0%    | 100%  | 18%   | 0%    |
| Sign Control             | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane      | 50    | 340   | 220   | 680   |
| LT Vol                   | 50    | 0     | 0     | 430   |
| Through Vol              | 0     | 0     | 180   | 250   |
| RT Vol                   | 0     | 340   | 40    | 0     |
| Lane Flow Rate           | 53    | 358   | 232   | 716   |
| Geometry Grp             | 5     | 5     | 2     | 2     |
| Degree of Util (X)       | 0.109 | 0.616 | 0.39  | 1.154 |
| Departure Headway (Hd)   | 7.787 | 6.558 | 6.427 | 5.803 |
| Convergence, Y/N         | Yes   | Yes   | Yes   | Yes   |
| Cap                      | 463   | 555   | 563   | 630   |
| Service Time             | 5.487 | 4.258 | 4.427 | 3.803 |
| HCM Lane V/C Ratio       | 0.114 | 0.645 | 0.412 | 1.137 |
| HCM Control Delay, s/veh | 11.4  | 19.2  | 13.5  | 108.4 |
| HCM Lane LOS             | B     | C     | B     | F     |
| HCM 95th-tile Q          | 0.4   | 4.2   | 1.8   | 23.4  |

HCM 7th TWSC  
33: SR-78 EB Ramps & Mar Vista Drive

Future Year Conditions  
AM Peak Hour

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 23.2 |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↱    |      |      | ↰    |      |      |      |      | ↱    |      | ↰    |
| Traffic Vol, veh/h       | 0    | 400  | 120  | 250  | 430  | 0    | 0    | 0    | 0    | 120  | 0    | 250  |
| Future Vol, veh/h        | 0    | 400  | 120  | 250  | 430  | 0    | 0    | 0    | 0    | 120  | 0    | 250  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | 0    | -    | 45   |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 421  | 126  | 263  | 453  | 0    | 0    | 0    | 0    | 126  | 0    | 263  |

| Major/Minor          | Major1 |   |   | Major2 |   |   | Minor2 |   |       |
|----------------------|--------|---|---|--------|---|---|--------|---|-------|
| Conflicting Flow All | -      | 0 | 0 | 547    | 0 | 0 | 1400   | - | 453   |
| Stage 1              | -      | - | - | -      | - | - | 979    | - | -     |
| Stage 2              | -      | - | - | -      | - | - | 421    | - | -     |
| Critical Hdwy        | -      | - | - | 4.13   | - | - | 6.43   | - | 6.23  |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | - | 5.43   | - | -     |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | - | 5.43   | - | -     |
| Follow-up Hdwy       | -      | - | - | 2.227  | - | - | 3.527  | - | 3.327 |
| Pot Cap-1 Maneuver   | 0      | - | - | 1017   | - | 0 | 154    | 0 | 605   |
| Stage 1              | 0      | - | - | -      | - | 0 | 363    | 0 | -     |
| Stage 2              | 0      | - | - | -      | - | 0 | 660    | 0 | -     |
| Platoon blocked, %   | -      | - | - | -      | - | - | -      | - | -     |
| Mov Cap-1 Maneuver   | -      | - | - | 1017   | - | - | ~ 101  | 0 | 605   |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | - | ~ 101  | 0 | -     |
| Stage 1              | -      | - | - | -      | - | - | 363    | 0 | -     |
| Stage 2              | -      | - | - | -      | - | - | 432    | 0 | -     |

| Approach          | EB | WB   | SB    |
|-------------------|----|------|-------|
| HCM Ctrl Dly, s/v | 0  | 3.59 | 91.89 |
| HCM LOS           |    |      | F     |

| Minor Lane/Major Mvmt | EBT | EBR | WBL   | WBT | SBLn1 | SBLn2 |
|-----------------------|-----|-----|-------|-----|-------|-------|
| Capacity (veh/h)      | -   | -   | 662   | -   | 101   | 605   |
| HCM Lane V/C Ratio    | -   | -   | 0.259 | -   | 1.254 | 0.435 |
| HCM Ctrl Dly (s/v)    | -   | -   | 9.8   | 0   | 251.1 | 15.5  |
| HCM Lane LOS          | -   | -   | A     | A   | F     | C     |
| HCM 95th %tile Q(veh) | -   | -   | 1     | -   | 8.7   | 2.2   |

| Notes                      |                                |
|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$. Delay exceeds 300s         |
| +: Computation Not Defined | *: All major volume in platoon |

Vista GPU

HCM 7th TWSC  
34: SR-78 WB Ramps & Mar Vista Drive

Future Year Conditions  
AM Peak Hour

| Intersection             |                                                                                   |        |       |                                                                                   |                                                                                   |       |
|--------------------------|-----------------------------------------------------------------------------------|--------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|
| Int Delay, s/veh         | 28                                                                                |        |       |                                                                                   |                                                                                   |       |
| Movement                 | EBT                                                                               | EBR    | WBL   | WBT                                                                               | NBL                                                                               | NBR   |
| Lane Configurations      |  |        |       |  |  |       |
| Traffic Vol, veh/h       | 240                                                                               | 280    | 250   | 590                                                                               | 90                                                                                | 170   |
| Future Vol, veh/h        | 240                                                                               | 280    | 250   | 590                                                                               | 90                                                                                | 170   |
| Conflicting Peds, #/hr   | 0                                                                                 | 0      | 0     | 0                                                                                 | 0                                                                                 | 0     |
| Sign Control             | Free                                                                              | Free   | Free  | Free                                                                              | Stop                                                                              | Stop  |
| RT Channelized           | -                                                                                 | Free   | -     | None                                                                              | -                                                                                 | None  |
| Storage Length           | -                                                                                 | -      | -     | -                                                                                 | 0                                                                                 | -     |
| Veh in Median Storage, # | 0                                                                                 | -      | -     | 0                                                                                 | 0                                                                                 | -     |
| Grade, %                 | 0                                                                                 | -      | -     | 0                                                                                 | 0                                                                                 | -     |
| Peak Hour Factor         | 95                                                                                | 95     | 95    | 95                                                                                | 95                                                                                | 95    |
| Heavy Vehicles, %        | 3                                                                                 | 3      | 3     | 3                                                                                 | 3                                                                                 | 3     |
| Mvmt Flow                | 253                                                                               | 295    | 263   | 621                                                                               | 95                                                                                | 179   |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
| Major/Minor              | Major1                                                                            | Major2 |       | Minor1                                                                            |                                                                                   |       |
| Conflicting Flow All     | 0                                                                                 | -      | 253   | 0                                                                                 | 1400                                                                              | 253   |
| Stage 1                  | -                                                                                 | -      | -     | -                                                                                 | 253                                                                               | -     |
| Stage 2                  | -                                                                                 | -      | -     | -                                                                                 | 1147                                                                              | -     |
| Critical Hdwy            | -                                                                                 | -      | 4.13  | -                                                                                 | 6.43                                                                              | 6.23  |
| Critical Hdwy Stg 1      | -                                                                                 | -      | -     | -                                                                                 | 5.43                                                                              | -     |
| Critical Hdwy Stg 2      | -                                                                                 | -      | -     | -                                                                                 | 5.43                                                                              | -     |
| Follow-up Hdwy           | -                                                                                 | -      | 2.227 | -                                                                                 | 3.527                                                                             | 3.327 |
| Pot Cap-1 Maneuver       | -                                                                                 | 0      | 1307  | -                                                                                 | 154                                                                               | 784   |
| Stage 1                  | -                                                                                 | 0      | -     | -                                                                                 | 787                                                                               | -     |
| Stage 2                  | -                                                                                 | 0      | -     | -                                                                                 | 301                                                                               | -     |
| Platoon blocked, %       | -                                                                                 |        |       | -                                                                                 |                                                                                   |       |
| Mov Cap-1 Maneuver       | -                                                                                 | -      | 1307  | -                                                                                 | 107                                                                               | 784   |
| Mov Cap-2 Maneuver       | -                                                                                 | -      | -     | -                                                                                 | 107                                                                               | -     |
| Stage 1                  | -                                                                                 | -      | -     | -                                                                                 | 787                                                                               | -     |
| Stage 2                  | -                                                                                 | -      | -     | -                                                                                 | 209                                                                               | -     |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
| Approach                 | EB                                                                                | WB     |       | NB                                                                                |                                                                                   |       |
| HCM Ctrl Dly, s/v        | 0                                                                                 | 2.51   |       | 135.99                                                                            |                                                                                   |       |
| HCM LOS                  | F                                                                                 |        |       |                                                                                   |                                                                                   |       |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
| Minor Lane/Major Mvmt    | NBLn1                                                                             | EBT    | WBL   | WBT                                                                               |                                                                                   |       |
| Capacity (veh/h)         | 245                                                                               | -      | 536   | -                                                                                 |                                                                                   |       |
| HCM Lane V/C Ratio       | 1.117                                                                             | -      | 0.201 | -                                                                                 |                                                                                   |       |
| HCM Ctrl Dly (s/v)       | 136                                                                               | -      | 8.4   | 0                                                                                 |                                                                                   |       |
| HCM Lane LOS             | F                                                                                 | -      | A     | A                                                                                 |                                                                                   |       |
| HCM 95th %tile Q(veh)    | 12.1                                                                              | -      | 0.8   | -                                                                                 |                                                                                   |       |

Vista GPU

# HCM 7th Signalized Intersection Summary 35: Sycamore Avenue & 78 WB ON/78 WB OFF

Future Year Conditions  
AM Peak Hour

|                                                                                                    |  |  |  |  |  |  |   |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                                                |                                                                                   |                                                                                   |                                                                                   |  |  |  |  |  |                                                                                     |                                                                                     |  |  |
| Traffic Volume (veh/h)                                                                             | 0                                                                                 | 0                                                                                 | 0                                                                                 | 1200                                                                              | 10                                                                                | 380                                                                               | 400                                                                                 | 730                                                                                 | 0                                                                                   | 0                                                                                   | 1200                                                                                | 430                                                                                 |
| Future Volume (veh/h)                                                                              | 0                                                                                 | 0                                                                                 | 0                                                                                 | 1200                                                                              | 10                                                                                | 380                                                                               | 400                                                                                 | 730                                                                                 | 0                                                                                   | 0                                                                                   | 1200                                                                                | 430                                                                                 |
| Initial Q (Qb), veh                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.                                                                                    |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.04                                                                                |
| Ped-Bike Adj(A_pbT)                                                                                |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                                              |                                                                                   |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln                                                                             |                                                                                   |                                                                                   |                                                                                   | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0                                                                                   | 0                                                                                   | 1856                                                                                | 1930                                                                                |
| Adj Flow Rate, veh/h                                                                               |                                                                                   |                                                                                   |                                                                                   | 1271                                                                              | 0                                                                                 | 274                                                                               | 421                                                                                 | 768                                                                                 | 0                                                                                   | 0                                                                                   | 1263                                                                                | 358                                                                                 |
| Peak Hour Factor                                                                                   |                                                                                   |                                                                                   |                                                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %                                                                               |                                                                                   |                                                                                   |                                                                                   | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                                                         |                                                                                   |                                                                                   |                                                                                   | 1057                                                                              | 0                                                                                 | 938                                                                               | 903                                                                                 | 3868                                                                                | 0                                                                                   | 0                                                                                   | 2284                                                                                | 728                                                                                 |
| Arrive On Green                                                                                    |                                                                                   |                                                                                   |                                                                                   | 0.30                                                                              | 0.00                                                                              | 0.30                                                                              | 0.53                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 0.45                                                                                | 0.45                                                                                |
| Sat Flow, veh/h                                                                                    |                                                                                   |                                                                                   |                                                                                   | 3534                                                                              | 0                                                                                 | 3136                                                                              | 3428                                                                                | 5233                                                                                | 0                                                                                   | 0                                                                                   | 5233                                                                                | 1614                                                                                |
| Grp Volume(v), veh/h                                                                               |                                                                                   |                                                                                   |                                                                                   | 1271                                                                              | 0                                                                                 | 274                                                                               | 421                                                                                 | 768                                                                                 | 0                                                                                   | 0                                                                                   | 1263                                                                                | 358                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                                                           |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 0                                                                                 | 1568                                                                              | 1714                                                                                | 1689                                                                                | 0                                                                                   | 0                                                                                   | 1689                                                                                | 1614                                                                                |
| Q Serve(g_s), s                                                                                    |                                                                                   |                                                                                   |                                                                                   | 32.9                                                                              | 0.0                                                                               | 7.4                                                                               | 8.5                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 20.1                                                                                | 17.2                                                                                |
| Cycle Q Clear(g_c), s                                                                              |                                                                                   |                                                                                   |                                                                                   | 32.9                                                                              | 0.0                                                                               | 7.4                                                                               | 8.5                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 20.1                                                                                | 17.2                                                                                |
| Prop In Lane                                                                                       |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                                                             |                                                                                   |                                                                                   |                                                                                   | 1057                                                                              | 0                                                                                 | 938                                                                               | 903                                                                                 | 3868                                                                                | 0                                                                                   | 0                                                                                   | 2284                                                                                | 728                                                                                 |
| V/C Ratio(X)                                                                                       |                                                                                   |                                                                                   |                                                                                   | 1.20                                                                              | 0.00                                                                              | 0.29                                                                              | 0.47                                                                                | 0.20                                                                                | 0.00                                                                                | 0.00                                                                                | 0.55                                                                                | 0.49                                                                                |
| Avail Cap(c_a), veh/h                                                                              |                                                                                   |                                                                                   |                                                                                   | 1057                                                                              | 0                                                                                 | 938                                                                               | 903                                                                                 | 3868                                                                                | 0                                                                                   | 0                                                                                   | 2284                                                                                | 728                                                                                 |
| HCM Platoon Ratio                                                                                  |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 2.00                                                                                | 2.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                                                 |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 0.86                                                                                | 0.86                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                                                           |                                                                                   |                                                                                   |                                                                                   | 38.5                                                                              | 0.0                                                                               | 29.6                                                                              | 21.2                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 22.1                                                                                | 21.3                                                                                |
| Incr Delay (d2), s/veh                                                                             |                                                                                   |                                                                                   |                                                                                   | 100.2                                                                             | 0.0                                                                               | 0.1                                                                               | 0.3                                                                                 | 0.1                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 1.0                                                                                 | 2.4                                                                                 |
| Initial Q Delay(d3), s/veh                                                                         |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                                                           |                                                                                   |                                                                                   |                                                                                   | 28.7                                                                              | 0.0                                                                               | 2.8                                                                               | 2.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 7.7                                                                                 | 6.7                                                                                 |
| Unsig. Movement Delay, s/veh                                                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                                              |                                                                                   |                                                                                   |                                                                                   | 138.8                                                                             | 0.0                                                                               | 29.7                                                                              | 21.5                                                                                | 0.1                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 23.1                                                                                | 23.7                                                                                |
| LnGrp LOS                                                                                          |                                                                                   |                                                                                   |                                                                                   | F                                                                                 |                                                                                   | C                                                                                 | C                                                                                   | A                                                                                   |                                                                                     |                                                                                     | C                                                                                   | C                                                                                   |
| Approach Vol, veh/h                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1545                                                                              |                                                                                   |                                                                                     | 1189                                                                                |                                                                                     |                                                                                     | 1621                                                                                |                                                                                     |
| Approach Delay, s/veh                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 119.4                                                                             |                                                                                   |                                                                                     | 7.7                                                                                 |                                                                                     |                                                                                     | 23.2                                                                                |                                                                                     |
| Approach LOS                                                                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| Timer - Assigned Phs                                                                               | 2                                                                                 |                                                                                   |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                                                           | 89.4                                                                              |                                                                                   |                                                                                   | 34.4                                                                              |                                                                                   | 55.0                                                                              | 39.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                                                            | 5.4                                                                               |                                                                                   |                                                                                   | 5.4                                                                               |                                                                                   | * 5.4                                                                             | 6.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                                                        | 65.6                                                                              |                                                                                   |                                                                                   | 11.3                                                                              |                                                                                   | * 50                                                                              | 32.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s                                                                       | 2.0                                                                               |                                                                                   |                                                                                   | 10.5                                                                              |                                                                                   | 22.1                                                                              | 34.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                                                            | 3.6                                                                               |                                                                                   |                                                                                   | 0.2                                                                               |                                                                                   | 7.3                                                                               | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                                                       |                                                                                   |                                                                                   |                                                                                   | 53.1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                                                        |                                                                                   |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| User approved volume balancing among the lanes for turning movement.                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 36: Sycamore Avenue & 78 EB OFF/78 EB ON

Future Year Conditions  
AM Peak Hour



| Movement                     | EBL  | EBT  | EBR   | WBL  | WBT | WBR | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|-------|------|-----|-----|------|------|------|------|------|------|
| Lane Configurations          |      |      |       |      |     |     |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 390  | 10   | 800   | 0    | 0   | 0   | 0    | 740  | 950  | 300  | 2100 | 0    |
| Future Volume (veh/h)        | 390  | 10   | 800   | 0    | 0   | 0   | 0    | 740  | 950  | 300  | 2100 | 0    |
| Initial Q (Qb), veh          | 0    | 0    | 0     |      |     |     | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              | 1.04 | 1.00 | 1.00  |      |     |     | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00  |      |     |     | 1.00 |      | 0.98 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00  |      |     |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |       |      |     |     | No   |      |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1930 | 1856 | 1856  |      |     |     | 0    | 1856 | 1930 | 1856 | 1856 | 0    |
| Adj Flow Rate, veh/h         | 413  | 0    | 583   |      |     |     | 0    | 771  | 813  | 312  | 2188 | 0    |
| Peak Hour Factor             | 0.96 | 0.96 | 0.96  |      |     |     | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, %         | 3    | 3    | 3     |      |     |     | 0    | 3    | 3    | 3    | 3    | 0    |
| Cap, veh/h                   | 598  | 0    | 510   |      |     |     | 0    | 2213 | 1906 | 321  | 3712 | 0    |
| Arrive On Green              | 0.16 | 0.00 | 0.16  |      |     |     | 0.00 | 0.60 | 0.60 | 0.19 | 1.00 | 0.00 |
| Sat Flow, veh/h              | 3676 | 0    | 3133  |      |     |     | 0    | 3711 | 3196 | 3428 | 5233 | 0    |
| Grp Volume(v), veh/h         | 413  | 0    | 583   |      |     |     | 0    | 771  | 813  | 312  | 2188 | 0    |
| Grp Sat Flow(s), veh/h/ln    | 1838 | 0    | 1567  |      |     |     | 0    | 1856 | 1598 | 1714 | 1689 | 0    |
| Q Serve(g_s), s              | 11.7 | 0.0  | 17.9  |      |     |     | 0.0  | 11.6 | 15.1 | 9.9  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s        | 11.7 | 0.0  | 17.9  |      |     |     | 0.0  | 11.6 | 15.1 | 9.9  | 0.0  | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00  |      |     |     | 0.00 |      | 1.00 | 1.00 |      | 0.00 |
| Lane Grp Cap(c), veh/h       | 598  | 0    | 510   |      |     |     | 0    | 2213 | 1906 | 321  | 3712 | 0    |
| V/C Ratio(X)                 | 0.69 | 0.00 | 1.14  |      |     |     | 0.00 | 0.35 | 0.43 | 0.97 | 0.59 | 0.00 |
| Avail Cap(c_a), veh/h        | 598  | 0    | 510   |      |     |     | 0    | 2213 | 1906 | 321  | 3712 | 0    |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00  |      |     |     | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00  |      |     |     | 0.00 | 1.00 | 1.00 | 0.51 | 0.51 | 0.00 |
| Uniform Delay (d), s/veh     | 43.4 | 0.0  | 46.0  |      |     |     | 0.0  | 11.3 | 12.0 | 44.6 | 0.0  | 0.0  |
| Incr Delay (d2), s/veh       | 2.8  | 0.0  | 85.7  |      |     |     | 0.0  | 0.4  | 0.7  | 28.8 | 0.4  | 0.0  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0   |      |     |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 5.5  | 0.0  | 13.0  |      |     |     | 0.0  | 4.5  | 5.1  | 5.0  | 0.1  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |       |      |     |     |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        | 46.3 | 0.0  | 131.8 |      |     |     | 0.0  | 11.7 | 12.7 | 73.4 | 0.4  | 0.0  |
| LnGrp LOS                    | D    |      | F     |      |     |     |      | B    | B    | E    | A    |      |
| Approach Vol, veh/h          | 996  |      |       |      |     |     | 1584 |      |      | 2500 |      |      |
| Approach Delay, s/veh        | 96.3 |      |       |      |     |     | 12.2 |      |      | 9.5  |      |      |
| Approach LOS                 | F    |      |       |      |     |     | B    |      |      | A    |      |      |
| Timer - Assigned Phs         | 1    | 2    |       | 4    |     |     | 6    |      |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 5.0  | 71.0 |       | 24.0 |     |     | 86.0 |      |      |      |      |      |
| Change Period (Y+Rc), s      | 4.7  | 5.4  |       | 6.1  |     |     | 5.4  |      |      |      |      |      |
| Max Green Setting (Gmax), s  | 10.3 | 65.6 |       | 17.9 |     |     | 80.6 |      |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 11.9 | 17.1 |       | 19.9 |     |     | 2.0  |      |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 6.3  |       | 0.0  |     |     | 19.4 |      |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 27.4  
HCM 7th LOS C

## Notes

User approved volume balancing among the lanes for turning movement.

# HCM 7th Signalized Intersection Summary 37: Sycamore Avenue & Watson Way/Hibiscus Avenue

Future Year Conditions  
AM Peak Hour



| Movement                      | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL   | SBT  | SBR  |
|-------------------------------|------|------|------|------|------|------|------|------|------|-------|------|------|
| Lane Configurations           |      | ↔    | ↔    |      | ↔    | ↔    | ↔    | ↔    | ↔    | ↔     | ↔    | ↔    |
| Traffic Volume (veh/h)        | 50   | 10   | 40   | 100  | 20   | 250  | 50   | 850  | 100  | 290   | 2400 | 100  |
| Future Volume (veh/h)         | 50   | 10   | 40   | 100  | 20   | 250  | 50   | 850  | 100  | 290   | 2400 | 100  |
| Initial Q (Qb), veh           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    |
| Lane Width Adj.               | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)           | 1.00 |      | 1.00 | 1.00 |      | 0.98 | 1.00 |      | 0.98 | 1.00  |      | 1.00 |
| Parking Bus, Adj              | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Work Zone On Approach         | No   |      |      | No   |      |      | No   |      |      | No    |      |      |
| Adj Sat Flow, veh/h/ln        | 1934 | 1934 | 1934 | 1934 | 1934 | 2011 | 1934 | 1934 | 1934 | 1934  | 1934 | 1934 |
| Adj Flow Rate, veh/h          | 52   | 10   | 31   | 103  | 21   | 206  | 52   | 876  | 93   | 299   | 2474 | 93   |
| Peak Hour Factor              | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97  | 0.97 | 0.97 |
| Percent Heavy Veh, %          | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3     | 3    | 3    |
| Cap, veh/h                    | 93   | 18   | 98   | 270  | 55   | 250  | 68   | 2030 | 214  | 288   | 2816 | 105  |
| Arrive On Green               | 0.06 | 0.06 | 0.06 | 0.17 | 0.17 | 0.17 | 0.04 | 0.42 | 0.42 | 0.16  | 0.54 | 0.54 |
| Sat Flow, veh/h               | 1556 | 299  | 1639 | 1542 | 314  | 1431 | 1842 | 4836 | 511  | 1842  | 5222 | 195  |
| Grp Volume(v), veh/h          | 62   | 0    | 31   | 124  | 0    | 206  | 52   | 636  | 333  | 299   | 1661 | 906  |
| Grp Sat Flow(s),veh/h/ln      | 1856 | 0    | 1639 | 1857 | 0    | 1431 | 1842 | 1760 | 1828 | 1842  | 1760 | 1898 |
| Q Serve(g_s), s               | 3.6  | 0.0  | 2.0  | 6.5  | 0.0  | 15.3 | 3.1  | 14.1 | 14.2 | 17.2  | 45.3 | 46.3 |
| Cycle Q Clear(g_c), s         | 3.6  | 0.0  | 2.0  | 6.5  | 0.0  | 15.3 | 3.1  | 14.1 | 14.2 | 17.2  | 45.3 | 46.3 |
| Prop In Lane                  | 0.84 |      | 1.00 | 0.83 |      | 1.00 | 1.00 |      | 0.28 | 1.00  |      | 0.10 |
| Lane Grp Cap(c), veh/h        | 111  | 0    | 98   | 325  | 0    | 250  | 68   | 1477 | 767  | 288   | 1898 | 1023 |
| V/C Ratio(X)                  | 0.56 | 0.00 | 0.32 | 0.38 | 0.00 | 0.82 | 0.77 | 0.43 | 0.43 | 1.04  | 0.88 | 0.88 |
| Avail Cap(c_a), veh/h         | 159  | 0    | 140  | 547  | 0    | 422  | 121  | 1477 | 767  | 288   | 1898 | 1023 |
| HCM Platoon Ratio             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Upstream Filter(I)            | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Uniform Delay (d), s/veh      | 50.3 | 0.0  | 49.5 | 40.1 | 0.0  | 43.7 | 52.5 | 22.6 | 22.6 | 46.4  | 22.1 | 22.3 |
| Incr Delay (d2), s/veh        | 1.6  | 0.0  | 0.7  | 0.5  | 0.0  | 5.0  | 6.6  | 0.9  | 1.8  | 63.4  | 6.0  | 11.1 |
| Initial Q Delay(d3), s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 1.7  | 0.0  | 0.8  | 3.0  | 0.0  | 5.7  | 1.5  | 5.7  | 6.1  | 12.7  | 18.5 | 21.8 |
| Unsig. Movement Delay, s/veh  |      |      |      |      |      |      |      |      |      |       |      |      |
| LnGrp Delay(d), s/veh         | 51.9 | 0.0  | 50.2 | 40.7 | 0.0  | 48.8 | 59.1 | 23.5 | 24.4 | 109.8 | 28.1 | 33.5 |
| LnGrp LOS                     | D    |      | D    | D    |      | D    | E    | C    | C    | F     | C    | C    |
| Approach Vol, veh/h           |      | 93   |      |      | 330  |      |      | 1021 |      |       | 2866 |      |
| Approach Delay, s/veh         |      | 51.3 |      |      | 45.7 |      |      | 25.6 |      |       | 38.3 |      |
| Approach LOS                  |      | D    |      |      | D    |      |      | C    |      |       | D    |      |
| Timer - Assigned Phs          | 1    | 2    |      | 4    | 5    | 6    |      | 8    |      |       |      |      |
| Phs Duration (G+Y+Rc), s      | 30.0 | 52.0 |      | 11.2 | 9.8  | 65.1 |      | 23.8 |      |       |      |      |
| Change Period (Y+Rc), s       | 5.8  | 5.8  |      | 4.6  | 5.8  | 5.8  |      | 4.6  |      |       |      |      |
| Max Green Setting (Gmax), s   | 30.2 |      |      | 9.4  | 7.2  | 40.2 |      | 32.4 |      |       |      |      |
| Max Q Clear Time (g_c+119, s) | 16.2 |      |      | 5.6  | 5.1  | 48.3 |      | 17.3 |      |       |      |      |
| Green Ext Time (p_c), s       | 0.0  | 3.4  |      | 0.1  | 0.0  | 0.0  |      | 0.9  |      |       |      |      |
| Intersection Summary          |      |      |      |      |      |      |      |      |      |       |      |      |
| HCM 7th Control Delay, s/veh  |      |      | 36.2 |      |      |      |      |      |      |       |      |      |
| HCM 7th LOS                   |      |      | D    |      |      |      |      |      |      |       |      |      |

# HCM 7th Signalized Intersection Summary 38: Sycamore Avenue & La Mirada Avenue

Future Year Conditions  
AM Peak Hour



| Movement                      | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL   | NBT  | NBR  | SBL   | SBT   | SBR   |
|-------------------------------|------|------|------|------|------|------|-------|------|------|-------|-------|-------|
| Lane Configurations           |      | ↔    | ↔    |      | ↔    | ↔    | ↔     | ↔    |      | ↔     | ↔     | ↔     |
| Traffic Volume (veh/h)        | 40   | 20   | 30   | 70   | 40   | 100  | 150   | 500  | 230  | 450   | 2000  | 200   |
| Future Volume (veh/h)         | 40   | 20   | 30   | 70   | 40   | 100  | 150   | 500  | 230  | 450   | 2000  | 200   |
| Initial Q (Qb), veh           | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0     | 0     | 0     |
| Lane Width Adj.               | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.04 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Ped-Bike Adj(A_pbT)           | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00  |      | 0.99 | 1.00  |       | 1.00  |
| Parking Bus, Adj              | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Work Zone On Approach         | No   |      |      | No   |      |      | No    |      |      | No    |       |       |
| Adj Sat Flow, veh/h/ln        | 1856 | 1856 | 1930 | 1856 | 1856 | 1930 | 1856  | 1856 | 1856 | 1856  | 1856  | 1856  |
| Adj Flow Rate, veh/h          | 42   | 21   | 21   | 74   | 42   | 84   | 158   | 526  | 189  | 474   | 2105  | 190   |
| Peak Hour Factor              | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95  | 0.95 | 0.95 | 0.95  | 0.95  | 0.95  |
| Percent Heavy Veh, %          | 3    | 3    | 3    | 3    | 3    | 3    | 3     | 3    | 3    | 3     | 3     | 3     |
| Cap, veh/h                    | 59   | 30   | 81   | 99   | 56   | 141  | 116   | 926  | 331  | 318   | 1859  | 166   |
| Arrive On Green               | 0.05 | 0.05 | 0.05 | 0.09 | 0.09 | 0.09 | 0.07  | 0.37 | 0.37 | 0.09  | 0.39  | 0.39  |
| Sat Flow, veh/h               | 1197 | 599  | 1635 | 1147 | 651  | 1635 | 1767  | 2535 | 907  | 3428  | 4733  | 423   |
| Grp Volume(v), veh/h          | 63   | 0    | 21   | 116  | 0    | 84   | 158   | 365  | 350  | 474   | 1496  | 799   |
| Grp Sat Flow(s),veh/h/ln      | 1796 | 0    | 1635 | 1798 | 0    | 1635 | 1767  | 1763 | 1679 | 1714  | 1689  | 1779  |
| Q Serve(g_s), s               | 3.8  | 0.0  | 1.4  | 6.9  | 0.0  | 5.4  | 7.2   | 18.2 | 18.4 | 10.2  | 43.2  | 43.2  |
| Cycle Q Clear(g_c), s         | 3.8  | 0.0  | 1.4  | 6.9  | 0.0  | 5.4  | 7.2   | 18.2 | 18.4 | 10.2  | 43.2  | 43.2  |
| Prop In Lane                  | 0.67 |      | 1.00 | 0.64 |      | 1.00 | 1.00  |      | 0.54 | 1.00  |       | 0.24  |
| Lane Grp Cap(c), veh/h        | 89   | 0    | 81   | 155  | 0    | 141  | 116   | 644  | 613  | 318   | 1326  | 699   |
| V/C Ratio(X)                  | 0.71 | 0.00 | 0.26 | 0.75 | 0.00 | 0.59 | 1.37  | 0.57 | 0.57 | 1.49  | 1.13  | 1.14  |
| Avail Cap(c_a), veh/h         | 176  | 0    | 161  | 458  | 0    | 416  | 116   | 644  | 613  | 318   | 1326  | 699   |
| HCM Platoon Ratio             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)            | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh      | 51.5 | 0.0  | 50.3 | 49.1 | 0.0  | 48.4 | 51.4  | 27.9 | 28.0 | 49.9  | 33.4  | 33.4  |
| Incr Delay (d2), s/veh        | 7.5  | 0.0  | 1.2  | 5.2  | 0.0  | 2.9  | 210.2 | 0.7  | 0.8  | 237.0 | 67.8  | 81.0  |
| Initial Q Delay(d3), s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln      | 9    | 0.0  | 0.6  | 3.3  | 0.0  | 2.3  | 9.8   | 7.4  | 7.1  | 14.7  | 28.9  | 33.0  |
| Unsig. Movement Delay, s/veh  |      |      |      |      |      |      |       |      |      |       |       |       |
| LnGrp Delay(d), s/veh         | 59.0 | 0.0  | 51.6 | 54.3 | 0.0  | 51.3 | 261.6 | 28.7 | 28.8 | 286.9 | 101.2 | 114.4 |
| LnGrp LOS                     | E    |      | D    | D    |      | D    | F     | C    | C    | F     | F     | F     |
| Approach Vol, veh/h           | 84   |      |      | 200  |      |      | 873   |      |      | 2769  |       |       |
| Approach Delay, s/veh         | 57.1 |      |      | 53.1 |      |      | 70.9  |      |      | 136.8 |       |       |
| Approach LOS                  | E    |      |      | D    |      |      | E     |      |      | F     |       |       |
| Timer - Assigned Phs          | 1    | 2    |      | 4    | 5    | 6    |       | 8    |      |       |       |       |
| Phs Duration (G+Y+Rc), s      | 6.0  | 46.0 |      | 10.0 | 13.0 | 49.0 |       | 14.1 |      |       |       |       |
| Change Period (Y+Rc), s       | 5.8  | 5.8  |      | 4.6  | 5.8  | 5.8  |       | 4.6  |      |       |       |       |
| Max Green Setting (Gmax), s   | 40.2 |      |      | 10.8 | 7.2  | 43.2 |       | 28.0 |      |       |       |       |
| Max Q Clear Time (g_c+I12), s | 20.4 |      |      | 5.8  | 9.2  | 45.2 |       | 8.9  |      |       |       |       |
| Green Ext Time (p_c), s       | 0.0  | 2.5  |      | 0.1  | 0.0  | 0.0  |       | 0.6  |      |       |       |       |

## Intersection Summary

HCM 7th Control Delay, s/veh 116.2  
HCM 7th LOS F

## Notes

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

# HCM 7th Signalized Intersection Summary 39: S Melrose Dr & Sycamore Av/Sycamore Av

Future Year Conditions  
AM Peak Hour

|                                                                      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                                                             | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                  |  |  |  |  |  |  |  |  |   |   |  |  |
| Traffic Volume (veh/h)                                               | 130                                                                               | 140                                                                               | 180                                                                               | 1180                                                                              | 100                                                                               | 150                                                                               | 120                                                                               | 550                                                                               | 440                                                                                | 400                                                                                 | 2360                                                                                | 90                                                                                  |
| Future Volume (veh/h)                                                | 130                                                                               | 140                                                                               | 180                                                                               | 1180                                                                              | 100                                                                               | 150                                                                               | 120                                                                               | 550                                                                               | 440                                                                                | 400                                                                                 | 2360                                                                                | 90                                                                                  |
| Initial Q (Qb), veh                                                  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.                                                      | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)                                                  | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                               | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj                                                     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                               | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h                                                 | 137                                                                               | 147                                                                               | 147                                                                               | 1070                                                                              | 346                                                                               | 126                                                                               | 126                                                                               | 579                                                                               | 368                                                                                | 421                                                                                 | 2484                                                                                | 84                                                                                  |
| Peak Hour Factor                                                     | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                               | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                           | 118                                                                               | 124                                                                               | 109                                                                               | 875                                                                               | 460                                                                               | 651                                                                               | 79                                                                                | 1707                                                                              | 909                                                                                | 575                                                                                 | 2315                                                                                | 78                                                                                  |
| Arrive On Green                                                      | 0.07                                                                              | 0.07                                                                              | 0.07                                                                              | 0.25                                                                              | 0.25                                                                              | 0.25                                                                              | 0.04                                                                              | 0.34                                                                              | 0.34                                                                               | 0.17                                                                                | 0.46                                                                                | 0.46                                                                                |
| Sat Flow, veh/h                                                      | 1767                                                                              | 1856                                                                              | 1635                                                                              | 3534                                                                              | 1856                                                                              | 1563                                                                              | 1767                                                                              | 5066                                                                              | 1542                                                                               | 3428                                                                                | 5033                                                                                | 169                                                                                 |
| Grp Volume(v), veh/h                                                 | 137                                                                               | 147                                                                               | 147                                                                               | 1070                                                                              | 346                                                                               | 126                                                                               | 126                                                                               | 579                                                                               | 368                                                                                | 421                                                                                 | 1662                                                                                | 906                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                             | 1767                                                                              | 1856                                                                              | 1635                                                                              | 3534                                                                              | 1856                                                                              | 1563                                                                              | 1767                                                                              | 1689                                                                              | 1542                                                                               | 1714                                                                                | 1689                                                                                | 1825                                                                                |
| Q Serve(g_s), s                                                      | 8.7                                                                               | 8.7                                                                               | 8.7                                                                               | 32.2                                                                              | 22.4                                                                              | 0.0                                                                               | 5.8                                                                               | 11.1                                                                              | 16.9                                                                               | 15.1                                                                                | 59.8                                                                                | 59.8                                                                                |
| Cycle Q Clear(g_c), s                                                | 8.7                                                                               | 8.7                                                                               | 8.7                                                                               | 32.2                                                                              | 22.4                                                                              | 0.0                                                                               | 5.8                                                                               | 11.1                                                                              | 16.9                                                                               | 15.1                                                                                | 59.8                                                                                | 59.8                                                                                |
| Prop In Lane                                                         | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                |                                                                                     | 0.09                                                                                |
| Lane Grp Cap(c), veh/h                                               | 118                                                                               | 124                                                                               | 109                                                                               | 875                                                                               | 460                                                                               | 651                                                                               | 79                                                                                | 1707                                                                              | 909                                                                                | 575                                                                                 | 1553                                                                                | 839                                                                                 |
| V/C Ratio(X)                                                         | 1.16                                                                              | 1.18                                                                              | 1.34                                                                              | 1.22                                                                              | 0.75                                                                              | 0.19                                                                              | 1.60                                                                              | 0.34                                                                              | 0.40                                                                               | 0.73                                                                                | 1.07                                                                                | 1.08                                                                                |
| Avail Cap(c_a), veh/h                                                | 118                                                                               | 124                                                                               | 109                                                                               | 875                                                                               | 460                                                                               | 651                                                                               | 79                                                                                | 1707                                                                              | 909                                                                                | 575                                                                                 | 1553                                                                                | 839                                                                                 |
| HCM Platoon Ratio                                                    | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                             | 60.6                                                                              | 60.7                                                                              | 60.7                                                                              | 48.9                                                                              | 45.2                                                                              | 24.2                                                                              | 62.1                                                                              | 32.3                                                                              | 14.7                                                                               | 51.3                                                                                | 35.1                                                                                | 35.1                                                                                |
| Incr Delay (d2), s/veh                                               | 131.6                                                                             | 138.5                                                                             | 203.3                                                                             | 110.3                                                                             | 6.9                                                                               | 0.1                                                                               | 320.4                                                                             | 0.5                                                                               | 1.3                                                                                | 4.5                                                                                 | 44.0                                                                                | 54.9                                                                                |
| Initial Q Delay(d3), s/veh                                           | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                             | 8.3                                                                               | 8.9                                                                               | 9.7                                                                               | 27.1                                                                              | 10.9                                                                              | 2.4                                                                               | 9.6                                                                               | 4.5                                                                               | 10.1                                                                               | 6.7                                                                                 | 32.1                                                                                | 37.2                                                                                |
| Unsig. Movement Delay, s/veh                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                | 192.2                                                                             | 199.1                                                                             | 264.0                                                                             | 159.2                                                                             | 52.1                                                                              | 24.3                                                                              | 382.5                                                                             | 32.8                                                                              | 16.1                                                                               | 55.9                                                                                | 79.1                                                                                | 90.0                                                                                |
| LnGrp LOS                                                            | F                                                                                 | F                                                                                 | F                                                                                 | F                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | C                                                                                 | B                                                                                  | E                                                                                   | F                                                                                   | F                                                                                   |
| Approach Vol, veh/h                                                  | 431                                                                               |                                                                                   |                                                                                   | 1542                                                                              |                                                                                   |                                                                                   | 1073                                                                              |                                                                                   |                                                                                    | 2989                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                                | 219.0                                                                             |                                                                                   |                                                                                   | 124.1                                                                             |                                                                                   |                                                                                   | 68.1                                                                              |                                                                                   |                                                                                    | 79.1                                                                                |                                                                                     |                                                                                     |
| Approach LOS                                                         | F                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    | E                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                                 | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |                                                                                   | 8                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                             | 38.0                                                                              | 50.0                                                                              |                                                                                   | 14.0                                                                              | 12.0                                                                              | 66.0                                                                              |                                                                                   | 38.0                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                              | 6.2                                                                               | 6.2                                                                               |                                                                                   | 5.3                                                                               | 6.2                                                                               | 6.2                                                                               |                                                                                   | 5.8                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                          | 21.8                                                                              | 43.8                                                                              |                                                                                   | 8.7                                                                               | 5.8                                                                               | 59.8                                                                              |                                                                                   | 32.2                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+117), s                                        | 117.1                                                                             | 18.9                                                                              |                                                                                   | 10.7                                                                              | 7.8                                                                               | 61.8                                                                              |                                                                                   | 34.2                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                              | 0.5                                                                               | 2.9                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                         | 98.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                          | F                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| User approved volume balancing among the lanes for turning movement. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 40: S Melrose Dr & Faraday Ave/Park Center Dr

Future Year Conditions  
AM Peak Hour



| Movement                       | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               | SBR                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations            |  |  |      |  |  |      |  |  |      |  |  |  |
| Traffic Volume (veh/h)         | 250                                                                               | 150                                                                               | 150  | 70                                                                                | 130                                                                               | 40   | 290                                                                               | 750                                                                               | 120  | 100                                                                               | 2300                                                                              | 1150                                                                              |
| Future Volume (veh/h)          | 250                                                                               | 150                                                                               | 150  | 70                                                                                | 130                                                                               | 40   | 290                                                                               | 750                                                                               | 120  | 100                                                                               | 2300                                                                              | 1150                                                                              |
| Initial Q (Qb), veh            | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Lane Width 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                                                                              |
| Ped-Bike Adj(A_pbT)            | 1.00                                                                              |                                                                                   | 0.98 | 1.00                                                                              |                                                                                   | 1.00 | 1.00                                                                              |                                                                                   | 0.99 | 1.00                                                                              |                                                                                   | 1.00                                                                              |
| Parking Bus, Adj               | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Work Zone On Approach          | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |                                                                                   |
| Adj Sat Flow, veh/h/ln         | 2012                                                                              | 2012                                                                              | 2012 | 2012                                                                              | 2012                                                                              | 2012 | 2012                                                                              | 2012                                                                              | 2012 | 2012                                                                              | 2012                                                                              | 2012                                                                              |
| Adj Flow Rate, veh/h           | 263                                                                               | 158                                                                               | 142  | 74                                                                                | 137                                                                               | 37   | 305                                                                               | 789                                                                               | 110  | 105                                                                               | 2421                                                                              | 969                                                                               |
| Peak Hour Factor               | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              |
| Percent Heavy Veh, %           | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Cap, veh/h                     | 325                                                                               | 236                                                                               | 196  | 133                                                                               | 206                                                                               | 54   | 174                                                                               | 2909                                                                              | 403  | 130                                                                               | 3157                                                                              | 1129                                                                              |
| Arrive On Green                | 0.09                                                                              | 0.12                                                                              | 0.12 | 0.04                                                                              | 0.07                                                                              | 0.07 | 0.09                                                                              | 0.60                                                                              | 0.60 | 0.07                                                                              | 0.57                                                                              | 0.57                                                                              |
| Sat Flow, veh/h                | 3718                                                                              | 1964                                                                              | 1630 | 3718                                                                              | 2995                                                                              | 784  | 1916                                                                              | 4869                                                                              | 674  | 1916                                                                              | 5494                                                                              | 1705                                                                              |
| Grp Volume(v), veh/h           | 263                                                                               | 153                                                                               | 147  | 74                                                                                | 86                                                                                | 88   | 305                                                                               | 592                                                                               | 307  | 105                                                                               | 2421                                                                              | 969                                                                               |
| Grp Sat Flow(s),veh/h/ln       | 1859                                                                              | 1912                                                                              | 1682 | 1859                                                                              | 1912                                                                              | 1867 | 1916                                                                              | 1831                                                                              | 1880 | 1916                                                                              | 1831                                                                              | 1705                                                                              |
| Q Serve(g_s), s                | 9.0                                                                               | 10.0                                                                              | 10.9 | 2.5                                                                               | 5.7                                                                               | 6.0  | 11.8                                                                              | 10.1                                                                              | 10.2 | 7.0                                                                               | 43.6                                                                              | 57.8                                                                              |
| Cycle Q Clear(g_c), s          | 9.0                                                                               | 10.0                                                                              | 10.9 | 2.5                                                                               | 5.7                                                                               | 6.0  | 11.8                                                                              | 10.1                                                                              | 10.2 | 7.0                                                                               | 43.6                                                                              | 57.8                                                                              |
| Prop In Lane                   | 1.00                                                                              |                                                                                   | 0.97 | 1.00                                                                              |                                                                                   | 0.42 | 1.00                                                                              |                                                                                   | 0.36 | 1.00                                                                              |                                                                                   | 1.00                                                                              |
| Lane Grp Cap(c), veh/h         | 325                                                                               | 230                                                                               | 202  | 133                                                                               | 131                                                                               | 128  | 174                                                                               | 2188                                                                              | 1123 | 130                                                                               | 3157                                                                              | 1129                                                                              |
| V/C Ratio(X)                   | 0.81                                                                              | 0.67                                                                              | 0.72 | 0.56                                                                              | 0.65                                                                              | 0.69 | 1.75                                                                              | 0.27                                                                              | 0.27 | 0.80                                                                              | 0.77                                                                              | 0.86                                                                              |
| Avail Cap(c_a), veh/h          | 589                                                                               | 729                                                                               | 642  | 275                                                                               | 568                                                                               | 554  | 174                                                                               | 2188                                                                              | 1123 | 180                                                                               | 3157                                                                              | 1129                                                                              |
| HCM Platoon Ratio              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Upstream Filter(I)             | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Uniform Delay (d), s/veh       | 58.3                                                                              | 54.7                                                                              | 55.1 | 61.7                                                                              | 59.0                                                                              | 59.2 | 59.1                                                                              | 12.6                                                                              | 12.6 | 59.7                                                                              | 21.0                                                                              | 17.2                                                                              |
| Incr Delay (d2), s/veh         | 1.9                                                                               | 1.3                                                                               | 1.8  | 1.3                                                                               | 2.0                                                                               | 2.4  | 361.6                                                                             | 0.3                                                                               | 0.6  | 11.8                                                                              | 1.8                                                                               | 8.5                                                                               |
| Initial Q Delay(d3), s/veh     | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |
| %ile BackOfQ(50%),veh/ln       | 4.2                                                                               | 4.7                                                                               | 4.6  | 1.2                                                                               | 2.8                                                                               | 2.9  | 23.0                                                                              | 3.9                                                                               | 4.1  | 3.7                                                                               | 17.2                                                                              | 22.6                                                                              |
| Unsig. Movement Delay, s/veh   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |
| LnGrp Delay(d), s/veh          | 60.1                                                                              | 56.0                                                                              | 57.0 | 63.0                                                                              | 61.1                                                                              | 61.6 | 420.7                                                                             | 12.9                                                                              | 13.2 | 71.5                                                                              | 22.9                                                                              | 25.7                                                                              |
| LnGrp LOS                      | E                                                                                 | E                                                                                 | E    | E                                                                                 | E                                                                                 | E    | F                                                                                 | B                                                                                 | B    | E                                                                                 | C                                                                                 | C                                                                                 |
| Approach Vol, veh/h            | 563                                                                               |                                                                                   |      | 248                                                                               |                                                                                   |      | 1204                                                                              |                                                                                   |      | 3495                                                                              |                                                                                   |                                                                                   |
| Approach Delay, s/veh          | 58.2                                                                              |                                                                                   |      | 61.8                                                                              |                                                                                   |      | 116.3                                                                             |                                                                                   |      | 25.1                                                                              |                                                                                   |                                                                                   |
| Approach LOS                   | E                                                                                 |                                                                                   |      | E                                                                                 |                                                                                   |      | F                                                                                 |                                                                                   |      | C                                                                                 |                                                                                   |                                                                                   |
| Timer - Assigned Phs           | 1                                                                                 | 2                                                                                 | 3    | 4                                                                                 | 5                                                                                 | 6    | 7                                                                                 | 8                                                                                 |      |                                                                                   |                                                                                   |                                                                                   |
| Phs Duration (G+Y+Rc), s       | 5.0                                                                               | 83.9                                                                              | 10.1 | 21.0                                                                              | 18.0                                                                              | 80.9 | 16.8                                                                              | 14.3                                                                              |      |                                                                                   |                                                                                   |                                                                                   |
| Change Period (Y+Rc), s        | 6.2                                                                               | 6.2                                                                               | 5.4  | 5.4                                                                               | 6.2                                                                               | 6.2  | 5.4                                                                               | 5.4                                                                               |      |                                                                                   |                                                                                   |                                                                                   |
| Max Green Setting (Gmax), s    | 12.2                                                                              | 35.4                                                                              | 9.6  | 49.6                                                                              | 11.8                                                                              | 35.8 | 20.6                                                                              | 38.6                                                                              |      |                                                                                   |                                                                                   |                                                                                   |
| Max Q Clear Time (g_c+19.0), s | 12.2                                                                              | 12.2                                                                              | 4.5  | 12.9                                                                              | 13.8                                                                              | 59.8 | 11.0                                                                              | 8.0                                                                               |      |                                                                                   |                                                                                   |                                                                                   |
| Green Ext Time (p_c), s        | 0.0                                                                               | 3.4                                                                               | 0.0  | 1.0                                                                               | 0.0                                                                               | 0.0  | 0.3                                                                               | 0.6                                                                               |      |                                                                                   |                                                                                   |                                                                                   |

## Intersection Summary

|                              |      |
|------------------------------|------|
| HCM 7th Control Delay, s/veh | 50.1 |
| HCM 7th LOS                  | D    |

## Notes

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

# HCM 7th Signalized Intersection Summary

## 1: N. Santa Fe Avenue & Osborne Street

Future Year Conditions  
PM Peak Hour

|                                                                    |  |  |  |  |  |  |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Movement                                                           | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                               |
| Lane Configurations                                                |  |  |  |  |  |  |
| Traffic Volume (veh/h)                                             | 150                                                                               | 250                                                                               | 650                                                                               | 250                                                                               | 510                                                                               | 540                                                                               |
| Future Volume (veh/h)                                              | 150                                                                               | 250                                                                               | 650                                                                               | 250                                                                               | 510                                                                               | 540                                                                               |
| Initial Q (Qb), veh                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Lane Width Adj.                                                    | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.96                                                                              | 1.00                                                                              |
| Ped-Bike Adj(A_pbT)                                                | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   |
| Parking Bus, Adj                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Work Zone On Approach                                              | No                                                                                |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |
| Adj Sat Flow, veh/h/ln                                             | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1781                                                                              | 1856                                                                              |
| Adj Flow Rate, veh/h                                               | 158                                                                               | 210                                                                               | 684                                                                               | 210                                                                               | 537                                                                               | 568                                                                               |
| Peak Hour Factor                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              |
| Percent Heavy Veh, %                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Cap, veh/h                                                         | 276                                                                               | 246                                                                               | 1111                                                                              | 941                                                                               | 183                                                                               | 1389                                                                              |
| Arrive On Green                                                    | 0.16                                                                              | 0.16                                                                              | 0.60                                                                              | 0.60                                                                              | 0.11                                                                              | 0.75                                                                              |
| Sat Flow, veh/h                                                    | 1767                                                                              | 1572                                                                              | 1856                                                                              | 1571                                                                              | 1696                                                                              | 1856                                                                              |
| Grp Volume(v), veh/h                                               | 158                                                                               | 210                                                                               | 684                                                                               | 210                                                                               | 537                                                                               | 568                                                                               |
| Grp Sat Flow(s),veh/h/ln                                           | 1767                                                                              | 1572                                                                              | 1856                                                                              | 1571                                                                              | 1696                                                                              | 1856                                                                              |
| Q Serve(g_s), s                                                    | 8.3                                                                               | 13.0                                                                              | 23.4                                                                              | 6.2                                                                               | 10.8                                                                              | 11.1                                                                              |
| Cycle Q Clear(g_c), s                                              | 8.3                                                                               | 13.0                                                                              | 23.4                                                                              | 6.2                                                                               | 10.8                                                                              | 11.1                                                                              |
| Prop In Lane                                                       | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   |
| Lane Grp Cap(c), veh/h                                             | 276                                                                               | 246                                                                               | 1111                                                                              | 941                                                                               | 183                                                                               | 1389                                                                              |
| V/C Ratio(X)                                                       | 0.57                                                                              | 0.85                                                                              | 0.62                                                                              | 0.22                                                                              | 2.93                                                                              | 0.41                                                                              |
| Avail Cap(c_a), veh/h                                              | 421                                                                               | 374                                                                               | 1111                                                                              | 941                                                                               | 183                                                                               | 1389                                                                              |
| HCM Platoon Ratio                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Upstream Filter(I)                                                 | 1.00                                                                              | 1.00                                                                              | 0.82                                                                              | 0.82                                                                              | 1.00                                                                              | 1.00                                                                              |
| Uniform Delay (d), s/veh                                           | 39.1                                                                              | 41.1                                                                              | 12.8                                                                              | 9.3                                                                               | 44.6                                                                              | 4.6                                                                               |
| Incr Delay (d2), s/veh                                             | 1.4                                                                               | 9.8                                                                               | 2.1                                                                               | 0.5                                                                               | 883.6                                                                             | 0.9                                                                               |
| Initial Q Delay(d3), s/veh                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |
| %ile BackOfQ(50%),veh/ln                                           | 3.7                                                                               | 11.4                                                                              | 8.9                                                                               | 2.0                                                                               | 49.3                                                                              | 3.1                                                                               |
| Unsig. Movement Delay, s/veh                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| LnGrp Delay(d), s/veh                                              | 40.5                                                                              | 50.9                                                                              | 14.9                                                                              | 9.7                                                                               | 928.2                                                                             | 5.4                                                                               |
| LnGrp LOS                                                          | D                                                                                 | D                                                                                 | B                                                                                 | A                                                                                 | F                                                                                 | A                                                                                 |
| Approach Vol, veh/h                                                | 368                                                                               |                                                                                   | 894                                                                               |                                                                                   |                                                                                   | 1105                                                                              |
| Approach Delay, s/veh                                              | 46.4                                                                              |                                                                                   | 13.7                                                                              |                                                                                   |                                                                                   | 453.9                                                                             |
| Approach LOS                                                       | D                                                                                 |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | F                                                                                 |
| Timer - Assigned Phs                                               | 2                                                                                 |                                                                                   | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 |
| Phs Duration (G+Y+Rc), s                                           | 80.2                                                                              |                                                                                   | 19.8                                                                              |                                                                                   | 15.0                                                                              | 65.2                                                                              |
| Change Period (Y+Rc), s                                            | 5.3                                                                               |                                                                                   | 4.2                                                                               |                                                                                   | 4.2                                                                               | 5.3                                                                               |
| Max Green Setting (Gmax), s                                        | 66.7                                                                              |                                                                                   | 23.8                                                                              |                                                                                   | 10.8                                                                              | 51.7                                                                              |
| Max Q Clear Time (g_c+l1), s                                       | 13.1                                                                              |                                                                                   | 15.0                                                                              |                                                                                   | 12.8                                                                              | 25.4                                                                              |
| Green Ext Time (p_c), s                                            | 2.1                                                                               |                                                                                   | 0.6                                                                               |                                                                                   | 0.0                                                                               | 3.0                                                                               |
| Intersection Summary                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| HCM 7th Control Delay, s/veh                                       | 224.3                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| HCM 7th LOS                                                        | F                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Notes                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| User approved pedestrian interval to be less than phase max green. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |

## HCM 7th Signalized Intersection Summary

### 2: N. Santa Fe Avenue & Museum Way

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL  | EBR  | NBL  | NBT  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 120  | 160  | 150  | 840  | 650  | 90   |
| Future Volume (veh/h)        | 120  | 160  | 150  | 840  | 650  | 90   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              | 1.00 | 1.00 | 1.00 | 1.04 | 1.04 | 1.04 |
| Ped-Bike Adj(A_pbT)          | 1.00 | 1.00 | 1.00 |      |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      | No   | No   |      |
| Adj Sat Flow, veh/h/ln       | 1856 | 1856 | 1856 | 1930 | 1930 | 1930 |
| Adj Flow Rate, veh/h         | 126  | 131  | 158  | 884  | 684  | 74   |
| Peak Hour Factor             | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                   | 182  | 333  | 193  | 1502 | 1190 | 1008 |
| Arrive On Green              | 0.10 | 0.10 | 0.11 | 0.78 | 0.62 | 0.62 |
| Sat Flow, veh/h              | 1767 | 1572 | 1767 | 1930 | 1930 | 1634 |
| Grp Volume(v), veh/h         | 126  | 131  | 158  | 884  | 684  | 74   |
| Grp Sat Flow(s), veh/h/ln    | 1767 | 1572 | 1767 | 1930 | 1930 | 1634 |
| Q Serve(g_s), s              | 5.5  | 5.7  | 7.0  | 15.0 | 16.8 | 1.5  |
| Cycle Q Clear(g_c), s        | 5.5  | 5.7  | 7.0  | 15.0 | 16.8 | 1.5  |
| Prop In Lane                 | 1.00 | 1.00 | 1.00 |      |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 182  | 333  | 193  | 1502 | 1190 | 1008 |
| V/C Ratio(X)                 | 0.69 | 0.39 | 0.82 | 0.59 | 0.57 | 0.07 |
| Avail Cap(c_a), veh/h        | 508  | 624  | 216  | 1502 | 1190 | 1008 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 0.90 | 0.90 | 0.89 | 0.89 |
| Uniform Delay (d), s/veh     | 34.7 | 27.1 | 34.9 | 3.6  | 9.1  | 6.2  |
| Incr Delay (d2), s/veh       | 3.5  | 0.6  | 15.9 | 1.5  | 1.8  | 0.1  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 2.5  | 5.3  | 3.7  | 2.9  | 5.9  | 0.4  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        | 38.2 | 27.7 | 50.7 | 5.1  | 10.9 | 6.3  |
| LnGrp LOS                    | D    | C    | D    | A    | B    | A    |
| Approach Vol, veh/h          | 257  |      |      | 1042 | 758  |      |
| Approach Delay, s/veh        | 32.8 |      |      | 12.1 | 10.5 |      |
| Approach LOS                 | C    |      |      | B    | B    |      |
| Timer - Assigned Phs         | 2    |      |      | 4    | 5    | 6    |
| Phs Duration (G+Y+Rc), s     | 67.6 |      |      | 12.4 | 12.9 | 54.6 |
| Change Period (Y+Rc), s      | 5.3  |      |      | 4.2  | 4.2  | 5.3  |
| Max Green Setting (Gmax), s  | 47.5 |      |      | 23.0 | 9.8  | 33.5 |
| Max Q Clear Time (g_c+l1), s | 17.0 |      |      | 7.7  | 9.0  | 18.8 |
| Green Ext Time (p_c), s      | 4.0  |      |      | 0.5  | 0.0  | 2.5  |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh |      |      | 14.1 |      |      |      |
| HCM 7th LOS                  |      |      | B    |      |      |      |

# HCM 7th Signalized Intersection Summary 3: N. Santa Fe Avenue & Adobe Estates Drive/Taylor Street

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      | ↕    |      | ↕    | ↕    |      | ↕    | ↕    | ↕    | ↕    | ↕    | ↕    |
| Traffic Volume (veh/h)       | 20   | 10   | 10   | 110  | 10   | 170  | 20   | 800  | 180  | 130  | 670  | 10   |
| Future Volume (veh/h)        | 20   | 10   | 10   | 110  | 10   | 170  | 20   | 800  | 180  | 130  | 670  | 10   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.04 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 0.82 | 1.00 |      | 0.97 | 1.00 |      | 0.84 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      | No   |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln       | 1856 | 1930 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1930 | 1930 |
| Adj Flow Rate, veh/h         | 21   | 11   | 10   | 116  | 11   | 158  | 21   | 842  | 147  | 137  | 705  | 9    |
| Peak Hour Factor             | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                   | 31   | 16   | 15   | 407  | 20   | 284  | 471  | 825  | 355  | 510  | 939  | 350  |
| Arrive On Green              | 0.03 | 0.03 | 0.03 | 0.23 | 0.23 | 0.23 | 0.27 | 0.23 | 0.23 | 0.29 | 0.26 | 0.26 |
| Sat Flow, veh/h              | 904  | 473  | 430  | 1767 | 86   | 1233 | 1767 | 3526 | 1519 | 1767 | 3667 | 1367 |
| Grp Volume(v), veh/h         | 42   | 0    | 0    | 116  | 0    | 169  | 21   | 842  | 147  | 137  | 705  | 9    |
| Grp Sat Flow(s),veh/h/ln     | 1807 | 0    | 0    | 1767 | 0    | 1318 | 1767 | 1763 | 1519 | 1767 | 1833 | 1367 |
| Q Serve(g_s), s              | 2.3  | 0.0  | 0.0  | 5.4  | 0.0  | 11.3 | 0.9  | 23.4 | 8.2  | 6.0  | 17.7 | 0.5  |
| Cycle Q Clear(g_c), s        | 2.3  | 0.0  | 0.0  | 5.4  | 0.0  | 11.3 | 0.9  | 23.4 | 8.2  | 6.0  | 17.7 | 0.5  |
| Prop In Lane                 | 0.50 |      | 0.24 | 1.00 |      | 0.93 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 62   | 0    | 0    | 407  | 0    | 304  | 471  | 825  | 355  | 510  | 939  | 350  |
| V/C Ratio(X)                 | 0.68 | 0.00 | 0.00 | 0.29 | 0.00 | 0.56 | 0.04 | 1.02 | 0.41 | 0.27 | 0.75 | 0.03 |
| Avail Cap(c_a), veh/h        | 381  | 0    | 0    | 477  | 0    | 356  | 471  | 825  | 355  | 510  | 939  | 350  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.79 | 0.79 | 0.79 |
| Uniform Delay (d), s/veh     | 47.7 | 0.0  | 0.0  | 31.7 | 0.0  | 34.0 | 27.2 | 38.3 | 32.5 | 27.4 | 34.3 | 27.9 |
| Incr Delay (d2), s/veh       | 9.1  | 0.0  | 0.0  | 0.3  | 0.0  | 1.2  | 0.0  | 36.6 | 3.5  | 0.1  | 4.4  | 0.1  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 1.2  | 0.0  | 0.0  | 2.3  | 0.0  | 3.6  | 0.4  | 14.0 | 3.3  | 2.5  | 8.2  | 0.2  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        | 56.8 | 0.0  | 0.0  | 32.0 | 0.0  | 35.2 | 27.2 | 74.9 | 36.0 | 27.5 | 38.7 | 28.0 |
| LnGrp LOS                    | E    |      |      | C    |      | D    | C    | F    | D    | C    | D    | C    |
| Approach Vol, veh/h          | 42   |      |      | 285  |      |      | 1010 |      |      | 851  |      |      |
| Approach Delay, s/veh        | 56.8 |      |      | 33.9 |      |      | 68.3 |      |      | 36.8 |      |      |
| Approach LOS                 | E    |      |      | C    |      |      | E    |      |      | D    |      |      |
| Timer - Assigned Phs         | 1    | 2    |      | 4    | 5    | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 34.6 | 29.2 |      | 8.0  | 32.4 | 31.4 |      | 28.1 |      |      |      |      |
| Change Period (Y+Rc), s      | 5.8  | 5.8  |      | 4.6  | 5.8  | 5.8  |      | 5.1  |      |      |      |      |
| Max Green Setting (Gmax), s  | 7.2  | 23.4 |      | 21.1 | 5.0  | 25.6 |      | 27.0 |      |      |      |      |
| Max Q Clear Time (g_c+I), s  | 19.0 | 25.4 |      | 4.3  | 2.9  | 19.7 |      | 13.3 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 0.0  |      | 0.1  | 0.0  | 2.3  |      | 1.0  |      |      |      |      |
| <b>Intersection Summary</b>  |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh | 51.3 |      |      |      |      |      |      |      |      |      |      |      |
| HCM 7th LOS                  | D    |      |      |      |      |      |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 4: N. Santa Fe Avenue & Bobier Drive

Future Year Conditions  
PM Peak Hour

|                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)                                             | 250                                                                               | 700                                                                               | 200                                                                               | 280                                                                               | 550                                                                               | 250                                                                               | 230                                                                               | 680                                                                               | 200                                                                               | 220                                                                                 | 430                                                                                 | 130                                                                                 |
| Future Volume (veh/h)                                              | 250                                                                               | 700                                                                               | 200                                                                               | 280                                                                               | 550                                                                               | 250                                                                               | 230                                                                               | 680                                                                               | 200                                                                               | 220                                                                                 | 430                                                                                 | 130                                                                                 |
| Initial Q (Qb), veh                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width 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                                                                                |
| Ped-Bike Adj(A_pbT)                                                | 1.00                                                                              |                                                                                   | 0.94                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.93                                                                                |
| Parking Bus, Adj                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                             | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h                                               | 258                                                                               | 722                                                                               | 165                                                                               | 289                                                                               | 567                                                                               | 206                                                                               | 237                                                                               | 701                                                                               | 165                                                                               | 227                                                                                 | 443                                                                                 | 103                                                                                 |
| Peak Hour Factor                                                   | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Percent Heavy Veh, %                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                         | 177                                                                               | 946                                                                               | 522                                                                               | 177                                                                               | 946                                                                               | 548                                                                               | 141                                                                               | 1293                                                                              | 732                                                                               | 141                                                                                 | 1293                                                                                | 693                                                                                 |
| Arrive On Green                                                    | 0.10                                                                              | 0.27                                                                              | 0.27                                                                              | 0.10                                                                              | 0.27                                                                              | 0.27                                                                              | 0.08                                                                              | 0.37                                                                              | 0.37                                                                              | 0.08                                                                                | 0.37                                                                                | 0.37                                                                                |
| Sat Flow, veh/h                                                    | 1767                                                                              | 3526                                                                              | 1478                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1567                                                                              | 1767                                                                                | 3526                                                                                | 1462                                                                                |
| Grp Volume(v), veh/h                                               | 258                                                                               | 722                                                                               | 165                                                                               | 289                                                                               | 567                                                                               | 206                                                                               | 237                                                                               | 701                                                                               | 165                                                                               | 227                                                                                 | 443                                                                                 | 103                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                           | 1767                                                                              | 3526                                                                              | 1478                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1567                                                                              | 1767                                                                                | 3526                                                                                | 1462                                                                                |
| Q Serve(g_s), s                                                    | 10.0                                                                              | 18.8                                                                              | 8.2                                                                               | 10.0                                                                              | 14.0                                                                              | 9.8                                                                               | 8.0                                                                               | 15.7                                                                              | 6.3                                                                               | 8.0                                                                                 | 9.1                                                                                 | 4.0                                                                                 |
| Cycle Q Clear(g_c), s                                              | 10.0                                                                              | 18.8                                                                              | 8.2                                                                               | 10.0                                                                              | 14.0                                                                              | 9.8                                                                               | 8.0                                                                               | 15.7                                                                              | 6.3                                                                               | 8.0                                                                                 | 9.1                                                                                 | 4.0                                                                                 |
| Prop In Lane                                                       | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                             | 177                                                                               | 946                                                                               | 522                                                                               | 177                                                                               | 946                                                                               | 548                                                                               | 141                                                                               | 1293                                                                              | 732                                                                               | 141                                                                                 | 1293                                                                                | 693                                                                                 |
| V/C Ratio(X)                                                       | 1.46                                                                              | 0.76                                                                              | 0.32                                                                              | 1.64                                                                              | 0.60                                                                              | 0.38                                                                              | 1.68                                                                              | 0.54                                                                              | 0.23                                                                              | 1.61                                                                                | 0.34                                                                                | 0.15                                                                                |
| Avail Cap(c_a), veh/h                                              | 177                                                                               | 1040                                                                              | 562                                                                               | 177                                                                               | 1040                                                                              | 590                                                                               | 141                                                                               | 1293                                                                              | 732                                                                               | 141                                                                                 | 1293                                                                                | 693                                                                                 |
| HCM Platoon Ratio                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.65                                                                              | 0.65                                                                              | 0.65                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                           | 45.0                                                                              | 33.7                                                                              | 23.9                                                                              | 45.0                                                                              | 31.9                                                                              | 24.4                                                                              | 46.0                                                                              | 25.0                                                                              | 15.9                                                                              | 46.0                                                                                | 22.9                                                                                | 15.3                                                                                |
| Incr Delay (d2), s/veh                                             | 235.4                                                                             | 2.9                                                                               | 0.3                                                                               | 310.1                                                                             | 0.7                                                                               | 0.3                                                                               | 323.7                                                                             | 1.1                                                                               | 0.5                                                                               | 302.9                                                                               | 0.7                                                                                 | 0.5                                                                                 |
| Initial Q Delay(d3), s/veh                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                           | 15.8                                                                              | 8.1                                                                               | 2.8                                                                               | 19.5                                                                              | 5.8                                                                               | 3.5                                                                               | 16.2                                                                              | 6.5                                                                               | 2.2                                                                               | 15.3                                                                                | 3.8                                                                                 | 1.4                                                                                 |
| Unsig. Movement Delay, s/veh                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                              | 280.4                                                                             | 36.6                                                                              | 24.2                                                                              | 355.1                                                                             | 32.6                                                                              | 24.8                                                                              | 369.7                                                                             | 26.1                                                                              | 16.4                                                                              | 348.9                                                                               | 23.7                                                                                | 15.7                                                                                |
| LnGrp LOS                                                          | F                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | C                                                                                 | C                                                                                 | F                                                                                 | C                                                                                 | B                                                                                 | F                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h                                                | 1145                                                                              |                                                                                   |                                                                                   | 1062                                                                              |                                                                                   |                                                                                   | 1103                                                                              |                                                                                   |                                                                                   | 773                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                              | 89.7                                                                              |                                                                                   |                                                                                   | 118.8                                                                             |                                                                                   |                                                                                   | 98.5                                                                              |                                                                                   |                                                                                   | 118.1                                                                               |                                                                                     |                                                                                     |
| Approach LOS                                                       | F                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | F                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                               | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                           | 42.0                                                                              | 41.8                                                                              | 14.0                                                                              | 32.2                                                                              | 12.0                                                                              | 41.8                                                                              | 14.0                                                                              | 32.2                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                            | 4.0                                                                               | 5.1                                                                               | 4.0                                                                               | 5.4                                                                               | 4.0                                                                               | 5.1                                                                               | 4.0                                                                               | 5.4                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                        | 42.0                                                                              | 34.0                                                                              | 10.0                                                                              | 29.5                                                                              | 8.0                                                                               | 34.0                                                                              | 10.0                                                                              | 29.5                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+T1), s                                       | 11.0                                                                              | 17.7                                                                              | 12.0                                                                              | 16.0                                                                              | 10.0                                                                              | 11.1                                                                              | 12.0                                                                              | 20.8                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                            | 0.0                                                                               | 4.0                                                                               | 0.0                                                                               | 3.0                                                                               | 0.0                                                                               | 2.6                                                                               | 0.0                                                                               | 2.9                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                       | 105.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                        | F                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| User approved pedestrian interval to be less than phase max green. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 5: E. Bobier Drive & Anza Avenue

Future Year Conditions  
PM Peak Hour



| Movement                      | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT | NBR | SBL                                                                                 | SBT  | SBR                                                                                 |
|-------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-----|-----|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|
| Lane Configurations           |  |  |      |  |  |      |      |     |     |  |      |  |
| Traffic Volume (veh/h)        | 120                                                                               | 860                                                                               | 0    | 0                                                                                 | 690                                                                               | 140  | 0    | 0   | 0   | 90                                                                                  | 0    | 100                                                                                 |
| Future Volume (veh/h)         | 120                                                                               | 860                                                                               | 0    | 0                                                                                 | 690                                                                               | 140  | 0    | 0   | 0   | 90                                                                                  | 0    | 100                                                                                 |
| Initial Q (Qb), veh           | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    |      |     |     | 0                                                                                   | 0    | 0                                                                                   |
| Lane Width Adj.               | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |      |     |     | 1.00                                                                                | 1.00 | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)           | 1.00                                                                              |                                                                                   | 1.00 | 1.00                                                                              |                                                                                   | 0.95 |      |     |     | 1.00                                                                                |      | 1.00                                                                                |
| Parking Bus, Adj              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |      |     |     | 1.00                                                                                | 1.00 | 1.00                                                                                |
| Work Zone On Approach         | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |      |      |     |     | No                                                                                  |      |                                                                                     |
| Adj Sat Flow, veh/h/ln        | 1856                                                                              | 1856                                                                              | 0    | 1856                                                                              | 1856                                                                              | 1856 |      |     |     | 1856                                                                                | 0    | 1856                                                                                |
| Adj Flow Rate, veh/h          | 126                                                                               | 905                                                                               | 0    | 0                                                                                 | 726                                                                               | 131  |      |     |     | 95                                                                                  | 0    | 84                                                                                  |
| Peak Hour Factor              | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95 |      |     |     | 0.95                                                                                | 0.95 | 0.95                                                                                |
| Percent Heavy Veh, %          | 3                                                                                 | 3                                                                                 | 0    | 3                                                                                 | 3                                                                                 | 3    |      |     |     | 3                                                                                   | 0    | 3                                                                                   |
| Cap, veh/h                    | 167                                                                               | 2301                                                                              | 0    | 4                                                                                 | 1314                                                                              | 237  |      |     |     | 191                                                                                 | 0    | 170                                                                                 |
| Arrive On Green               | 0.09                                                                              | 0.65                                                                              | 0.00 | 0.00                                                                              | 0.44                                                                              | 0.44 |      |     |     | 0.11                                                                                | 0.00 | 0.11                                                                                |
| Sat Flow, veh/h               | 1767                                                                              | 3618                                                                              | 0    | 1767                                                                              | 2954                                                                              | 533  |      |     |     | 1767                                                                                | 0    | 1572                                                                                |
| Grp Volume(v), veh/h          | 126                                                                               | 905                                                                               | 0    | 0                                                                                 | 433                                                                               | 424  |      |     |     | 95                                                                                  | 0    | 84                                                                                  |
| Grp Sat Flow(s),veh/h/ln      | 1767                                                                              | 1763                                                                              | 0    | 1767                                                                              | 1763                                                                              | 1724 |      |     |     | 1767                                                                                | 0    | 1572                                                                                |
| Q Serve(g_s), s               | 2.8                                                                               | 4.8                                                                               | 0.0  | 0.0                                                                               | 7.2                                                                               | 7.2  |      |     |     | 2.0                                                                                 | 0.0  | 2.0                                                                                 |
| Cycle Q Clear(g_c), s         | 2.8                                                                               | 4.8                                                                               | 0.0  | 0.0                                                                               | 7.2                                                                               | 7.2  |      |     |     | 2.0                                                                                 | 0.0  | 2.0                                                                                 |
| Prop In Lane                  | 1.00                                                                              |                                                                                   | 0.00 | 1.00                                                                              |                                                                                   | 0.31 |      |     |     | 1.00                                                                                |      | 1.00                                                                                |
| Lane Grp Cap(c), veh/h        | 167                                                                               | 2301                                                                              | 0    | 4                                                                                 | 784                                                                               | 767  |      |     |     | 191                                                                                 | 0    | 170                                                                                 |
| V/C Ratio(X)                  | 0.75                                                                              | 0.39                                                                              | 0.00 | 0.00                                                                              | 0.55                                                                              | 0.55 |      |     |     | 0.50                                                                                | 0.00 | 0.49                                                                                |
| Avail Cap(c_a), veh/h         | 289                                                                               | 2572                                                                              | 0    | 222                                                                               | 1220                                                                              | 1193 |      |     |     | 1200                                                                                | 0    | 1068                                                                                |
| HCM Platoon Ratio             | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |      |     |     | 1.00                                                                                | 1.00 | 1.00                                                                                |
| Upstream Filter(I)            | 1.00                                                                              | 1.00                                                                              | 0.00 | 0.00                                                                              | 1.00                                                                              | 1.00 |      |     |     | 1.00                                                                                | 0.00 | 1.00                                                                                |
| Uniform Delay (d), s/veh      | 17.5                                                                              | 3.2                                                                               | 0.0  | 0.0                                                                               | 8.1                                                                               | 8.1  |      |     |     | 16.7                                                                                | 0.0  | 16.7                                                                                |
| Incr Delay (d2), s/veh        | 2.6                                                                               | 0.2                                                                               | 0.0  | 0.0                                                                               | 0.9                                                                               | 0.9  |      |     |     | 1.5                                                                                 | 0.0  | 1.6                                                                                 |
| Initial Q Delay(d3), s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  |      |     |     | 0.0                                                                                 | 0.0  | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln      | 0.0                                                                               | 0.4                                                                               | 0.0  | 0.0                                                                               | 1.8                                                                               | 1.7  |      |     |     | 0.8                                                                                 | 0.0  | 0.1                                                                                 |
| Unsig. Movement Delay, s/veh  |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |      |     |     |                                                                                     |      |                                                                                     |
| LnGrp Delay(d), s/veh         | 20.1                                                                              | 3.4                                                                               | 0.0  | 0.0                                                                               | 9.0                                                                               | 9.0  |      |     |     | 18.2                                                                                | 0.0  | 18.3                                                                                |
| LnGrp LOS                     | C                                                                                 | A                                                                                 |      |                                                                                   | A                                                                                 | A    |      |     |     | B                                                                                   |      | B                                                                                   |
| Approach Vol, veh/h           | 1031                                                                              |                                                                                   |      | 857                                                                               |                                                                                   |      | 179  |     |     |                                                                                     |      |                                                                                     |
| Approach Delay, s/veh         | 5.4                                                                               |                                                                                   |      | 9.0                                                                               |                                                                                   |      | 18.2 |     |     |                                                                                     |      |                                                                                     |
| Approach LOS                  | A                                                                                 |                                                                                   |      | A                                                                                 |                                                                                   |      | B    |     |     |                                                                                     |      |                                                                                     |
| Timer - Assigned Phs          | 1                                                                                 | 2                                                                                 |      | 4                                                                                 | 5                                                                                 | 6    |      |     |     |                                                                                     |      |                                                                                     |
| Phs Duration (G+Y+Rc), s      | 0.0                                                                               | 30.9                                                                              |      | 8.8                                                                               | 8.3                                                                               | 22.7 |      |     |     |                                                                                     |      |                                                                                     |
| Change Period (Y+Rc), s       | 4.5                                                                               | 5.0                                                                               |      | 4.5                                                                               | 4.5                                                                               | 5.0  |      |     |     |                                                                                     |      |                                                                                     |
| Max Green Setting (Gmax), s   | 5.0                                                                               | 29.0                                                                              |      | 27.0                                                                              | 6.5                                                                               | 27.5 |      |     |     |                                                                                     |      |                                                                                     |
| Max Q Clear Time (g_c+I10), s | 6.8                                                                               | 6.8                                                                               |      | 4.0                                                                               | 4.8                                                                               | 9.2  |      |     |     |                                                                                     |      |                                                                                     |
| Green Ext Time (p_c), s       | 0.0                                                                               | 8.6                                                                               |      | 0.4                                                                               | 0.0                                                                               | 6.9  |      |     |     |                                                                                     |      |                                                                                     |
| Intersection Summary          |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |      |     |     |                                                                                     |      |                                                                                     |
| HCM 7th Control Delay, s/veh  |                                                                                   |                                                                                   | 8.0  |                                                                                   |                                                                                   |      |      |     |     |                                                                                     |      |                                                                                     |
| HCM 7th LOS                   |                                                                                   |                                                                                   | A    |                                                                                   |                                                                                   |      |      |     |     |                                                                                     |      |                                                                                     |

# HCM 7th Signalized Intersection Summary

## 6: E. Vista Way & E. Bobier Drive/Foothill Drive

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR  | NBL                                                                               | NBT                                                                               | NBR                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Configurations          |  |  |  |  |  |      |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 310                                                                               | 340                                                                               | 130                                                                               | 270                                                                               | 350                                                                               | 90   | 220                                                                               | 1010                                                                              | 290                                                                                | 120                                                                                 | 750                                                                                 | 280                                                                                 |
| Future Volume (veh/h)        | 310                                                                               | 340                                                                               | 130                                                                               | 270                                                                               | 350                                                                               | 90   | 220                                                                               | 1010                                                                              | 290                                                                                | 120                                                                                 | 750                                                                                 | 280                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.96                                                                                | 1.00                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.95 | 1.00                                                                              |                                                                                   | 0.97                                                                               | 1.00                                                                                |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1856 | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1781                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 326                                                                               | 358                                                                               | 105                                                                               | 284                                                                               | 368                                                                               | 84   | 232                                                                               | 1063                                                                              | 242                                                                                | 126                                                                                 | 789                                                                                 | 232                                                                                 |
| Peak Hour Factor             | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95                                                                               | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 382                                                                               | 391                                                                               | 330                                                                               | 339                                                                               | 584                                                                               | 131  | 628                                                                               | 1638                                                                              | 708                                                                                | 149                                                                                 | 1280                                                                                | 563                                                                                 |
| Arrive On Green              | 0.11                                                                              | 0.21                                                                              | 0.21                                                                              | 0.10                                                                              | 0.20                                                                              | 0.20 | 0.18                                                                              | 0.46                                                                              | 0.46                                                                               | 0.09                                                                                | 0.36                                                                                | 0.36                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 1856                                                                              | 1565                                                                              | 3428                                                                              | 2944                                                                              | 662  | 3428                                                                              | 3526                                                                              | 1523                                                                               | 1696                                                                                | 3526                                                                                | 1550                                                                                |
| Grp Volume(v), veh/h         | 326                                                                               | 358                                                                               | 105                                                                               | 284                                                                               | 227                                                                               | 225  | 232                                                                               | 1063                                                                              | 242                                                                                | 126                                                                                 | 789                                                                                 | 232                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1856                                                                              | 1565                                                                              | 1714                                                                              | 1833                                                                              | 1773 | 1714                                                                              | 1763                                                                              | 1523                                                                               | 1696                                                                                | 1763                                                                                | 1550                                                                                |
| Q Serve(g_s), s              | 12.1                                                                              | 24.5                                                                              | 5.0                                                                               | 10.6                                                                              | 14.7                                                                              | 15.1 | 7.7                                                                               | 30.0                                                                              | 13.1                                                                               | 9.5                                                                                 | 23.9                                                                                | 10.4                                                                                |
| Cycle Q Clear(g_c), s        | 12.1                                                                              | 24.5                                                                              | 5.0                                                                               | 10.6                                                                              | 14.7                                                                              | 15.1 | 7.7                                                                               | 30.0                                                                              | 13.1                                                                               | 9.5                                                                                 | 23.9                                                                                | 10.4                                                                                |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.37 | 1.00                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 382                                                                               | 391                                                                               | 330                                                                               | 339                                                                               | 364                                                                               | 352  | 628                                                                               | 1638                                                                              | 708                                                                                | 149                                                                                 | 1280                                                                                | 563                                                                                 |
| V/C Ratio(X)                 | 0.85                                                                              | 0.91                                                                              | 0.32                                                                              | 0.84                                                                              | 0.62                                                                              | 0.64 | 0.37                                                                              | 0.65                                                                              | 0.34                                                                               | 0.85                                                                                | 0.62                                                                                | 0.41                                                                                |
| Avail Cap(c_a), veh/h        | 522                                                                               | 450                                                                               | 379                                                                               | 469                                                                               | 416                                                                               | 402  | 628                                                                               | 1638                                                                              | 708                                                                                | 180                                                                                 | 1280                                                                                | 563                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 56.7                                                                              | 50.1                                                                              | 19.8                                                                              | 57.6                                                                              | 47.7                                                                              | 47.8 | 46.5                                                                              | 26.7                                                                              | 22.1                                                                               | 58.4                                                                                | 34.0                                                                                | 15.8                                                                                |
| Incr Delay (d2), s/veh       | 7.7                                                                               | 21.0                                                                              | 0.4                                                                               | 6.9                                                                               | 1.9                                                                               | 2.3  | 0.1                                                                               | 2.0                                                                               | 1.3                                                                                | 22.3                                                                                | 2.2                                                                                 | 2.2                                                                                 |
| Initial Q Delay(d3), s/veh   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 5.6                                                                               | 13.4                                                                              | 2.8                                                                               | 4.9                                                                               | 6.9                                                                               | 6.9  | 3.3                                                                               | 12.8                                                                              | 4.9                                                                                | 5.0                                                                                 | 10.4                                                                                | 4.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh        | 64.4                                                                              | 71.1                                                                              | 20.2                                                                              | 64.4                                                                              | 49.6                                                                              | 50.1 | 46.6                                                                              | 28.7                                                                              | 23.5                                                                               | 80.8                                                                                | 36.2                                                                                | 18.0                                                                                |
| LnGrp LOS                    | E                                                                                 | E                                                                                 | C                                                                                 | E                                                                                 | D                                                                                 | D    | D                                                                                 | C                                                                                 | C                                                                                  | F                                                                                   | D                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 789                                                                               |                                                                                   |                                                                                   | 736                                                                               |                                                                                   |      | 1537                                                                              |                                                                                   |                                                                                    | 1147                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 61.6                                                                              |                                                                                   |                                                                                   | 55.5                                                                              |                                                                                   |      | 30.6                                                                              |                                                                                   |                                                                                    | 37.4                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |      | C                                                                                 |                                                                                   |                                                                                    | D                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6    | 7                                                                                 | 8                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 55.6                                                                              | 65.4                                                                              | 17.0                                                                              | 31.9                                                                              | 28.8                                                                              | 52.2 | 18.7                                                                              | 30.3                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.2                                                                               | 5.0                                                                               | 4.2                                                                               | 4.5                                                                               | 5.0                                                                               | * 5  | 4.2                                                                               | 4.5                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 13.8                                                                              | 49.0                                                                              | 17.8                                                                              | 31.5                                                                              | 15.6                                                                              | * 47 | 19.8                                                                              | 29.5                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 11.5                                                                              | 32.0                                                                              | 12.6                                                                              | 26.5                                                                              | 9.7                                                                               | 25.9 | 14.1                                                                              | 17.1                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 5.3                                                                               | 0.3                                                                               | 0.9                                                                               | 0.2                                                                               | 3.8  | 0.3                                                                               | 1.7                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |

### Intersection Summary

HCM 7th Control Delay, s/veh 42.6  
HCM 7th LOS D

### Notes

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

\* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Vista GPU

# HCM 7th Signalized Intersection Summary 7: N Melrose Dr & North Ave

Future Year Conditions  
PM Peak Hour

|                                                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                                                |  |  |  |  |  |                                                                                   |  |  |   |    |    |  |
| Traffic Volume (veh/h)                                                                             | 200                                                                               | 280                                                                               | 150                                                                               | 180                                                                               | 200                                                                               | 120                                                                               | 150                                                                               | 1490                                                                              | 250                                                                                | 150                                                                                 | 950                                                                                 | 150                                                                                 |
| Future Volume (veh/h)                                                                              | 200                                                                               | 280                                                                               | 150                                                                               | 180                                                                               | 200                                                                               | 120                                                                               | 150                                                                               | 1490                                                                              | 250                                                                                | 150                                                                                 | 950                                                                                 | 150                                                                                 |
| Initial Q (Qb), veh                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width 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                                                                                |
| Ped-Bike Adj(A_pbT)                                                                                | 1.00                                                                              |                                                                                   | 0.91                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                               | 1.00                                                                                |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                                                             | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h                                                                               | 208                                                                               | 292                                                                               | 125                                                                               | 188                                                                               | 208                                                                               | 109                                                                               | 156                                                                               | 1552                                                                              | 234                                                                                | 156                                                                                 | 990                                                                                 | 140                                                                                 |
| Peak Hour Factor                                                                                   | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                               | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                |
| Percent Heavy Veh, %                                                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                                                         | 335                                                                               | 352                                                                               | 271                                                                               | 318                                                                               | 206                                                                               | 108                                                                               | 218                                                                               | 1790                                                                              | 269                                                                                | 147                                                                                 | 1589                                                                                | 224                                                                                 |
| Arrive On Green                                                                                    | 0.19                                                                              | 0.19                                                                              | 0.19                                                                              | 0.18                                                                              | 0.18                                                                              | 0.18                                                                              | 0.12                                                                              | 0.40                                                                              | 0.40                                                                               | 0.08                                                                                | 0.35                                                                                | 0.35                                                                                |
| Sat Flow, veh/h                                                                                    | 1767                                                                              | 1856                                                                              | 1429                                                                              | 1767                                                                              | 1147                                                                              | 601                                                                               | 1767                                                                              | 4437                                                                              | 667                                                                                | 1767                                                                                | 4482                                                                                | 632                                                                                 |
| Grp Volume(v), veh/h                                                                               | 208                                                                               | 292                                                                               | 125                                                                               | 188                                                                               | 0                                                                                 | 317                                                                               | 156                                                                               | 1180                                                                              | 606                                                                                | 156                                                                                 | 745                                                                                 | 385                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                                                           | 1767                                                                              | 1856                                                                              | 1429                                                                              | 1767                                                                              | 0                                                                                 | 1747                                                                              | 1767                                                                              | 1689                                                                              | 1728                                                                               | 1767                                                                                | 1689                                                                                | 1737                                                                                |
| Q Serve(g_s), s                                                                                    | 14.1                                                                              | 19.7                                                                              | 10.1                                                                              | 12.7                                                                              | 0.0                                                                               | 23.4                                                                              | 11.0                                                                              | 41.7                                                                              | 41.9                                                                               | 10.8                                                                                | 23.8                                                                                | 23.9                                                                                |
| Cycle Q Clear(g_c), s                                                                              | 14.1                                                                              | 19.7                                                                              | 10.1                                                                              | 12.7                                                                              | 0.0                                                                               | 23.4                                                                              | 11.0                                                                              | 41.7                                                                              | 41.9                                                                               | 10.8                                                                                | 23.8                                                                                | 23.9                                                                                |
| Prop In Lane                                                                                       | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.34                                                                              | 1.00                                                                              |                                                                                   | 0.39                                                                               | 1.00                                                                                |                                                                                     | 0.36                                                                                |
| Lane Grp Cap(c), veh/h                                                                             | 335                                                                               | 352                                                                               | 271                                                                               | 318                                                                               | 0                                                                                 | 315                                                                               | 218                                                                               | 1362                                                                              | 697                                                                                | 147                                                                                 | 1198                                                                                | 616                                                                                 |
| V/C Ratio(X)                                                                                       | 0.62                                                                              | 0.83                                                                              | 0.46                                                                              | 0.59                                                                              | 0.00                                                                              | 1.01                                                                              | 0.72                                                                              | 0.87                                                                              | 0.87                                                                               | 1.06                                                                                | 0.62                                                                                | 0.62                                                                                |
| Avail Cap(c_a), veh/h                                                                              | 353                                                                               | 371                                                                               | 286                                                                               | 318                                                                               | 0                                                                                 | 315                                                                               | 218                                                                               | 1362                                                                              | 697                                                                                | 147                                                                                 | 1198                                                                                | 616                                                                                 |
| HCM Platoon Ratio                                                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                                                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 0.40                                                                              | 0.40                                                                              | 0.40                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                                                           | 48.4                                                                              | 50.6                                                                              | 46.8                                                                              | 48.9                                                                              | 0.0                                                                               | 53.3                                                                              | 54.8                                                                              | 35.6                                                                              | 35.6                                                                               | 59.6                                                                                | 34.7                                                                                | 34.8                                                                                |
| Incr Delay (d2), s/veh                                                                             | 2.7                                                                               | 13.6                                                                              | 0.9                                                                               | 2.5                                                                               | 0.0                                                                               | 52.7                                                                              | 3.9                                                                               | 3.3                                                                               | 6.2                                                                                | 91.9                                                                                | 2.4                                                                                 | 4.7                                                                                 |
| Initial Q Delay(d3), s/veh                                                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                                                           | 6.4                                                                               | 10.4                                                                              | 3.7                                                                               | 5.8                                                                               | 0.0                                                                               | 14.9                                                                              | 5.0                                                                               | 16.9                                                                              | 18.0                                                                               | 8.5                                                                                 | 9.8                                                                                 | 10.6                                                                                |
| Unsig. Movement Delay, s/veh                                                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                                              | 51.0                                                                              | 64.2                                                                              | 47.7                                                                              | 51.4                                                                              | 0.0                                                                               | 106.0                                                                             | 58.6                                                                              | 38.8                                                                              | 41.9                                                                               | 151.5                                                                               | 37.2                                                                                | 39.5                                                                                |
| LnGrp LOS                                                                                          | D                                                                                 | E                                                                                 | D                                                                                 | D                                                                                 |                                                                                   | F                                                                                 | E                                                                                 | D                                                                                 | D                                                                                  | F                                                                                   | D                                                                                   | D                                                                                   |
| Approach Vol, veh/h                                                                                | 625                                                                               |                                                                                   |                                                                                   | 505                                                                               |                                                                                   |                                                                                   | 1942                                                                              |                                                                                   |                                                                                    | 1286                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                                                              | 56.5                                                                              |                                                                                   |                                                                                   | 85.7                                                                              |                                                                                   |                                                                                   | 41.4                                                                              |                                                                                   |                                                                                    | 51.7                                                                                |                                                                                     |                                                                                     |
| Approach LOS                                                                                       | E                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                    | D                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                                                               | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |                                                                                   | 8                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                                                           | 5.0                                                                               | 57.7                                                                              |                                                                                   | 29.3                                                                              | 21.3                                                                              | 51.4                                                                              |                                                                                   | 28.0                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                                                            | 4.2                                                                               | 5.3                                                                               |                                                                                   | 4.6                                                                               | 5.3                                                                               | * 5.3                                                                             |                                                                                   | 4.6                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                                                        | 10.8                                                                              | 51.1                                                                              |                                                                                   | 26.0                                                                              | 15.8                                                                              | * 46                                                                              |                                                                                   | 23.4                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+1/2Rc), s                                                                    | 11.2                                                                              | 43.9                                                                              |                                                                                   | 21.7                                                                              | 13.0                                                                              | 25.9                                                                              |                                                                                   | 25.4                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                                                            | 0.0                                                                               | 5.5                                                                               |                                                                                   | 1.0                                                                               | 0.1                                                                               | 7.1                                                                               |                                                                                   | 0.0                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                                                       | 51.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                                                        | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 8: N. Santa Fe Avenue & E. California Avenue

Future Year Conditions  
PM Peak Hour

|                               |  |      |      |       |      |      |      |      |      |      |      |      |
|-------------------------------|------------------------------------------------------------------------------------|------|------|-------|------|------|------|------|------|------|------|------|
| Movement                      | EBL                                                                                | EBT  | EBR  | WBL   | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations           |                                                                                    | ↔    | ↔    |       | ↔    | ↔    | ↔    | ↕    | ↔    | ↔    | ↕    | ↔    |
| Traffic Volume (veh/h)        | 110                                                                                | 70   | 170  | 70    | 70   | 90   | 230  | 1210 | 50   | 150  | 720  | 20   |
| Future Volume (veh/h)         | 110                                                                                | 70   | 170  | 70    | 70   | 90   | 230  | 1210 | 50   | 150  | 720  | 20   |
| Initial Q (Qb), veh           | 0                                                                                  | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)           | 1.00                                                                               |      | 0.86 | 1.00  |      | 0.86 | 1.00 |      | 0.97 | 1.00 |      | 0.96 |
| Parking Bus, Adj              | 1.00                                                                               | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach         | No                                                                                 |      |      | No    |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln        | 1856                                                                               | 1856 | 1856 | 1856  | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 |
| Adj Flow Rate, veh/h          | 116                                                                                | 74   | 158  | 74    | 74   | 84   | 242  | 1274 | 42   | 158  | 758  | 16   |
| Peak Hour Factor              | 0.95                                                                               | 0.95 | 0.95 | 0.95  | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %          | 3                                                                                  | 3    | 3    | 3     | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                    | 58                                                                                 | 24   | 345  | 54    | 37   | 345  | 263  | 1731 | 747  | 189  | 1583 | 678  |
| Arrive On Green               | 0.25                                                                               | 0.25 | 0.25 | 0.25  | 0.25 | 0.25 | 0.15 | 0.49 | 0.49 | 0.11 | 0.45 | 0.45 |
| Sat Flow, veh/h               | 0                                                                                  | 93   | 1359 | 0     | 146  | 1359 | 1767 | 3526 | 1523 | 1767 | 3526 | 1511 |
| Grp Volume(v), veh/h          | 190                                                                                | 0    | 158  | 148   | 0    | 84   | 242  | 1274 | 42   | 158  | 758  | 16   |
| Grp Sat Flow(s), veh/h/ln     | 93                                                                                 | 0    | 1359 | 146   | 0    | 1359 | 1767 | 1763 | 1523 | 1767 | 1763 | 1511 |
| Q Serve(g_s), s               | 0.0                                                                                | 0.0  | 9.8  | 0.0   | 0.0  | 4.9  | 13.5 | 28.8 | 1.4  | 8.8  | 15.1 | 0.6  |
| Cycle Q Clear(g_c), s         | 25.4                                                                               | 0.0  | 9.8  | 25.4  | 0.0  | 4.9  | 13.5 | 28.8 | 1.4  | 8.8  | 15.1 | 0.6  |
| Prop In Lane                  | 0.61                                                                               |      | 1.00 | 0.50  |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h        | 82                                                                                 | 0    | 345  | 91    | 0    | 345  | 263  | 1731 | 747  | 189  | 1583 | 678  |
| V/C Ratio(X)                  | 2.33                                                                               | 0.00 | 0.46 | 1.62  | 0.00 | 0.24 | 0.92 | 0.74 | 0.06 | 0.83 | 0.48 | 0.02 |
| Avail Cap(c_a), veh/h         | 82                                                                                 | 0    | 345  | 91    | 0    | 345  | 263  | 1731 | 747  | 263  | 1583 | 678  |
| HCM Platoon Ratio             | 1.00                                                                               | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)            | 1.00                                                                               | 0.00 | 1.00 | 1.00  | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.76 | 0.76 | 0.76 |
| Uniform Delay (d), s/veh      | 42.8                                                                               | 0.0  | 31.5 | 40.1  | 0.0  | 29.7 | 42.0 | 20.3 | 13.3 | 43.8 | 19.3 | 15.3 |
| Incr Delay (d2), s/veh        | 633.5                                                                              | 0.0  | 0.7  | 325.4 | 0.0  | 0.3  | 34.1 | 2.8  | 0.1  | 8.7  | 0.8  | 0.0  |
| Initial Q Delay(d3), s/veh    | 0.0                                                                                | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 16.4                                                                               | 0.0  | 3.3  | 10.5  | 0.0  | 1.6  | 8.2  | 11.7 | 0.5  | 4.2  | 6.1  | 0.2  |
| Unsig. Movement Delay, s/veh  |                                                                                    |      |      |       |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh         | 676.4                                                                              | 0.0  | 32.2 | 365.5 | 0.0  | 29.9 | 76.1 | 23.1 | 13.5 | 52.4 | 20.1 | 15.4 |
| LnGrp LOS                     | F                                                                                  |      | C    | F     |      | C    | E    | C    | B    | D    | C    | B    |
| Approach Vol, veh/h           | 348                                                                                |      |      | 232   |      |      | 1558 |      |      | 932  |      |      |
| Approach Delay, s/veh         | 383.9                                                                              |      |      | 244.0 |      |      | 31.1 |      |      | 25.5 |      |      |
| Approach LOS                  | F                                                                                  |      |      | F     |      |      | C    |      |      | C    |      |      |
| Timer - Assigned Phs          | 1                                                                                  | 2    |      | 4     | 5    | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s      | 5.8                                                                                | 54.2 |      | 30.0  | 20.0 | 50.0 |      | 30.0 |      |      |      |      |
| Change Period (Y+Rc), s       | 5.1                                                                                | 5.1  |      | 4.6   | 5.1  | 5.1  |      | 4.6  |      |      |      |      |
| Max Green Setting (Gmax), s   | 14.9                                                                               | 44.9 |      | 25.4  | 14.9 | 44.9 |      | 25.4 |      |      |      |      |
| Max Q Clear Time (g_c+I10), s | 110.8                                                                              | 30.8 |      | 27.4  | 15.5 | 17.1 |      | 27.4 |      |      |      |      |
| Green Ext Time (p_c), s       | 0.1                                                                                | 7.7  |      | 0.0   | 0.0  | 5.7  |      | 0.0  |      |      |      |      |
| <b>Intersection Summary</b>   |                                                                                    |      |      |       |      |      |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh  | 85.5                                                                               |      |      |       |      |      |      |      |      |      |      |      |
| HCM 7th LOS                   | F                                                                                  |      |      |       |      |      |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary

## 9: Emerald Drive/North Avenue & Olive Drive/Olive Avenue

Future Year Conditions

PM Peak Hour

|                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                             | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                  |  |  |  |  |  |                                                                                   |  |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)                                               | 150                                                                               | 400                                                                               | 480                                                                               | 110                                                                               | 220                                                                               | 50                                                                                | 460                                                                               | 360                                                                               | 160                                                                               | 40                                                                                  | 310                                                                                 | 80                                                                                  |
| Future Volume (veh/h)                                                | 150                                                                               | 400                                                                               | 480                                                                               | 110                                                                               | 220                                                                               | 50                                                                                | 460                                                                               | 360                                                                               | 160                                                                               | 40                                                                                  | 310                                                                                 | 80                                                                                  |
| Initial Q (Qb), veh                                                  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width 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                                                                                |
| Ped-Bike Adj(A_pbT)                                                  | 1.00                                                                              |                                                                                   | 0.97                                                                              | 1.00                                                                              |                                                                                   | 0.97                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj                                                     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                               | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                              | 1894                                                                                | 1894                                                                                | 1894                                                                                |
| Adj Flow Rate, veh/h                                                 | 156                                                                               | 417                                                                               | 396                                                                               | 115                                                                               | 229                                                                               | 47                                                                                | 427                                                                               | 448                                                                               | 131                                                                               | 42                                                                                  | 323                                                                                 | 62                                                                                  |
| Peak Hour Factor                                                     | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                |
| Percent Heavy Veh, %                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                           | 172                                                                               | 475                                                                               | 796                                                                               | 140                                                                               | 692                                                                               | 139                                                                               | 456                                                                               | 478                                                                               | 399                                                                               | 46                                                                                  | 356                                                                                 | 342                                                                                 |
| Arrive On Green                                                      | 0.10                                                                              | 0.25                                                                              | 0.25                                                                              | 0.08                                                                              | 0.23                                                                              | 0.23                                                                              | 0.25                                                                              | 0.25                                                                              | 0.25                                                                              | 0.21                                                                                | 0.21                                                                                | 0.21                                                                                |
| Sat Flow, veh/h                                                      | 1804                                                                              | 1894                                                                              | 1557                                                                              | 1804                                                                              | 2967                                                                              | 596                                                                               | 1804                                                                              | 1894                                                                              | 1580                                                                              | 217                                                                                 | 1667                                                                                | 1602                                                                                |
| Grp Volume(v), veh/h                                                 | 156                                                                               | 417                                                                               | 396                                                                               | 115                                                                               | 137                                                                               | 139                                                                               | 427                                                                               | 448                                                                               | 131                                                                               | 365                                                                                 | 0                                                                                   | 62                                                                                  |
| Grp Sat Flow(s),veh/h/ln                                             | 1804                                                                              | 1894                                                                              | 1557                                                                              | 1804                                                                              | 1800                                                                              | 1764                                                                              | 1804                                                                              | 1894                                                                              | 1580                                                                              | 1883                                                                                | 0                                                                                   | 1602                                                                                |
| Q Serve(g_s), s                                                      | 8.7                                                                               | 21.5                                                                              | 17.2                                                                              | 6.4                                                                               | 6.4                                                                               | 6.7                                                                               | 23.6                                                                              | 23.6                                                                              | 6.9                                                                               | 19.2                                                                                | 0.0                                                                                 | 3.2                                                                                 |
| Cycle Q Clear(g_c), s                                                | 8.7                                                                               | 21.5                                                                              | 17.2                                                                              | 6.4                                                                               | 6.4                                                                               | 6.7                                                                               | 23.6                                                                              | 23.6                                                                              | 6.9                                                                               | 19.2                                                                                | 0.0                                                                                 | 3.2                                                                                 |
| Prop In Lane                                                         | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.34                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.12                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                               | 172                                                                               | 475                                                                               | 796                                                                               | 140                                                                               | 419                                                                               | 411                                                                               | 456                                                                               | 478                                                                               | 399                                                                               | 402                                                                                 | 0                                                                                   | 342                                                                                 |
| V/C Ratio(X)                                                         | 0.91                                                                              | 0.88                                                                              | 0.50                                                                              | 0.82                                                                              | 0.33                                                                              | 0.34                                                                              | 0.94                                                                              | 0.94                                                                              | 0.33                                                                              | 0.91                                                                                | 0.00                                                                                | 0.18                                                                                |
| Avail Cap(c_a), veh/h                                                | 172                                                                               | 499                                                                               | 816                                                                               | 140                                                                               | 442                                                                               | 433                                                                               | 457                                                                               | 480                                                                               | 401                                                                               | 437                                                                                 | 0                                                                                   | 371                                                                                 |
| HCM Platoon Ratio                                                    | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                             | 45.6                                                                              | 36.6                                                                              | 16.8                                                                              | 46.2                                                                              | 32.4                                                                              | 32.5                                                                              | 37.2                                                                              | 37.2                                                                              | 31.0                                                                              | 39.0                                                                                | 0.0                                                                                 | 32.7                                                                                |
| Incr Delay (d2), s/veh                                               | 43.0                                                                              | 17.1                                                                              | 1.0                                                                               | 30.7                                                                              | 1.0                                                                               | 1.0                                                                               | 27.0                                                                              | 25.9                                                                              | 0.5                                                                               | 21.1                                                                                | 0.0                                                                                 | 0.2                                                                                 |
| Initial Q Delay(d3), s/veh                                           | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                             | 5.9                                                                               | 11.9                                                                              | 9.8                                                                               | 4.0                                                                               | 2.9                                                                               | 2.9                                                                               | 13.5                                                                              | 14.0                                                                              | 2.6                                                                               | 11.0                                                                                | 0.0                                                                                 | 1.2                                                                                 |
| Unsig. Movement Delay, s/veh                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                | 88.6                                                                              | 53.7                                                                              | 17.9                                                                              | 76.9                                                                              | 33.3                                                                              | 33.5                                                                              | 64.2                                                                              | 63.2                                                                              | 31.5                                                                              | 60.1                                                                                | 0.0                                                                                 | 32.9                                                                                |
| LnGrp LOS                                                            | F                                                                                 | D                                                                                 | B                                                                                 | E                                                                                 | C                                                                                 | C                                                                                 | E                                                                                 | E                                                                                 | C                                                                                 | E                                                                                   |                                                                                     | C                                                                                   |
| Approach Vol, veh/h                                                  | 969                                                                               |                                                                                   |                                                                                   | 391                                                                               |                                                                                   |                                                                                   | 1006                                                                              |                                                                                   |                                                                                   | 427                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                                | 44.7                                                                              |                                                                                   |                                                                                   | 46.2                                                                              |                                                                                   |                                                                                   | 59.5                                                                              |                                                                                   |                                                                                   | 56.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                                                         | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | E                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                                 | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                             | 2.6                                                                               | 30.9                                                                              |                                                                                   | 31.1                                                                              | 14.4                                                                              | 29.1                                                                              |                                                                                   | 27.1                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                              | 4.7                                                                               | 5.4                                                                               |                                                                                   | 5.4                                                                               | 4.7                                                                               | 5.4                                                                               |                                                                                   | 5.4                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                          | 7.9                                                                               | 26.8                                                                              |                                                                                   | 25.8                                                                              | 9.7                                                                               | 25.0                                                                              |                                                                                   | 23.6                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I), s                                          | 13.4                                                                              | 23.5                                                                              |                                                                                   | 25.6                                                                              | 10.7                                                                              | 8.7                                                                               |                                                                                   | 21.2                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                              | 0.0                                                                               | 2.0                                                                               |                                                                                   | 0.1                                                                               | 0.0                                                                               | 2.4                                                                               |                                                                                   | 0.5                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                         | 52.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                          | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| User approved volume balancing among the lanes for turning movement. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 10: N Melrose Dr & Olive Ave

Future Year Conditions  
PM Peak Hour



| Movement                       | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                               | SBR                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations            |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)         | 180                                                                               | 260                                                                               | 240                                                                               | 100                                                                               | 170                                                                               | 180                                                                               | 400                                                                               | 1800                                                                              | 150                                                                               | 180                                                                               | 1200                                                                              | 120                                                                               |
| Future Volume (veh/h)          | 180                                                                               | 260                                                                               | 240                                                                               | 100                                                                               | 170                                                                               | 180                                                                               | 400                                                                               | 1800                                                                              | 150                                                                               | 180                                                                               | 1200                                                                              | 120                                                                               |
| Initial Q (Qb), veh            | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Lane Width Adj.                | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Ped-Bike Adj(A_pbT)            | 1.00                                                                              |                                                                                   | 0.92                                                                              | 1.00                                                                              |                                                                                   | 0.96                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                              |
| Parking Bus, Adj               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Work Zone On Approach          | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   |
| Adj Sat Flow, veh/h/ln         | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1856                                                                              | 1930                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              |
| Adj Flow Rate, veh/h           | 189                                                                               | 274                                                                               | 200                                                                               | 105                                                                               | 179                                                                               | 147                                                                               | 421                                                                               | 1895                                                                              | 142                                                                               | 189                                                                               | 1263                                                                              | 110                                                                               |
| Peak Hour Factor               | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              |
| Percent Heavy Veh, %           | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Cap, veh/h                     | 163                                                                               | 385                                                                               | 311                                                                               | 128                                                                               | 370                                                                               | 515                                                                               | 394                                                                               | 2070                                                                              | 155                                                                               | 253                                                                               | 1693                                                                              | 147                                                                               |
| Arrive On Green                | 0.09                                                                              | 0.21                                                                              | 0.21                                                                              | 0.07                                                                              | 0.19                                                                              | 0.19                                                                              | 0.22                                                                              | 0.43                                                                              | 0.43                                                                              | 0.14                                                                              | 0.36                                                                              | 0.36                                                                              |
| Sat Flow, veh/h                | 1767                                                                              | 1856                                                                              | 1501                                                                              | 1767                                                                              | 1930                                                                              | 1513                                                                              | 1767                                                                              | 4806                                                                              | 359                                                                               | 1767                                                                              | 4722                                                                              | 411                                                                               |
| Grp Volume(v), veh/h           | 189                                                                               | 274                                                                               | 200                                                                               | 105                                                                               | 179                                                                               | 147                                                                               | 421                                                                               | 1329                                                                              | 708                                                                               | 189                                                                               | 903                                                                               | 470                                                                               |
| Grp Sat Flow(s),veh/h/ln       | 1767                                                                              | 1856                                                                              | 1501                                                                              | 1767                                                                              | 1930                                                                              | 1513                                                                              | 1767                                                                              | 1689                                                                              | 1788                                                                              | 1767                                                                              | 1689                                                                              | 1756                                                                              |
| Q Serve(g_s), s                | 12.0                                                                              | 17.8                                                                              | 10.1                                                                              | 7.6                                                                               | 10.7                                                                              | 1.7                                                                               | 29.0                                                                              | 48.0                                                                              | 48.5                                                                              | 13.3                                                                              | 30.4                                                                              | 30.5                                                                              |
| Cycle Q Clear(g_c), s          | 12.0                                                                              | 17.8                                                                              | 10.1                                                                              | 7.6                                                                               | 10.7                                                                              | 1.7                                                                               | 29.0                                                                              | 48.0                                                                              | 48.5                                                                              | 13.3                                                                              | 30.4                                                                              | 30.5                                                                              |
| Prop In Lane                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.20                                                                              | 1.00                                                                              |                                                                                   | 0.23                                                                              |
| Lane Grp Cap(c), veh/h         | 163                                                                               | 385                                                                               | 311                                                                               | 128                                                                               | 370                                                                               | 515                                                                               | 394                                                                               | 1455                                                                              | 770                                                                               | 253                                                                               | 1211                                                                              | 630                                                                               |
| V/C Ratio(X)                   | 1.16                                                                              | 0.71                                                                              | 0.64                                                                              | 0.82                                                                              | 0.48                                                                              | 0.29                                                                              | 1.07                                                                              | 0.91                                                                              | 0.92                                                                              | 0.75                                                                              | 0.75                                                                              | 0.75                                                                              |
| Avail Cap(c_a), veh/h          | 163                                                                               | 464                                                                               | 375                                                                               | 150                                                                               | 468                                                                               | 592                                                                               | 394                                                                               | 1455                                                                              | 770                                                                               | 253                                                                               | 1211                                                                              | 630                                                                               |
| HCM Platoon Ratio              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Upstream Filter(I)             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.73                                                                              | 0.73                                                                              | 0.73                                                                              |
| Uniform Delay (d), s/veh       | 59.0                                                                              | 47.9                                                                              | 19.1                                                                              | 59.5                                                                              | 46.8                                                                              | 16.9                                                                              | 50.5                                                                              | 34.7                                                                              | 34.9                                                                              | 53.4                                                                              | 36.5                                                                              | 36.5                                                                              |
| Incr Delay (d2), s/veh         | 119.5                                                                             | 3.5                                                                               | 2.2                                                                               | 22.7                                                                              | 0.7                                                                               | 0.2                                                                               | 64.6                                                                              | 10.3                                                                              | 17.8                                                                              | 7.7                                                                               | 3.1                                                                               | 5.8                                                                               |
| Initial Q Delay(d3), s/veh     | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |
| %ile BackOfQ(50%),veh/ln       | 10.7                                                                              | 8.6                                                                               | 3.8                                                                               | 4.2                                                                               | 5.3                                                                               | 2.3                                                                               | 19.6                                                                              | 20.9                                                                              | 24.0                                                                              | 6.4                                                                               | 12.7                                                                              | 13.7                                                                              |
| Unsig. Movement Delay, s/veh   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| LnGrp Delay(d), s/veh          | 178.5                                                                             | 51.4                                                                              | 21.3                                                                              | 82.1                                                                              | 47.6                                                                              | 17.1                                                                              | 115.1                                                                             | 45.1                                                                              | 52.7                                                                              | 61.1                                                                              | 39.6                                                                              | 42.3                                                                              |
| LnGrp LOS                      | F                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | D                                                                                 | B                                                                                 | F                                                                                 | D                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 | D                                                                                 |
| Approach Vol, veh/h            | 663                                                                               |                                                                                   |                                                                                   | 431                                                                               |                                                                                   |                                                                                   | 2458                                                                              |                                                                                   |                                                                                   | 1562                                                                              |                                                                                   |                                                                                   |
| Approach Delay, s/veh          | 78.5                                                                              |                                                                                   |                                                                                   | 45.6                                                                              |                                                                                   |                                                                                   | 59.2                                                                              |                                                                                   |                                                                                   | 43.0                                                                              |                                                                                   |                                                                                   |
| Approach LOS                   | E                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |
| Timer - Assigned Phs           | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Phs Duration (G+Y+Rc), s       | 23.6                                                                              | 61.0                                                                              | 13.9                                                                              | 31.5                                                                              | 33.0                                                                              | 51.6                                                                              | 16.0                                                                              | 29.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Change Period (Y+Rc), s        | 5.0                                                                               | * 5                                                                               | 4.5                                                                               | * 4.5                                                                             | 4.0                                                                               | 5.0                                                                               | 4.0                                                                               | 4.5                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Max Green Setting (Gmax), s    | 13.0                                                                              | * 56                                                                              | 11.0                                                                              | * 33                                                                              | 29.0                                                                              | 40.0                                                                              | 12.0                                                                              | 31.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Max Q Clear Time (g_c+11.5), s | 11.5                                                                              | 50.5                                                                              | 9.6                                                                               | 19.8                                                                              | 31.0                                                                              | 32.5                                                                              | 14.0                                                                              | 12.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Green Ext Time (p_c), s        | 0.0                                                                               | 4.7                                                                               | 0.0                                                                               | 1.5                                                                               | 0.0                                                                               | 4.8                                                                               | 0.0                                                                               | 1.2                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |

## Intersection Summary

HCM 7th Control Delay, s/veh 55.6  
HCM 7th LOS E

## Notes

\* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

# HCM 7th Signalized Intersection Summary 11: N Santa Fe Avenue & Vista Village Drive

Future Year Conditions  
PM Peak Hour

|                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                |  |  |  |  |  |                                                                                   |  |  |                                                                                   |  |  |  |
| Traffic Volume (veh/h)                                             | 600                                                                               | 1090                                                                              | 260                                                                               | 90                                                                                | 780                                                                               | 150                                                                               | 170                                                                               | 500                                                                               | 60                                                                                | 160                                                                                 | 450                                                                                 | 400                                                                                 |
| Future Volume (veh/h)                                              | 600                                                                               | 1090                                                                              | 260                                                                               | 90                                                                                | 780                                                                               | 150                                                                               | 170                                                                               | 500                                                                               | 60                                                                                | 160                                                                                 | 450                                                                                 | 400                                                                                 |
| Initial Q (Qb), veh                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.                                                    | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.96                                                                                | 1.00                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)                                                | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.97                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                                |                                                                                     | 0.98                                                                                |
| Parking Bus, Adj                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                             | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1781                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h                                               | 625                                                                               | 1135                                                                              | 214                                                                               | 94                                                                                | 812                                                                               | 140                                                                               | 177                                                                               | 521                                                                               | 52                                                                                | 167                                                                                 | 469                                                                                 | 334                                                                                 |
| Peak Hour Factor                                                   | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                |
| Percent Heavy Veh, %                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                         | 686                                                                               | 1236                                                                              | 817                                                                               | 119                                                                               | 943                                                                               | 161                                                                               | 584                                                                               | 1147                                                                              | 114                                                                               | 218                                                                                 | 882                                                                                 | 701                                                                                 |
| Arrive On Green                                                    | 0.20                                                                              | 0.35                                                                              | 0.35                                                                              | 0.07                                                                              | 0.22                                                                              | 0.22                                                                              | 0.17                                                                              | 0.35                                                                              | 0.35                                                                              | 0.07                                                                                | 0.25                                                                                | 0.25                                                                                |
| Sat Flow, veh/h                                                    | 3428                                                                              | 3526                                                                              | 1566                                                                              | 1767                                                                              | 4334                                                                              | 741                                                                               | 3428                                                                              | 3236                                                                              | 322                                                                               | 3291                                                                                | 3526                                                                                | 1544                                                                                |
| Grp Volume(v), veh/h                                               | 625                                                                               | 1135                                                                              | 214                                                                               | 94                                                                                | 631                                                                               | 321                                                                               | 177                                                                               | 283                                                                               | 290                                                                               | 167                                                                                 | 469                                                                                 | 334                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                           | 1714                                                                              | 1763                                                                              | 1566                                                                              | 1767                                                                              | 1689                                                                              | 1699                                                                              | 1714                                                                              | 1763                                                                              | 1795                                                                              | 1646                                                                                | 1763                                                                                | 1544                                                                                |
| Q Serve(g_s), s                                                    | 23.2                                                                              | 40.1                                                                              | 0.0                                                                               | 6.8                                                                               | 23.4                                                                              | 23.7                                                                              | 5.9                                                                               | 16.1                                                                              | 16.2                                                                              | 6.5                                                                                 | 15.0                                                                                | 9.3                                                                                 |
| Cycle Q Clear(g_c), s                                              | 23.2                                                                              | 40.1                                                                              | 0.0                                                                               | 6.8                                                                               | 23.4                                                                              | 23.7                                                                              | 5.9                                                                               | 16.1                                                                              | 16.2                                                                              | 6.5                                                                                 | 15.0                                                                                | 9.3                                                                                 |
| Prop In Lane                                                       | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.44                                                                              | 1.00                                                                              |                                                                                   | 0.18                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                             | 686                                                                               | 1236                                                                              | 817                                                                               | 119                                                                               | 735                                                                               | 370                                                                               | 584                                                                               | 625                                                                               | 636                                                                               | 218                                                                                 | 882                                                                                 | 701                                                                                 |
| V/C Ratio(X)                                                       | 0.91                                                                              | 0.92                                                                              | 0.26                                                                              | 0.79                                                                              | 0.86                                                                              | 0.87                                                                              | 0.30                                                                              | 0.45                                                                              | 0.46                                                                              | 0.77                                                                                | 0.53                                                                                | 0.48                                                                                |
| Avail Cap(c_a), veh/h                                              | 781                                                                               | 1345                                                                              | 865                                                                               | 144                                                                               | 795                                                                               | 400                                                                               | 584                                                                               | 625                                                                               | 636                                                                               | 311                                                                                 | 922                                                                                 | 719                                                                                 |
| HCM Platoon Ratio                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                           | 50.8                                                                              | 40.4                                                                              | 17.3                                                                              | 59.7                                                                              | 48.9                                                                              | 49.0                                                                              | 47.2                                                                              | 32.3                                                                              | 32.3                                                                              | 59.7                                                                                | 42.2                                                                                | 9.2                                                                                 |
| Incr Delay (d2), s/veh                                             | 13.3                                                                              | 9.3                                                                               | 0.1                                                                               | 17.4                                                                              | 8.2                                                                               | 16.0                                                                              | 0.1                                                                               | 2.4                                                                               | 2.3                                                                               | 5.7                                                                                 | 0.2                                                                                 | 0.2                                                                                 |
| Initial Q Delay(d3), s/veh                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                           | 11.0                                                                              | 18.4                                                                              | 3.5                                                                               | 3.6                                                                               | 10.5                                                                              | 11.5                                                                              | 2.5                                                                               | 7.2                                                                               | 7.4                                                                               | 2.9                                                                                 | 6.5                                                                                 | 3.6                                                                                 |
| Unsig. Movement Delay, s/veh                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                              | 64.2                                                                              | 49.7                                                                              | 17.3                                                                              | 77.1                                                                              | 57.1                                                                              | 65.1                                                                              | 47.3                                                                              | 34.6                                                                              | 34.6                                                                              | 65.4                                                                                | 42.4                                                                                | 9.4                                                                                 |
| LnGrp LOS                                                          | E                                                                                 | D                                                                                 | B                                                                                 | E                                                                                 | E                                                                                 | E                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | E                                                                                   | D                                                                                   | A                                                                                   |
| Approach Vol, veh/h                                                | 1974                                                                              |                                                                                   |                                                                                   | 1046                                                                              |                                                                                   |                                                                                   | 750                                                                               |                                                                                   |                                                                                   | 970                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                              | 50.8                                                                              |                                                                                   |                                                                                   | 61.4                                                                              |                                                                                   |                                                                                   | 37.6                                                                              |                                                                                   |                                                                                   | 35.0                                                                                |                                                                                     |                                                                                     |
| Approach LOS                                                       | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                               | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                           | 13.7                                                                              | 51.2                                                                              | 14.1                                                                              | 51.0                                                                              | 27.3                                                                              | 37.6                                                                              | 31.4                                                                              | 33.7                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                            | 5.1                                                                               | 5.1                                                                               | 5.4                                                                               | 5.4                                                                               | 5.1                                                                               | 5.1                                                                               | 5.4                                                                               | 5.4                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                        | 12.3                                                                              | 36.5                                                                              | 10.6                                                                              | 49.6                                                                              | 14.8                                                                              | 34.0                                                                              | 29.6                                                                              | 30.6                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I), s                                        | 19.5                                                                              | 18.2                                                                              | 8.8                                                                               | 42.1                                                                              | 7.9                                                                               | 17.0                                                                              | 25.2                                                                              | 25.7                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                            | 0.1                                                                               | 2.0                                                                               | 0.0                                                                               | 3.5                                                                               | 0.2                                                                               | 2.5                                                                               | 0.8                                                                               | 1.9                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                       | 47.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                        | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| User approved pedestrian interval to be less than phase max green. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary

12: Civic Center Drive/Hillside Terrace & Vista Village Drive/E. Vista Way

Future Year Conditions

PM Peak Hour



| Movement                       | EBL  | EBT  | EBR  | WBL  | WBT  | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--------------------------------|------|------|------|------|------|-------|------|------|------|------|------|------|
| Lane Configurations            |      |      |      |      |      |       |      |      |      |      |      |      |
| Traffic Volume (veh/h)         | 80   | 920  | 180  | 710  | 740  | 80    | 220  | 80   | 1270 | 30   | 40   | 20   |
| Future Volume (veh/h)          | 80   | 920  | 180  | 710  | 740  | 80    | 220  | 80   | 1270 | 30   | 40   | 20   |
| Initial Q (Qb), veh            | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)            | 1.00 |      | 0.97 | 1.00 |      | 0.97  | 1.00 |      | 1.00 | 1.00 |      | 0.90 |
| Parking Bus, Adj               | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach          | No   |      |      | No   |      |       | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln         | 1934 | 1934 | 1934 | 1934 | 1934 | 1934  | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 |
| Adj Flow Rate, veh/h           | 82   | 948  | 145  | 732  | 763  | 72    | 155  | 184  | 917  | 31   | 41   | 16   |
| Peak Hour Factor               | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97  | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, %           | 3    | 3    | 3    | 3    | 3    | 3     | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                     | 104  | 978  | 423  | 1183 | 1829 | 172   | 197  | 207  | 1434 | 83   | 109  | 43   |
| Arrive On Green                | 0.06 | 0.27 | 0.27 | 0.33 | 0.54 | 0.54  | 0.11 | 0.11 | 0.11 | 0.13 | 0.13 | 0.13 |
| Sat Flow, veh/h                | 1842 | 3674 | 1589 | 3573 | 3382 | 319   | 1842 | 1934 | 3262 | 634  | 839  | 327  |
| Grp Volume(v), veh/h           | 82   | 948  | 145  | 732  | 414  | 421   | 155  | 184  | 917  | 88   | 0    | 0    |
| Grp Sat Flow(s), veh/h/ln      | 1842 | 1837 | 1589 | 1786 | 1837 | 1864  | 1842 | 1934 | 1631 | 1800 | 0    | 0    |
| Q Serve(g_s), s                | 5.7  | 33.2 | 9.6  | 22.4 | 17.4 | 17.4  | 10.7 | 12.2 | 0.0  | 5.8  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s          | 5.7  | 33.2 | 9.6  | 22.4 | 17.4 | 17.4  | 10.7 | 12.2 | 0.0  | 5.8  | 0.0  | 0.0  |
| Prop In Lane                   | 1.00 |      | 1.00 | 1.00 |      | 0.17  | 1.00 |      | 1.00 | 0.35 |      | 0.18 |
| Lane Grp Cap(c), veh/h         | 104  | 978  | 423  | 1183 | 993  | 1008  | 197  | 207  | 1434 | 235  | 0    | 0    |
| V/C Ratio(X)                   | 0.79 | 0.97 | 0.34 | 0.62 | 0.42 | 0.42  | 0.79 | 0.89 | 0.64 | 0.37 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h          | 193  | 978  | 423  | 1183 | 993  | 1008  | 197  | 207  | 1434 | 360  | 0    | 0    |
| HCM Platoon Ratio              | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh       | 60.6 | 47.2 | 38.5 | 36.6 | 17.7 | 17.7  | 56.6 | 57.3 | 28.5 | 51.7 | 0.0  | 0.0  |
| Incr Delay (d2), s/veh         | 4.9  | 22.3 | 2.2  | 0.7  | 1.3  | 1.3   | 18.3 | 34.0 | 0.9  | 0.7  | 0.0  | 0.0  |
| Initial Q Delay(d3), s/veh     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln       | 2.8  | 17.8 | 4.0  | 9.8  | 7.6  | 7.7   | 5.9  | 7.9  | 11.1 | 2.7  | 0.0  | 0.0  |
| Unsig. Movement Delay, s/veh   |      |      |      |      |      |       |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh          | 65.4 | 69.5 | 40.7 | 37.3 | 19.0 | 19.0  | 74.9 | 91.3 | 29.4 | 52.4 | 0.0  | 0.0  |
| LnGrp LOS                      | E    | E    | D    | D    | B    | B     | E    | F    | C    | D    |      |      |
| Approach Vol, veh/h            | 1175 |      |      |      | 1567 |       | 1256 |      | 88   |      |      |      |
| Approach Delay, s/veh          | 65.6 |      |      |      | 27.5 |       | 44.1 |      | 52.4 |      |      |      |
| Approach LOS                   | E    |      |      |      | C    |       | D    |      | D    |      |      |      |
| Timer - Assigned Phs           | 1    | 2    | 4    |      | 5    | 6     | 8    |      |      |      |      |      |
| Phs Duration (G+Y+Rc), s       | 49.4 | 40.0 | 21.6 |      | 12.7 | 76.7  | 19.0 |      |      |      |      |      |
| Change Period (Y+Rc), s        | 6.4  | 5.4  | 4.6  |      | 5.4  | * 6.4 | 5.1  |      |      |      |      |      |
| Max Green Setting (Gmax), s    | 34.6 | 34.6 | 26.0 |      | 13.6 | * 56  | 13.9 |      |      |      |      |      |
| Max Q Clear Time (g_c+24.4), s | 24.4 | 35.2 | 7.8  |      | 7.7  | 19.4  | 14.2 |      |      |      |      |      |
| Green Ext Time (p_c), s        | 1.2  | 0.0  | 0.3  |      | 0.0  | 3.5   | 0.0  |      |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 44.1

HCM 7th LOS D

## Notes

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

User approved volume balancing among the lanes for turning movement.

Vista GPU

# HCM 7th Signalized Intersection Summary 13: E. Vista Way & Townsite Drive

Future Year Conditions  
PM Peak Hour

|                              |  |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                                | EBT                                                                               | EBR                                                                               | WBL  | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |   |  |  |      |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 200                                                                                | 50                                                                                | 180                                                                               | 50   | 30                                                                                | 20                                                                                | 290                                                                               | 2010                                                                              | 40                                                                                | 50                                                                                  | 1380                                                                                | 250                                                                                 |
| Future Volume (veh/h)        | 200                                                                                | 50                                                                                | 180                                                                               | 50   | 30                                                                                | 20                                                                                | 290                                                                               | 2010                                                                              | 40                                                                                | 50                                                                                  | 1380                                                                                | 250                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                  | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.              | 1.04                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 0.96                                                                              | 0.96                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)          | 0.98                                                                               |                                                                                   | 0.98                                                                              | 0.98 |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.97                                                                              | 1.00                                                                                |                                                                                     | 0.97                                                                                |
| Parking Bus, Adj             | 1.00                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                 |                                                                                   |                                                                                   | No   |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1930                                                                               | 1856                                                                              | 1856                                                                              | 1856 | 1856                                                                              | 1781                                                                              | 1781                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 202                                                                                | 51                                                                                | 142                                                                               | 51   | 30                                                                                | 15                                                                                | 293                                                                               | 2030                                                                              | 35                                                                                | 51                                                                                  | 1394                                                                                | 228                                                                                 |
| Peak Hour Factor             | 0.99                                                                               | 0.99                                                                              | 0.99                                                                              | 0.99 | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                                | 0.99                                                                                | 0.99                                                                                |
| Percent Heavy Veh, %         | 3                                                                                  | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 239                                                                                | 363                                                                               | 301                                                                               | 192  | 103                                                                               | 289                                                                               | 311                                                                               | 3189                                                                              | 55                                                                                | 133                                                                                 | 1557                                                                                | 251                                                                                 |
| Arrive On Green              | 0.20                                                                               | 0.20                                                                              | 0.20                                                                              | 0.20 | 0.20                                                                              | 0.20                                                                              | 0.18                                                                              | 0.62                                                                              | 0.62                                                                              | 0.08                                                                                | 0.51                                                                                | 0.51                                                                                |
| Sat Flow, veh/h              | 1382                                                                               | 1856                                                                              | 1539                                                                              | 751  | 528                                                                               | 1477                                                                              | 1696                                                                              | 5125                                                                              | 88                                                                                | 1767                                                                                | 3025                                                                                | 488                                                                                 |
| Grp Volume(v), veh/h         | 202                                                                                | 51                                                                                | 142                                                                               | 81   | 0                                                                                 | 15                                                                                | 293                                                                               | 1337                                                                              | 728                                                                               | 51                                                                                  | 804                                                                                 | 818                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1382                                                                               | 1856                                                                              | 1539                                                                              | 1278 | 0                                                                                 | 1477                                                                              | 1696                                                                              | 1689                                                                              | 1836                                                                              | 1767                                                                                | 1763                                                                                | 1750                                                                                |
| Q Serve(g_s), s              | 17.3                                                                               | 3.0                                                                               | 10.6                                                                              | 5.1  | 0.0                                                                               | 1.1                                                                               | 22.2                                                                              | 32.2                                                                              | 32.3                                                                              | 3.6                                                                                 | 52.9                                                                                | 55.4                                                                                |
| Cycle Q Clear(g_c), s        | 25.4                                                                               | 3.0                                                                               | 10.6                                                                              | 8.1  | 0.0                                                                               | 1.1                                                                               | 22.2                                                                              | 32.2                                                                              | 32.3                                                                              | 3.6                                                                                 | 52.9                                                                                | 55.4                                                                                |
| Prop In Lane                 | 1.00                                                                               |                                                                                   | 1.00                                                                              | 0.63 |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.05                                                                              | 1.00                                                                                |                                                                                     | 0.28                                                                                |
| Lane Grp Cap(c), veh/h       | 239                                                                                | 363                                                                               | 301                                                                               | 295  | 0                                                                                 | 289                                                                               | 311                                                                               | 2102                                                                              | 1143                                                                              | 133                                                                                 | 907                                                                                 | 901                                                                                 |
| V/C Ratio(X)                 | 0.84                                                                               | 0.14                                                                              | 0.47                                                                              | 0.27 | 0.00                                                                              | 0.05                                                                              | 0.94                                                                              | 0.64                                                                              | 0.64                                                                              | 0.38                                                                                | 0.89                                                                                | 0.91                                                                                |
| Avail Cap(c_a), veh/h        | 239                                                                                | 363                                                                               | 301                                                                               | 295  | 0                                                                                 | 289                                                                               | 311                                                                               | 2102                                                                              | 1143                                                                              | 133                                                                                 | 907                                                                                 | 901                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00 | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.44                                                                                | 0.44                                                                                | 0.44                                                                                |
| Uniform Delay (d), s/veh     | 57.1                                                                               | 43.3                                                                              | 46.4                                                                              | 45.6 | 0.0                                                                               | 42.5                                                                              | 52.4                                                                              | 15.3                                                                              | 15.4                                                                              | 57.2                                                                                | 28.1                                                                                | 28.8                                                                                |
| Incr Delay (d2), s/veh       | 22.7                                                                               | 0.1                                                                               | 0.9                                                                               | 0.4  | 0.0                                                                               | 0.1                                                                               | 35.9                                                                              | 1.5                                                                               | 2.7                                                                               | 0.3                                                                                 | 6.1                                                                                 | 7.4                                                                                 |
| Initial Q Delay(d3), s/veh   | 0.0                                                                                | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 8.3                                                                                | 1.4                                                                               | 4.2                                                                               | 2.3  | 0.0                                                                               | 0.4                                                                               | 12.4                                                                              | 12.1                                                                              | 13.6                                                                              | 1.6                                                                                 | 22.8                                                                                | 24.0                                                                                |
| Unsig. Movement Delay, s/veh |                                                                                    |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh        | 79.9                                                                               | 43.4                                                                              | 47.2                                                                              | 46.0 | 0.0                                                                               | 42.6                                                                              | 88.3                                                                              | 16.8                                                                              | 18.1                                                                              | 57.5                                                                                | 34.2                                                                                | 36.2                                                                                |
| LnGrp LOS                    | E                                                                                  | D                                                                                 | D                                                                                 | D    |                                                                                   | D                                                                                 | F                                                                                 | B                                                                                 | B                                                                                 | E                                                                                   | C                                                                                   | D                                                                                   |
| Approach Vol, veh/h          | 395                                                                                |                                                                                   |                                                                                   | 96   |                                                                                   |                                                                                   | 2358                                                                              |                                                                                   |                                                                                   | 1673                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 63.4                                                                               |                                                                                   |                                                                                   | 45.4 |                                                                                   |                                                                                   | 26.1                                                                              |                                                                                   |                                                                                   | 35.9                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | E                                                                                  |                                                                                   |                                                                                   | D    |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                  | 2                                                                                 |                                                                                   | 4    | 5                                                                                 | 6                                                                                 |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 4.0                                                                                | 86.0                                                                              |                                                                                   | 30.0 | 28.0                                                                              | 72.0                                                                              |                                                                                   | 30.0                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.2                                                                                | 5.1                                                                               |                                                                                   | 4.6  | 4.2                                                                               | 5.1                                                                               |                                                                                   | 4.6                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.8                                                                                | 80.9                                                                              |                                                                                   | 25.4 | 23.8                                                                              | 66.9                                                                              |                                                                                   | 25.4                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I), s  | 15.6                                                                               | 34.3                                                                              |                                                                                   | 27.4 | 24.2                                                                              | 57.4                                                                              |                                                                                   | 10.1                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                                | 14.9                                                                              |                                                                                   | 0.0  | 0.0                                                                               | 5.3                                                                               |                                                                                   | 0.3                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                    |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh | 33.4                                                                               |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                  | C                                                                                  |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 14: Vale Terrace Drive/Anza Avenue & E. Vista Way

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL                                                                                 | NBT                                                                                 | NBR  | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Configurations          |  |  |      |  |  |      |  |  |      |  |  |  |
| Traffic Volume (veh/h)       | 240                                                                               | 1500                                                                              | 450  | 60                                                                                | 1100                                                                              | 60   | 420                                                                                 | 130                                                                                 | 50   | 30                                                                                  | 150                                                                                 | 130                                                                                 |
| Future Volume (veh/h)        | 240                                                                               | 1500                                                                              | 450  | 60                                                                                | 1100                                                                              | 60   | 420                                                                                 | 130                                                                                 | 50   | 30                                                                                  | 150                                                                                 | 130                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.              | 0.96                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                                | 1.04                                                                                | 1.00 | 1.00                                                                                | 1.04                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 0.97 | 1.00                                                                              |                                                                                   | 0.97 | 1.00                                                                                |                                                                                     | 1.00 | 1.00                                                                                |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |      | No                                                                                  |                                                                                     |      | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1934                                                                              | 1934 | 1934                                                                              | 1934                                                                              | 1934 | 1934                                                                                | 2011                                                                                | 1934 | 1934                                                                                | 2011                                                                                | 1934                                                                                |
| Adj Flow Rate, veh/h         | 245                                                                               | 1531                                                                              | 413  | 61                                                                                | 1122                                                                              | 51   | 429                                                                                 | 133                                                                                 | 46   | 31                                                                                  | 153                                                                                 | 102                                                                                 |
| Peak Hour Factor             | 0.98                                                                              | 0.98                                                                              | 0.98 | 0.98                                                                              | 0.98                                                                              | 0.98 | 0.98                                                                                | 0.98                                                                                | 0.98 | 0.98                                                                                | 0.98                                                                                | 0.98                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                   | 3                                                                                   | 3    | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 268                                                                               | 2335                                                                              | 623  | 79                                                                                | 1636                                                                              | 74   | 464                                                                                 | 296                                                                                 | 102  | 48                                                                                  | 208                                                                                 | 167                                                                                 |
| Arrive On Green              | 0.15                                                                              | 0.57                                                                              | 0.57 | 0.04                                                                              | 0.46                                                                              | 0.46 | 0.13                                                                                | 0.21                                                                                | 0.21 | 0.03                                                                                | 0.10                                                                                | 0.10                                                                                |
| Sat Flow, veh/h              | 1768                                                                              | 4121                                                                              | 1099 | 1842                                                                              | 3573                                                                              | 162  | 3573                                                                                | 1428                                                                                | 494  | 1842                                                                                | 2011                                                                                | 1615                                                                                |
| Grp Volume(v), veh/h         | 245                                                                               | 1305                                                                              | 639  | 61                                                                                | 577                                                                               | 596  | 429                                                                                 | 0                                                                                   | 179  | 31                                                                                  | 153                                                                                 | 102                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1768                                                                              | 1760                                                                              | 1700 | 1842                                                                              | 1837                                                                              | 1899 | 1786                                                                                | 0                                                                                   | 1921 | 1842                                                                                | 2011                                                                                | 1615                                                                                |
| Q Serve(g_s), s              | 17.7                                                                              | 33.2                                                                              | 33.9 | 4.3                                                                               | 32.2                                                                              | 32.3 | 15.4                                                                                | 0.0                                                                                 | 10.6 | 2.2                                                                                 | 9.6                                                                                 | 5.8                                                                                 |
| Cycle Q Clear(g_c), s        | 17.7                                                                              | 33.2                                                                              | 33.9 | 4.3                                                                               | 32.2                                                                              | 32.3 | 15.4                                                                                | 0.0                                                                                 | 10.6 | 2.2                                                                                 | 9.6                                                                                 | 5.8                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.65 | 1.00                                                                              |                                                                                   | 0.09 | 1.00                                                                                |                                                                                     | 0.26 | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 268                                                                               | 1994                                                                              | 964  | 79                                                                                | 841                                                                               | 869  | 464                                                                                 | 0                                                                                   | 399  | 48                                                                                  | 208                                                                                 | 167                                                                                 |
| V/C Ratio(X)                 | 0.91                                                                              | 0.65                                                                              | 0.66 | 0.77                                                                              | 0.69                                                                              | 0.69 | 0.92                                                                                | 0.00                                                                                | 0.45 | 0.65                                                                                | 0.74                                                                                | 0.61                                                                                |
| Avail Cap(c_a), veh/h        | 271                                                                               | 1994                                                                              | 964  | 140                                                                               | 841                                                                               | 869  | 464                                                                                 | 0                                                                                   | 399  | 211                                                                                 | 356                                                                                 | 286                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 0.70                                                                              | 0.70                                                                              | 0.70 | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                                | 0.00                                                                                | 1.00 | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 54.3                                                                              | 19.4                                                                              | 19.5 | 61.6                                                                              | 27.8                                                                              | 27.9 | 55.9                                                                                | 0.0                                                                                 | 45.0 | 62.7                                                                                | 56.6                                                                                | 30.8                                                                                |
| Incr Delay (d2), s/veh       | 24.8                                                                              | 1.2                                                                               | 2.5  | 5.8                                                                               | 4.5                                                                               | 4.4  | 23.8                                                                                | 0.0                                                                                 | 0.6  | 5.4                                                                                 | 3.7                                                                                 | 2.7                                                                                 |
| Initial Q Delay(d3), s/veh   | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                                 | 0.0                                                                                 | 0.0  | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 13.3                                                                              | 13.5 | 2.1                                                                               | 14.9                                                                              | 15.4 | 8.4                                                                                 | 0.0                                                                                 | 5.1  | 1.1                                                                                 | 5.1                                                                                 | 3.2                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh        | 79.1                                                                              | 20.6                                                                              | 22.1 | 67.4                                                                              | 32.4                                                                              | 32.2 | 79.7                                                                                | 0.0                                                                                 | 45.6 | 68.2                                                                                | 60.3                                                                                | 33.5                                                                                |
| LnGrp LOS                    | E                                                                                 | C                                                                                 | C    | E                                                                                 | C                                                                                 | C    | E                                                                                   |                                                                                     | D    | E                                                                                   | E                                                                                   | C                                                                                   |
| Approach Vol, veh/h          | 2189                                                                              |                                                                                   |      | 1234                                                                              |                                                                                   |      | 608                                                                                 |                                                                                     |      | 286                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 27.6                                                                              |                                                                                   |      | 34.0                                                                              |                                                                                   |      | 69.7                                                                                |                                                                                     |      | 51.6                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |      | C                                                                                 |                                                                                   |      | E                                                                                   |                                                                                     |      | D                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3    | 4                                                                                 | 5                                                                                 | 6    | 7                                                                                   | 8                                                                                   |      |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 78.8                                                                              | 78.8                                                                              | 22.0 | 18.5                                                                              | 24.8                                                                              | 64.6 | 8.5                                                                                 | 32.1                                                                                |      |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 5.1                                                                               | 5.1                                                                               | 5.1  | 5.1                                                                               | 5.1                                                                               | 5.1  | 5.1                                                                                 | 5.1                                                                                 |      |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 59.8                                                                              | 59.8                                                                              | 16.9 | 23.0                                                                              | 19.9                                                                              | 49.8 | 14.9                                                                                | 25.0                                                                                |      |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I), s  | 35.9                                                                              | 35.9                                                                              | 17.4 | 11.6                                                                              | 19.7                                                                              | 34.3 | 4.2                                                                                 | 12.6                                                                                |      |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 15.7                                                                              | 0.0  | 0.7                                                                               | 0.0                                                                               | 6.9  | 0.0                                                                                 | 0.6                                                                                 |      |                                                                                     |                                                                                     |                                                                                     |

## Intersection Summary

HCM 7th Control Delay, s/veh 36.9  
HCM 7th LOS D

## Notes

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

# HCM 7th Signalized Intersection Summary 15: Emerald Drive & 78 WB ON/78 WB OFF

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL | EBT  | EBR | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|-----|------|-----|------|-------|-------|------|------|------|------|------|------|
| Lane Configurations          |     |      |     | ↔↔   |       | ↔↔    | ↔↔   | ↔↔   |      |      | ↔↔↔  |      |
| Traffic Volume (veh/h)       | 0   | 0    | 0   | 350  | 0     | 770   | 370  | 1280 | 0    | 0    | 1260 | 330  |
| Future Volume (veh/h)        | 0   | 0    | 0   | 350  | 0     | 770   | 370  | 1280 | 0    | 0    | 1260 | 330  |
| Initial Q (Qb), veh          |     |      |     | 0    | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              |     |      |     | 1.00 | 1.00  | 1.00  | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)          |     |      |     | 1.00 |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 0.97 |
| Parking Bus, Adj             |     |      |     | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |     |      |     | No   |       |       | No   |      |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       |     |      |     | 1856 | 0     | 1856  | 1856 | 1930 | 0    | 0    | 1856 | 1856 |
| Adj Flow Rate, veh/h         |     |      |     | 354  | 0     | 778   | 374  | 1293 | 0    | 0    | 1273 | 298  |
| Peak Hour Factor             |     |      |     | 0.99 | 0.99  | 0.99  | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Percent Heavy Veh, %         |     |      |     | 3    | 0     | 3     | 3    | 3    | 0    | 0    | 3    | 3    |
| Cap, veh/h                   |     |      |     | 709  | 0     | 573   | 446  | 2620 | 0    | 0    | 2224 | 520  |
| Arrive On Green              |     |      |     | 0.21 | 0.00  | 0.21  | 0.09 | 0.48 | 0.00 | 0.00 | 0.55 | 0.55 |
| Sat Flow, veh/h              |     |      |     | 3428 | 0     | 2768  | 3428 | 3763 | 0    | 0    | 4245 | 954  |
| Grp Volume(v), veh/h         |     |      |     | 354  | 0     | 778   | 374  | 1293 | 0    | 0    | 1054 | 517  |
| Grp Sat Flow(s), veh/h/ln    |     |      |     | 1714 | 0     | 1384  | 1714 | 1833 | 0    | 0    | 1689 | 1655 |
| Q Serve(g_s), s              |     |      |     | 11.9 | 0.0   | 26.9  | 14.0 | 31.3 | 0.0  | 0.0  | 26.8 | 26.8 |
| Cycle Q Clear(g_c), s        |     |      |     | 11.9 | 0.0   | 26.9  | 14.0 | 31.3 | 0.0  | 0.0  | 26.8 | 26.8 |
| Prop In Lane                 |     |      |     | 1.00 |       | 1.00  | 1.00 |      | 0.00 | 0.00 |      | 0.58 |
| Lane Grp Cap(c), veh/h       |     |      |     | 709  | 0     | 573   | 446  | 2620 | 0    | 0    | 1842 | 902  |
| V/C Ratio(X)                 |     |      |     | 0.50 | 0.00  | 1.36  | 0.84 | 0.49 | 0.00 | 0.00 | 0.57 | 0.57 |
| Avail Cap(c_a), veh/h        |     |      |     | 709  | 0     | 573   | 456  | 2620 | 0    | 0    | 1842 | 902  |
| HCM Platoon Ratio            |     |      |     | 1.00 | 1.00  | 1.00  | 0.67 | 0.67 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           |     |      |     | 1.00 | 0.00  | 1.00  | 0.66 | 0.66 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     |     |      |     | 45.6 | 0.0   | 51.6  | 58.0 | 17.8 | 0.0  | 0.0  | 19.5 | 19.5 |
| Incr Delay (d2), s/veh       |     |      |     | 0.5  | 0.0   | 172.5 | 8.9  | 0.4  | 0.0  | 0.0  | 1.3  | 2.6  |
| Initial Q Delay(d3), s/veh   |     |      |     | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |     |      |     | 5.1  | 0.0   | 23.0  | 6.8  | 14.3 | 0.0  | 0.0  | 10.5 | 10.7 |
| Unsig. Movement Delay, s/veh |     |      |     |      |       |       |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        |     |      |     | 46.1 | 0.0   | 224.0 | 66.9 | 18.3 | 0.0  | 0.0  | 20.8 | 22.2 |
| LnGrp LOS                    |     |      |     | D    |       | F     | E    | B    |      |      | C    | C    |
| Approach Vol, veh/h          |     |      |     |      | 1132  |       |      | 1667 |      |      | 1571 |      |
| Approach Delay, s/veh        |     |      |     |      | 168.4 |       |      | 29.2 |      |      | 21.3 |      |
| Approach LOS                 |     |      |     |      | F     |       |      | C    |      |      | C    |      |
| Timer - Assigned Phs         |     | 2    |     |      | 5     | 6     |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |     | 98.0 |     |      | 22.0  | 76.0  |      | 32.0 |      |      |      |      |
| Change Period (Y+Rc), s      |     | 5.1  |     |      | 5.1   | * 5.1 |      | 5.1  |      |      |      |      |
| Max Green Setting (Gmax), s  |     | 92.9 |     |      | 17.3  | * 71  |      | 26.9 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |     | 33.3 |     |      | 16.0  | 28.8  |      | 28.9 |      |      |      |      |
| Green Ext Time (p_c), s      |     | 13.7 |     |      | 0.2   | 15.8  |      | 0.0  |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 62.4  
HCM 7th LOS E

## Notes

\* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 7th Signalized Intersection Summary  
16: Emerald Drive & 78 EB OFF/78 EB ON

Future Year Conditions  
PM Peak Hour

|                               |  |      |       |      |     |     |       |      |      |       |      |      |
|-------------------------------|------------------------------------------------------------------------------------|------|-------|------|-----|-----|-------|------|------|-------|------|------|
| Movement                      | EBL                                                                                | EBT  | EBR   | WBL  | WBT | WBR | NBL   | NBT  | NBR  | SBL   | SBT  | SBR  |
| Lane Configurations           | ↔                                                                                  |      | ↔     |      |     |     |       | ↔    |      | ↔     | ↔    |      |
| Traffic Volume (veh/h)        | 500                                                                                | 0    | 340   | 0    | 0   | 0   | 0     | 1150 | 340  | 710   | 900  | 0    |
| Future Volume (veh/h)         | 500                                                                                | 0    | 340   | 0    | 0   | 0   | 0     | 1150 | 340  | 710   | 900  | 0    |
| Initial Q (Qb), veh           | 0                                                                                  | 0    | 0     |      |     |     | 0     | 0    | 0    | 0     | 0    | 0    |
| Lane Width Adj.               | 1.04                                                                               | 1.00 | 1.04  |      |     |     | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)           | 1.00                                                                               |      | 1.00  |      |     |     | 1.00  |      | 1.00 | 1.00  |      | 1.00 |
| Parking Bus, Adj              | 1.00                                                                               | 1.00 | 1.00  |      |     |     | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Work Zone On Approach         | No                                                                                 |      |       |      |     |     | No    |      |      | No    |      |      |
| Adj Sat Flow, veh/h/ln        | 1930                                                                               | 0    | 1930  |      |     |     | 0     | 1856 | 1856 | 1856  | 1856 | 0    |
| Adj Flow Rate, veh/h          | 515                                                                                | 0    | 279   |      |     |     | 0     | 1186 | 315  | 732   | 928  | 0    |
| Peak Hour Factor              | 0.97                                                                               | 0.97 | 0.97  |      |     |     | 0.97  | 0.97 | 0.97 | 0.97  | 0.97 | 0.97 |
| Percent Heavy Veh, %          | 3                                                                                  | 0    | 3     |      |     |     | 0     | 3    | 3    | 3     | 3    | 0    |
| Cap, veh/h                    | 409                                                                                | 0    | 187   |      |     |     | 0     | 2540 | 675  | 456   | 2845 | 0    |
| Arrive On Green               | 0.11                                                                               | 0.00 | 0.11  |      |     |     | 0.00  | 1.00 | 1.00 | 0.27  | 1.00 | 0.00 |
| Sat Flow, veh/h               | 3565                                                                               | 0    | 1635  |      |     |     | 0     | 4150 | 1058 | 3428  | 3618 | 0    |
| Grp Volume(v), veh/h          | 515                                                                                | 0    | 279   |      |     |     | 0     | 1005 | 496  | 732   | 928  | 0    |
| Grp Sat Flow(s), veh/h/ln     | 1783                                                                               | 0    | 1635  |      |     |     | 0     | 1689 | 1664 | 1714  | 1763 | 0    |
| Q Serve(g_s), s               | 14.9                                                                               | 0.0  | 14.9  |      |     |     | 0.0   | 0.0  | 0.0  | 17.3  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s         | 14.9                                                                               | 0.0  | 14.9  |      |     |     | 0.0   | 0.0  | 0.0  | 17.3  | 0.0  | 0.0  |
| Prop In Lane                  | 1.00                                                                               |      | 1.00  |      |     |     | 0.00  |      | 0.64 | 1.00  |      | 0.00 |
| Lane Grp Cap(c), veh/h        | 409                                                                                | 0    | 187   |      |     |     | 0     | 2154 | 1061 | 456   | 2845 | 0    |
| V/C Ratio(X)                  | 1.26                                                                               | 0.00 | 1.49  |      |     |     | 0.00  | 0.47 | 0.47 | 1.60  | 0.33 | 0.00 |
| Avail Cap(c_a), veh/h         | 409                                                                                | 0    | 187   |      |     |     | 0     | 2154 | 1061 | 456   | 2845 | 0    |
| HCM Platoon Ratio             | 1.00                                                                               | 1.00 | 1.00  |      |     |     | 1.00  | 2.00 | 2.00 | 2.00  | 2.00 | 1.00 |
| Upstream Filter(I)            | 1.00                                                                               | 0.00 | 1.00  |      |     |     | 0.00  | 0.60 | 0.60 | 0.77  | 0.77 | 0.00 |
| Uniform Delay (d), s/veh      | 57.5                                                                               | 0.0  | 57.6  |      |     |     | 0.0   | 0.0  | 0.0  | 47.7  | 0.0  | 0.0  |
| Incr Delay (d2), s/veh        | 135.5                                                                              | 0.0  | 246.0 |      |     |     | 0.0   | 0.4  | 0.9  | 279.8 | 0.2  | 0.0  |
| Initial Q Delay(d3), s/veh    | 0.0                                                                                | 0.0  | 0.0   |      |     |     | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 14.4                                                                               | 0.0  | 19.0  |      |     |     | 0.0   | 0.1  | 0.3  | 24.0  | 0.1  | 0.0  |
| Unsig. Movement Delay, s/veh  |                                                                                    |      |       |      |     |     |       |      |      |       |      |      |
| LnGrp Delay(d), s/veh         | 193.1                                                                              | 0.0  | 303.5 |      |     |     | 0.0   | 0.4  | 0.9  | 327.5 | 0.2  | 0.0  |
| LnGrp LOS                     | F                                                                                  |      | F     |      |     |     |       | A    | A    | F     | A    |      |
| Approach Vol, veh/h           | 794                                                                                |      |       |      |     |     | 1501  |      |      | 1660  |      |      |
| Approach Delay, s/veh         | 231.9                                                                              |      |       |      |     |     | 0.6   |      |      | 144.6 |      |      |
| Approach LOS                  | F                                                                                  |      |       |      |     |     | A     |      |      | F     |      |      |
| Timer - Assigned Phs          | 1                                                                                  | 2    |       | 4    |     |     | 6     |      |      |       |      |      |
| Phs Duration (G+Y+Rc), s      | 32.0                                                                               | 88.0 |       | 20.0 |     |     | 110.0 |      |      |       |      |      |
| Change Period (Y+Rc), s       | 4.7                                                                                | 5.1  |       | 5.1  |     |     | 5.1   |      |      |       |      |      |
| Max Green Setting (Gmax), s   | 7.3                                                                                | 82.9 |       | 14.9 |     |     | 104.9 |      |      |       |      |      |
| Max Q Clear Time (g_c+119, s) | 119.3                                                                              | 2.0  |       | 16.9 |     |     | 2.0   |      |      |       |      |      |
| Green Ext Time (p_c), s       | 0.0                                                                                | 9.1  |       | 0.0  |     |     | 4.9   |      |      |       |      |      |
| <b>Intersection Summary</b>   |                                                                                    |      |       |      |     |     |       |      |      |       |      |      |
| HCM 7th Control Delay, s/veh  | 107.5                                                                              |      |       |      |     |     |       |      |      |       |      |      |
| HCM 7th LOS                   | F                                                                                  |      |       |      |     |     |       |      |      |       |      |      |

# HCM 7th Signalized Intersection Summary 17: Emerald Drive & Hacienda Drive

Future Year Conditions  
PM Peak Hour

|                                                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                                                           | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                                                |  |  |                                                                                   |  |  |  |  |  |                                                                                   |  |  |  |
| Traffic Volume (veh/h)                                                                             | 470                                                                               | 340                                                                               | 100                                                                               | 150                                                                               | 340                                                                               | 490                                                                               | 50                                                                                | 530                                                                               | 130                                                                               | 440                                                                                 | 420                                                                                 | 380                                                                                 |
| Future Volume (veh/h)                                                                              | 470                                                                               | 340                                                                               | 100                                                                               | 150                                                                               | 340                                                                               | 490                                                                               | 50                                                                                | 530                                                                               | 130                                                                               | 440                                                                                 | 420                                                                                 | 380                                                                                 |
| Initial Q (Qb), veh                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.                                                                                    | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.96                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.04                                                                                |
| Ped-Bike Adj(A_pbT)                                                                                | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                                              | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln                                                                             | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1781                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1930                                                                                |
| Adj Flow Rate, veh/h                                                                               | 303                                                                               | 584                                                                               | 91                                                                                | 152                                                                               | 343                                                                               | 343                                                                               | 51                                                                                | 535                                                                               | 116                                                                               | 444                                                                                 | 424                                                                                 | 303                                                                                 |
| Peak Hour Factor                                                                                   | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                              | 0.99                                                                                | 0.99                                                                                | 0.99                                                                                |
| Percent Heavy Veh, %                                                                               | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                                                         | 348                                                                               | 617                                                                               | 96                                                                                | 321                                                                               | 337                                                                               | 502                                                                               | 65                                                                                | 622                                                                               | 134                                                                               | 837                                                                                 | 1504                                                                                | 688                                                                                 |
| Arrive On Green                                                                                    | 0.20                                                                              | 0.20                                                                              | 0.20                                                                              | 0.18                                                                              | 0.18                                                                              | 0.18                                                                              | 0.04                                                                              | 0.22                                                                              | 0.22                                                                              | 0.08                                                                                | 0.14                                                                                | 0.14                                                                                |
| Sat Flow, veh/h                                                                                    | 1767                                                                              | 3135                                                                              | 487                                                                               | 1767                                                                              | 1856                                                                              | 2768                                                                              | 1696                                                                              | 2882                                                                              | 622                                                                               | 3428                                                                                | 3526                                                                                | 1614                                                                                |
| Grp Volume(v), veh/h                                                                               | 303                                                                               | 345                                                                               | 330                                                                               | 152                                                                               | 343                                                                               | 343                                                                               | 51                                                                                | 326                                                                               | 325                                                                               | 444                                                                                 | 424                                                                                 | 303                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                                                           | 1767                                                                              | 1856                                                                              | 1766                                                                              | 1767                                                                              | 1856                                                                              | 1384                                                                              | 1696                                                                              | 1763                                                                              | 1742                                                                              | 1714                                                                                | 1763                                                                                | 1614                                                                                |
| Q Serve(g_s), s                                                                                    | 21.6                                                                              | 23.9                                                                              | 24.0                                                                              | 10.0                                                                              | 23.6                                                                              | 15.1                                                                              | 3.9                                                                               | 23.2                                                                              | 23.4                                                                              | 16.2                                                                                | 14.0                                                                                | 22.4                                                                                |
| Cycle Q Clear(g_c), s                                                                              | 21.6                                                                              | 23.9                                                                              | 24.0                                                                              | 10.0                                                                              | 23.6                                                                              | 15.1                                                                              | 3.9                                                                               | 23.2                                                                              | 23.4                                                                              | 16.2                                                                                | 14.0                                                                                | 22.4                                                                                |
| Prop In Lane                                                                                       | 1.00                                                                              |                                                                                   | 0.28                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.36                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                                                             | 348                                                                               | 365                                                                               | 348                                                                               | 321                                                                               | 337                                                                               | 502                                                                               | 65                                                                                | 381                                                                               | 376                                                                               | 837                                                                                 | 1504                                                                                | 688                                                                                 |
| V/C Ratio(X)                                                                                       | 0.87                                                                              | 0.94                                                                              | 0.95                                                                              | 0.47                                                                              | 1.02                                                                              | 0.68                                                                              | 0.79                                                                              | 0.86                                                                              | 0.86                                                                              | 0.53                                                                                | 0.28                                                                                | 0.44                                                                                |
| Avail Cap(c_a), veh/h                                                                              | 348                                                                               | 365                                                                               | 348                                                                               | 321                                                                               | 337                                                                               | 502                                                                               | 124                                                                               | 473                                                                               | 468                                                                               | 837                                                                                 | 1504                                                                                | 688                                                                                 |
| HCM Platoon Ratio                                                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.33                                                                                | 0.33                                                                                | 0.33                                                                                |
| Upstream Filter(I)                                                                                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                |
| Uniform Delay (d), s/veh                                                                           | 50.6                                                                              | 51.5                                                                              | 51.6                                                                              | 47.6                                                                              | 53.2                                                                              | 49.7                                                                              | 62.0                                                                              | 49.0                                                                              | 49.1                                                                              | 52.6                                                                                | 38.0                                                                                | 41.6                                                                                |
| Incr Delay (d2), s/veh                                                                             | 20.2                                                                              | 32.8                                                                              | 34.8                                                                              | 0.8                                                                               | 53.8                                                                              | 3.5                                                                               | 14.4                                                                              | 21.3                                                                              | 22.2                                                                              | 0.5                                                                                 | 0.4                                                                                 | 1.8                                                                                 |
| Initial Q Delay(d3), s/veh                                                                         | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                                                           | 11.3                                                                              | 14.2                                                                              | 13.8                                                                              | 4.4                                                                               | 15.8                                                                              | 5.4                                                                               | 1.9                                                                               | 12.4                                                                              | 12.4                                                                              | 7.5                                                                                 | 6.7                                                                                 | 10.0                                                                                |
| Unsig. Movement Delay, s/veh                                                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                                              | 70.8                                                                              | 84.3                                                                              | 86.4                                                                              | 48.4                                                                              | 107.0                                                                             | 53.2                                                                              | 76.4                                                                              | 70.4                                                                              | 71.3                                                                              | 53.1                                                                                | 38.5                                                                                | 43.4                                                                                |
| LnGrp LOS                                                                                          | E                                                                                 | F                                                                                 | F                                                                                 | D                                                                                 | F                                                                                 | D                                                                                 | E                                                                                 | E                                                                                 | E                                                                                 | D                                                                                   | D                                                                                   | D                                                                                   |
| Approach Vol, veh/h                                                                                | 978                                                                               |                                                                                   |                                                                                   | 838                                                                               |                                                                                   |                                                                                   | 702                                                                               |                                                                                   |                                                                                   | 1171                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh                                                                              | 80.8                                                                              |                                                                                   |                                                                                   | 74.3                                                                              |                                                                                   |                                                                                   | 71.2                                                                              |                                                                                   |                                                                                   | 45.3                                                                                |                                                                                     |                                                                                     |
| Approach LOS                                                                                       | F                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | D                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs                                                                               | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                                                           | 36.8                                                                              | 33.2                                                                              |                                                                                   | 29.0                                                                              | 9.5                                                                               | 60.5                                                                              |                                                                                   | 31.0                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                                                            | 5.1                                                                               | * 5.1                                                                             |                                                                                   | 5.4                                                                               | 4.5                                                                               | 5.1                                                                               |                                                                                   | 5.4                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                                                        | 25.5                                                                              | * 35                                                                              |                                                                                   | 23.6                                                                              | 9.5                                                                               | 50.9                                                                              |                                                                                   | 25.6                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+1.0), s                                                                      | 119.2                                                                             | 25.4                                                                              |                                                                                   | 25.6                                                                              | 5.9                                                                               | 24.4                                                                              |                                                                                   | 26.0                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                                                            | 0.8                                                                               | 2.7                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 4.0                                                                               |                                                                                   | 0.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                                                       | 66.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                                                        | E                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| User approved volume balancing among the lanes for turning movement.                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| * HCM 7th computational engine requires equal clearance times for the phases crossing the barrier. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 18: SR-78 WB On-Ramp & W Vista Way

Future Year Conditions  
PM Peak Hour



| Movement                                                                                                 | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL | NBT | NBR | SBL | SBT | SBR |
|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|
| Lane Configurations                                                                                      |  |  |      |  |  |      |     |     |     |     |     |     |
| Traffic Volume (veh/h)                                                                                   | 0                                                                                 | 560                                                                               | 110  | 800                                                                               | 530                                                                               | 0    | 0   | 0   | 0   | 0   | 0   | 0   |
| Future Volume (veh/h)                                                                                    | 0                                                                                 | 560                                                                               | 110  | 800                                                                               | 530                                                                               | 0    | 0   | 0   | 0   | 0   | 0   | 0   |
| Initial Q (Qb), veh                                                                                      | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    |     |     |     |     |     |     |
| Lane Width Adj.                                                                                          | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |     |     |     |     |     |     |
| Ped-Bike Adj(A_pbT)                                                                                      | 1.00                                                                              |                                                                                   | 1.00 | 1.00                                                                              |                                                                                   | 1.00 |     |     |     |     |     |     |
| Parking Bus, Adj                                                                                         | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |     |     |     |     |     |     |
| Work Zone On Approach                                                                                    | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |      |     |     |     |     |     |     |
| Adj Sat Flow, veh/h/ln                                                                                   | 1856                                                                              | 1856                                                                              | 1856 | 1856                                                                              | 1856                                                                              | 0    |     |     |     |     |     |     |
| Adj Flow Rate, veh/h                                                                                     | 0                                                                                 | 583                                                                               | 0    | 833                                                                               | 552                                                                               | 0    |     |     |     |     |     |     |
| Peak Hour Factor                                                                                         | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96                                                                              | 0.96                                                                              | 0.96 |     |     |     |     |     |     |
| Percent Heavy Veh, %                                                                                     | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 0    |     |     |     |     |     |     |
| Cap, veh/h                                                                                               | 468                                                                               | 934                                                                               |      | 1643                                                                              | 863                                                                               | 0    |     |     |     |     |     |     |
| Arrive On Green                                                                                          | 0.00                                                                              | 0.27                                                                              | 0.00 | 0.47                                                                              | 0.47                                                                              | 0.00 |     |     |     |     |     |     |
| Sat Flow, veh/h                                                                                          | 1767                                                                              | 3618                                                                              | 0    | 3534                                                                              | 1856                                                                              | 0    |     |     |     |     |     |     |
| Grp Volume(v), veh/h                                                                                     | 0                                                                                 | 583                                                                               | 0    | 833                                                                               | 552                                                                               | 0    |     |     |     |     |     |     |
| Grp Sat Flow(s),veh/h/ln                                                                                 | 1767                                                                              | 1763                                                                              | 0    | 1767                                                                              | 1856                                                                              | 0    |     |     |     |     |     |     |
| Q Serve(g_s), s                                                                                          | 0.0                                                                               | 5.8                                                                               | 0.0  | 6.6                                                                               | 9.1                                                                               | 0.0  |     |     |     |     |     |     |
| Cycle Q Clear(g_c), s                                                                                    | 0.0                                                                               | 5.8                                                                               | 0.0  | 6.6                                                                               | 9.1                                                                               | 0.0  |     |     |     |     |     |     |
| Prop In Lane                                                                                             | 1.00                                                                              |                                                                                   | 0.00 | 1.00                                                                              |                                                                                   | 0.00 |     |     |     |     |     |     |
| Lane Grp Cap(c), veh/h                                                                                   | 468                                                                               | 934                                                                               |      | 1643                                                                              | 863                                                                               | 0    |     |     |     |     |     |     |
| V/C Ratio(X)                                                                                             | 0.00                                                                              | 0.62                                                                              |      | 0.51                                                                              | 0.64                                                                              | 0.00 |     |     |     |     |     |     |
| Avail Cap(c_a), veh/h                                                                                    | 468                                                                               | 934                                                                               |      | 1643                                                                              | 863                                                                               | 0    |     |     |     |     |     |     |
| HCM Platoon Ratio                                                                                        | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |     |     |     |     |     |     |
| Upstream Filter(I)                                                                                       | 0.00                                                                              | 1.00                                                                              | 0.00 | 0.55                                                                              | 0.55                                                                              | 0.00 |     |     |     |     |     |     |
| Uniform Delay (d), s/veh                                                                                 | 0.0                                                                               | 12.9                                                                              | 0.0  | 7.5                                                                               | 8.1                                                                               | 0.0  |     |     |     |     |     |     |
| Incr Delay (d2), s/veh                                                                                   | 0.0                                                                               | 1.2                                                                               | 0.0  | 0.6                                                                               | 2.0                                                                               | 0.0  |     |     |     |     |     |     |
| Initial Q Delay(d3), s/veh                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  |     |     |     |     |     |     |
| %ile BackOfQ(50%),veh/ln                                                                                 | 0.0                                                                               | 1.7                                                                               | 0.0  | 1.4                                                                               | 2.3                                                                               | 0.0  |     |     |     |     |     |     |
| Unsig. Movement Delay, s/veh                                                                             |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| LnGrp Delay(d), s/veh                                                                                    | 0.0                                                                               | 14.1                                                                              | 0.0  | 8.1                                                                               | 10.2                                                                              | 0.0  |     |     |     |     |     |     |
| LnGrp LOS                                                                                                | B                                                                                 |                                                                                   |      | A                                                                                 |                                                                                   | B    |     |     |     |     |     |     |
| Approach Vol, veh/h                                                                                      | 583                                                                               |                                                                                   |      | 1385                                                                              |                                                                                   |      |     |     |     |     |     |     |
| Approach Delay, s/veh                                                                                    | 14.1                                                                              |                                                                                   |      | 8.9                                                                               |                                                                                   |      |     |     |     |     |     |     |
| Approach LOS                                                                                             | B                                                                                 |                                                                                   |      | A                                                                                 |                                                                                   |      |     |     |     |     |     |     |
| Timer - Assigned Phs                                                                                     | 2                                                                                 |                                                                                   |      | 6                                                                                 |                                                                                   |      |     |     |     |     |     |     |
| Phs Duration (G+Y+Rc), s                                                                                 | 16.0                                                                              |                                                                                   |      | 24.0                                                                              |                                                                                   |      |     |     |     |     |     |     |
| Change Period (Y+Rc), s                                                                                  | 5.4                                                                               |                                                                                   |      | 5.4                                                                               |                                                                                   |      |     |     |     |     |     |     |
| Max Green Setting (Gmax), s                                                                              | 10.6                                                                              |                                                                                   |      | 18.6                                                                              |                                                                                   |      |     |     |     |     |     |     |
| Max Q Clear Time (g_c+l1), s                                                                             | 7.8                                                                               |                                                                                   |      | 11.1                                                                              |                                                                                   |      |     |     |     |     |     |     |
| Green Ext Time (p_c), s                                                                                  | 0.8                                                                               |                                                                                   |      | 2.6                                                                               |                                                                                   |      |     |     |     |     |     |     |
| Intersection Summary                                                                                     |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| HCM 7th Control Delay, s/veh                                                                             |                                                                                   |                                                                                   | 10.5 |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| HCM 7th LOS                                                                                              | B                                                                                 |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| Notes                                                                                                    |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| User approved volume balancing among the lanes for turning movement.                                     |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |
| Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay. |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |     |     |     |     |     |     |

Vista GPU

# HCM 7th Signalized Intersection Summary 19: S Melrose Dr & W Vista Way

Future Year Conditions  
PM Peak Hour



| Movement                       | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               | SBR                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations            |  |  |      |  |  |  |  |  |      |  |  |  |
| Traffic Volume (veh/h)         | 100                                                                               | 260                                                                               | 200  | 160                                                                               | 280                                                                               | 530                                                                               | 620                                                                               | 1910                                                                              | 330  | 190                                                                               | 1140                                                                              | 430                                                                               |
| Future Volume (veh/h)          | 100                                                                               | 260                                                                               | 200  | 160                                                                               | 280                                                                               | 530                                                                               | 620                                                                               | 1910                                                                              | 330  | 190                                                                               | 1140                                                                              | 430                                                                               |
| Initial Q (Qb), veh            | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Lane Width Adj.                | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Ped-Bike Adj(A_pbT)            | 1.00                                                                              |                                                                                   | 1.00 | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.98 | 1.00                                                                              |                                                                                   | 0.98                                                                              |
| Parking Bus, Adj               | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Work Zone On Approach          | No                                                                                |                                                                                   |      |                                                                                   | No                                                                                |                                                                                   |                                                                                   |                                                                                   | No   |                                                                                   |                                                                                   |                                                                                   |
| Adj Sat Flow, veh/h/ln         | 1856                                                                              | 1856                                                                              | 1856 | 1856                                                                              | 1856                                                                              | 1930                                                                              | 1856                                                                              | 1856                                                                              | 1856 | 1856                                                                              | 1856                                                                              | 1856                                                                              |
| Adj Flow Rate, veh/h           | 103                                                                               | 268                                                                               | 185  | 165                                                                               | 289                                                                               | 433                                                                               | 639                                                                               | 1969                                                                              | 304  | 196                                                                               | 1175                                                                              | 350                                                                               |
| Peak Hour Factor               | 0.97                                                                              | 0.97                                                                              | 0.97 | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97 | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              |
| Percent Heavy Veh, %           | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Cap, veh/h                     | 126                                                                               | 333                                                                               | 222  | 351                                                                               | 724                                                                               | 539                                                                               | 721                                                                               | 1958                                                                              | 297  | 222                                                                               | 1777                                                                              | 543                                                                               |
| Arrive On Green                | 0.07                                                                              | 0.16                                                                              | 0.16 | 0.10                                                                              | 0.21                                                                              | 0.21                                                                              | 0.42                                                                              | 0.89                                                                              | 0.89 | 0.13                                                                              | 0.35                                                                              | 0.35                                                                              |
| Sat Flow, veh/h                | 1767                                                                              | 2024                                                                              | 1351 | 3428                                                                              | 3526                                                                              | 1626                                                                              | 3428                                                                              | 4423                                                                              | 671  | 1767                                                                              | 5066                                                                              | 1548                                                                              |
| Grp Volume(v), veh/h           | 103                                                                               | 232                                                                               | 221  | 165                                                                               | 289                                                                               | 433                                                                               | 639                                                                               | 1495                                                                              | 778  | 196                                                                               | 1175                                                                              | 350                                                                               |
| Grp Sat Flow(s),veh/h/ln       | 1767                                                                              | 1763                                                                              | 1612 | 1714                                                                              | 1763                                                                              | 1626                                                                              | 1714                                                                              | 1689                                                                              | 1717 | 1767                                                                              | 1689                                                                              | 1548                                                                              |
| Q Serve(g_s), s                | 7.5                                                                               | 16.5                                                                              | 17.2 | 5.9                                                                               | 9.2                                                                               | 26.7                                                                              | 22.4                                                                              | 57.5                                                                              | 57.5 | 14.2                                                                              | 25.5                                                                              | 19.1                                                                              |
| Cycle Q Clear(g_c), s          | 7.5                                                                               | 16.5                                                                              | 17.2 | 5.9                                                                               | 9.2                                                                               | 26.7                                                                              | 22.4                                                                              | 57.5                                                                              | 57.5 | 14.2                                                                              | 25.5                                                                              | 19.1                                                                              |
| Prop In Lane                   | 1.00                                                                              |                                                                                   | 0.84 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.39 | 1.00                                                                              |                                                                                   | 1.00                                                                              |
| Lane Grp Cap(c), veh/h         | 126                                                                               | 290                                                                               | 265  | 351                                                                               | 724                                                                               | 539                                                                               | 721                                                                               | 1495                                                                              | 760  | 222                                                                               | 1777                                                                              | 543                                                                               |
| V/C Ratio(X)                   | 0.82                                                                              | 0.80                                                                              | 0.83 | 0.47                                                                              | 0.40                                                                              | 0.80                                                                              | 0.89                                                                              | 1.00                                                                              | 1.02 | 0.88                                                                              | 0.66                                                                              | 0.64                                                                              |
| Avail Cap(c_a), veh/h          | 156                                                                               | 403                                                                               | 368  | 351                                                                               | 724                                                                               | 539                                                                               | 721                                                                               | 1495                                                                              | 760  | 299                                                                               | 1777                                                                              | 543                                                                               |
| HCM Platoon Ratio              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 2.00                                                                              | 2.00                                                                              | 2.00 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Upstream Filter(I)             | 0.56                                                                              | 0.56                                                                              | 0.56 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.57                                                                              | 0.57                                                                              | 0.57 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Uniform Delay (d), s/veh       | 59.5                                                                              | 52.3                                                                              | 52.6 | 55.0                                                                              | 44.7                                                                              | 39.7                                                                              | 36.2                                                                              | 7.5                                                                               | 7.5  | 55.9                                                                              | 35.7                                                                              | 21.2                                                                              |
| Incr Delay (d2), s/veh         | 11.7                                                                              | 5.0                                                                               | 7.1  | 0.4                                                                               | 0.4                                                                               | 8.8                                                                               | 7.9                                                                               | 17.6                                                                              | 30.9 | 17.1                                                                              | 2.0                                                                               | 5.8                                                                               |
| Initial Q Delay(d3), s/veh     | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |
| %ile BackOfQ(50%),veh/ln       | 8.7                                                                               | 7.5                                                                               | 7.3  | 2.5                                                                               | 4.0                                                                               | 13.6                                                                              | 8.0                                                                               | 6.5                                                                               | 9.4  | 7.3                                                                               | 10.6                                                                              | 7.6                                                                               |
| Unsig. Movement Delay, s/veh   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                   |
| LnGrp Delay(d), s/veh          | 71.3                                                                              | 57.3                                                                              | 59.7 | 55.4                                                                              | 45.1                                                                              | 48.5                                                                              | 44.1                                                                              | 25.1                                                                              | 38.3 | 73.1                                                                              | 37.6                                                                              | 27.0                                                                              |
| LnGrp LOS                      | E                                                                                 | E                                                                                 | E    | E                                                                                 | D                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | F    | E                                                                                 | D                                                                                 | C                                                                                 |
| Approach Vol, veh/h            | 556                                                                               |                                                                                   |      |                                                                                   | 887                                                                               |                                                                                   |                                                                                   |                                                                                   | 2912 |                                                                                   |                                                                                   |                                                                                   |
| Approach Delay, s/veh          | 60.8                                                                              |                                                                                   |      |                                                                                   | 48.7                                                                              |                                                                                   |                                                                                   |                                                                                   | 32.8 |                                                                                   |                                                                                   |                                                                                   |
| Approach LOS                   | E                                                                                 |                                                                                   |      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                   | C    |                                                                                   |                                                                                   |                                                                                   |
| Timer - Assigned Phs           | 1                                                                                 | 2                                                                                 | 3    | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |      |                                                                                   |                                                                                   |                                                                                   |
| Phs Duration (G+Y+Rc), s       | 20.8                                                                              | 62.9                                                                              | 19.1 | 27.2                                                                              | 32.7                                                                              | 51.0                                                                              | 13.8                                                                              | 32.5                                                                              |      |                                                                                   |                                                                                   |                                                                                   |
| Change Period (Y+Rc), s        | 4.5                                                                               | 5.4                                                                               | 5.8  | * 5.8                                                                             | 5.4                                                                               | * 5.4                                                                             | 4.5                                                                               | 5.8                                                                               |      |                                                                                   |                                                                                   |                                                                                   |
| Max Green Setting (Gmax), s    | 22.6                                                                              | 49.6                                                                              | 8.5  | * 30                                                                              | 26.0                                                                              | * 46                                                                              | 11.5                                                                              | 26.7                                                                              |      |                                                                                   |                                                                                   |                                                                                   |
| Max Q Clear Time (g_c+11.0), s | 11.0                                                                              | 59.5                                                                              | 7.9  | 19.2                                                                              | 24.4                                                                              | 27.5                                                                              | 9.5                                                                               | 28.7                                                                              |      |                                                                                   |                                                                                   |                                                                                   |
| Green Ext Time (p_c), s        | 0.1                                                                               | 0.0                                                                               | 0.0  | 2.1                                                                               | 0.5                                                                               | 10.3                                                                              | 0.0                                                                               | 0.0                                                                               |      |                                                                                   |                                                                                   |                                                                                   |

## Intersection Summary

HCM 7th Control Delay, s/veh 39.6  
HCM 7th LOS D

## Notes

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

\* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Vista GPU

# HCM 7th Signalized Intersection Summary 20: S Melrose Dr & 78 EB OFF

Future Year Conditions  
PM Peak Hour



| Movement                                                             | EBL                                                                               | EBR                                                                               | NBL  | NBT                                                                               | SBT                                                                               | SBR  |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|
| Lane Configurations                                                  |  |  |      |  |  |      |
| Traffic Volume (veh/h)                                               | 600                                                                               | 500                                                                               | 0    | 2170                                                                              | 1500                                                                              | 0    |
| Future Volume (veh/h)                                                | 600                                                                               | 500                                                                               | 0    | 2170                                                                              | 1500                                                                              | 0    |
| Initial Q (Qb), veh                                                  | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    |
| Lane Width Adj.                                                      | 1.00                                                                              | 1.04                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |
| Ped-Bike Adj(A_pbT)                                                  | 1.00                                                                              | 1.00                                                                              | 1.00 |                                                                                   |                                                                                   | 1.00 |
| Parking Bus, Adj                                                     | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |
| Work Zone On Approach                                                | No                                                                                |                                                                                   |      | No                                                                                | No                                                                                |      |
| Adj Sat Flow, veh/h/ln                                               | 1856                                                                              | 1930                                                                              | 0    | 1856                                                                              | 1856                                                                              | 0    |
| Adj Flow Rate, veh/h                                                 | 748                                                                               | 378                                                                               | 0    | 2284                                                                              | 1579                                                                              | 0    |
| Peak Hour Factor                                                     | 0.95                                                                              | 0.95                                                                              | 0.95 | 0.95                                                                              | 0.95                                                                              | 0.95 |
| Percent Heavy Veh, %                                                 | 3                                                                                 | 3                                                                                 | 0    | 3                                                                                 | 3                                                                                 | 0    |
| Cap, veh/h                                                           | 813                                                                               | 376                                                                               | 0    | 3452                                                                              | 4350                                                                              | 0    |
| Arrive On Green                                                      | 0.23                                                                              | 0.23                                                                              | 0.00 | 1.00                                                                              | 1.00                                                                              | 0.00 |
| Sat Flow, veh/h                                                      | 3534                                                                              | 1635                                                                              | 0    | 5400                                                                              | 6903                                                                              | 0    |
| Grp Volume(v), veh/h                                                 | 748                                                                               | 378                                                                               | 0    | 2284                                                                              | 1579                                                                              | 0    |
| Grp Sat Flow(s),veh/h/ln                                             | 1767                                                                              | 1635                                                                              | 0    | 1689                                                                              | 1596                                                                              | 0    |
| Q Serve(g_s), s                                                      | 26.9                                                                              | 29.9                                                                              | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  |
| Cycle Q Clear(g_c), s                                                | 26.9                                                                              | 29.9                                                                              | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  |
| Prop In Lane                                                         | 1.00                                                                              | 1.00                                                                              | 0.00 |                                                                                   |                                                                                   | 0.00 |
| Lane Grp Cap(c), veh/h                                               | 813                                                                               | 376                                                                               | 0    | 3452                                                                              | 4350                                                                              | 0    |
| V/C Ratio(X)                                                         | 0.92                                                                              | 1.00                                                                              | 0.00 | 0.66                                                                              | 0.36                                                                              | 0.00 |
| Avail Cap(c_a), veh/h                                                | 813                                                                               | 376                                                                               | 0    | 3452                                                                              | 4350                                                                              | 0    |
| HCM Platoon Ratio                                                    | 1.00                                                                              | 1.00                                                                              | 1.00 | 2.00                                                                              | 2.00                                                                              | 1.00 |
| Upstream Filter(I)                                                   | 1.00                                                                              | 1.00                                                                              | 0.00 | 0.29                                                                              | 0.77                                                                              | 0.00 |
| Uniform Delay (d), s/veh                                             | 48.9                                                                              | 50.0                                                                              | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  |
| Incr Delay (d2), s/veh                                               | 15.3                                                                              | 47.6                                                                              | 0.0  | 0.3                                                                               | 0.2                                                                               | 0.0  |
| Initial Q Delay(d3), s/veh                                           | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  |
| %ile BackOfQ(50%),veh/ln                                             | 18.3                                                                              | 16.9                                                                              | 0.0  | 0.1                                                                               | 0.1                                                                               | 0.0  |
| Unsig. Movement Delay, s/veh                                         |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |
| LnGrp Delay(d), s/veh                                                | 64.2                                                                              | 97.7                                                                              | 0.0  | 0.3                                                                               | 0.2                                                                               | 0.0  |
| LnGrp LOS                                                            | E                                                                                 | F                                                                                 |      | A                                                                                 | A                                                                                 |      |
| Approach Vol, veh/h                                                  | 1126                                                                              |                                                                                   |      | 2284                                                                              | 1579                                                                              |      |
| Approach Delay, s/veh                                                | 75.4                                                                              |                                                                                   |      | 0.3                                                                               | 0.2                                                                               |      |
| Approach LOS                                                         | E                                                                                 |                                                                                   |      | A                                                                                 | A                                                                                 |      |
| Timer - Assigned Phs                                                 | 2                                                                                 |                                                                                   | 4    |                                                                                   | 6                                                                                 |      |
| Phs Duration (G+Y+Rc), s                                             | 94.0                                                                              |                                                                                   | 36.0 |                                                                                   | 94.0                                                                              |      |
| Change Period (Y+Rc), s                                              | 5.4                                                                               |                                                                                   | 6.1  |                                                                                   | 5.4                                                                               |      |
| Max Green Setting (Gmax), s                                          | 88.6                                                                              |                                                                                   | 29.9 |                                                                                   | 88.6                                                                              |      |
| Max Q Clear Time (g_c+l1), s                                         | 2.0                                                                               |                                                                                   | 31.9 |                                                                                   | 2.0                                                                               |      |
| Green Ext Time (p_c), s                                              | 40.1                                                                              |                                                                                   | 0.0  |                                                                                   | 18.1                                                                              |      |
| Intersection Summary                                                 |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |
| HCM 7th Control Delay, s/veh                                         |                                                                                   | 17.2                                                                              |      |                                                                                   |                                                                                   |      |
| HCM 7th LOS                                                          |                                                                                   | B                                                                                 |      |                                                                                   |                                                                                   |      |
| Notes                                                                |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |
| User approved volume balancing among the lanes for turning movement. |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |

# HCM 7th Signalized Intersection Summary 21: S Melrose Dr & Hacienda Dr

Future Year Conditions  
PM Peak Hour



| Movement                      | EBL   | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations           | ↔↔    | ↑↓   |      | ↔↔↔  | ↑↓   |      | ↔    | ↑↑↑  | ↔    | ↔↔   | ↑↑↑  |      |
| Traffic Volume (veh/h)        | 400   | 420  | 100  | 320  | 290  | 220  | 80   | 1550 | 390  | 400  | 950  | 250  |
| Future Volume (veh/h)         | 400   | 420  | 100  | 320  | 290  | 220  | 80   | 1550 | 390  | 400  | 950  | 250  |
| Initial Q (Qb), veh           | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)           | 1.00  |      | 0.98 | 1.00 |      | 1.00 | 1.00 |      | 0.98 | 1.00 |      | 0.97 |
| Parking Bus, Adj              | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach         | No    |      |      | No   |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln        | 1934  | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 | 1934 |
| Adj Flow Rate, veh/h          | 421   | 442  | 94   | 337  | 305  | 206  | 84   | 1632 | 327  | 421  | 1000 | 237  |
| Peak Hour Factor              | 0.95  | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %          | 3     | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                    | 401   | 603  | 127  | 424  | 361  | 237  | 106  | 1723 | 657  | 694  | 1960 | 464  |
| Arrive On Green               | 0.11  | 0.20 | 0.20 | 0.08 | 0.17 | 0.17 | 0.06 | 0.33 | 0.33 | 0.19 | 0.46 | 0.46 |
| Sat Flow, veh/h               | 3573  | 3005 | 634  | 5193 | 2121 | 1396 | 1842 | 5279 | 1605 | 3573 | 4234 | 1001 |
| Grp Volume(v), veh/h          | 421   | 269  | 267  | 337  | 263  | 248  | 84   | 1632 | 327  | 421  | 831  | 406  |
| Grp Sat Flow(s),veh/h/ln      | 1786  | 1837 | 1802 | 1731 | 1837 | 1680 | 1842 | 1760 | 1605 | 1786 | 1760 | 1715 |
| Q Serve(g_s), s               | 14.6  | 17.8 | 18.1 | 8.3  | 18.0 | 18.7 | 5.9  | 39.2 | 8.3  | 14.0 | 21.6 | 21.7 |
| Cycle Q Clear(g_c), s         | 14.6  | 17.8 | 18.1 | 8.3  | 18.0 | 18.7 | 5.9  | 39.2 | 8.3  | 14.0 | 21.6 | 21.7 |
| Prop In Lane                  | 1.00  |      | 0.35 | 1.00 |      | 0.83 | 1.00 |      | 1.00 | 1.00 |      | 0.58 |
| Lane Grp Cap(c), veh/h        | 401   | 369  | 362  | 424  | 312  | 286  | 106  | 1723 | 657  | 694  | 1629 | 794  |
| V/C Ratio(X)                  | 1.05  | 0.73 | 0.74 | 0.80 | 0.84 | 0.87 | 0.79 | 0.95 | 0.50 | 0.61 | 0.51 | 0.51 |
| Avail Cap(c_a), veh/h         | 401   | 410  | 402  | 583  | 410  | 375  | 178  | 1730 | 660  | 694  | 1629 | 794  |
| HCM Platoon Ratio             | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)            | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 0.87 | 0.87 |
| Uniform Delay (d), s/veh      | 57.7  | 48.6 | 48.7 | 58.6 | 52.3 | 52.5 | 60.5 | 42.7 | 9.9  | 47.8 | 24.5 | 24.6 |
| Incr Delay (d2), s/veh        | 58.4  | 4.6  | 5.2  | 3.6  | 9.3  | 12.9 | 4.9  | 12.3 | 2.7  | 1.0  | 1.0  | 2.0  |
| Initial Q Delay(d3), s/veh    | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 0.7   | 8.5  | 8.5  | 3.8  | 9.1  | 8.9  | 2.8  | 18.5 | 3.0  | 6.2  | 9.0  | 9.0  |
| Unsig. Movement Delay, s/veh  |       |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh         | 116.1 | 53.3 | 53.9 | 62.2 | 61.6 | 65.4 | 65.3 | 55.0 | 12.6 | 48.8 | 25.5 | 26.6 |
| LnGrp LOS                     | F     | D    | D    | E    | E    | E    | E    | E    | B    | D    | C    | C    |
| Approach Vol, veh/h           | 957   |      | 848  |      |      |      | 2043 |      |      | 1658 |      |      |
| Approach Delay, s/veh         | 81.1  |      | 62.9 |      |      |      | 48.7 |      |      | 31.7 |      |      |
| Approach LOS                  | F     |      | E    |      |      |      | D    |      |      | C    |      |      |
| Timer - Assigned Phs          | 1     | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s      | 31.7  | 48.8 | 17.0 | 32.5 | 13.9 | 66.6 | 21.0 | 28.5 |      |      |      |      |
| Change Period (Y+Rc), s       | 6.4   | 6.4  | 6.4  | 6.4  | 6.4  | 6.4  | 6.4  | 6.4  |      |      |      |      |
| Max Green Setting (Gmax), s   | 18.2  | 42.6 | 14.6 | 29.0 | 12.6 | 48.2 | 14.6 | 29.0 |      |      |      |      |
| Max Q Clear Time (g_c+110, s) | 110.0 | 41.2 | 10.3 | 20.1 | 7.9  | 23.7 | 16.6 | 20.7 |      |      |      |      |
| Green Ext Time (p_c), s       | 0.2   | 1.2  | 0.3  | 1.4  | 0.0  | 9.0  | 0.0  | 1.4  |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 51.4  
HCM 7th LOS D

## Notes

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

# HCM 7th Signalized Intersection Summary 22: Vista Village Drive & 78 WB ON RAMP/78 WB OFF RAMP

Future Year Conditions  
PM Peak Hour



| Movement                                                             | EBL | EBT  | EBR | WBL  | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|----------------------------------------------------------------------|-----|------|-----|------|-------|-------|------|------|------|------|------|------|
| Lane Configurations                                                  |     |      |     | ↰    | ↱     | ↰↱    | ↰    | ↱    |      |      | ↰↱↰  | ↰    |
| Traffic Volume (veh/h)                                               | 0   | 0    | 0   | 740  | 10    | 1240  | 180  | 1250 | 0    | 0    | 830  | 590  |
| Future Volume (veh/h)                                                | 0   | 0    | 0   | 740  | 10    | 1240  | 180  | 1250 | 0    | 0    | 830  | 590  |
| Initial Q (Qb), veh                                                  |     |      |     | 0    | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.                                                      |     |      |     | 1.04 | 1.04  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 |
| Ped-Bike Adj(A_pbT)                                                  |     |      |     | 1.00 |       | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj                                                     |     |      |     | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach                                                |     |      |     | No   |       |       | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln                                               |     |      |     | 1930 | 1930  | 1856  | 1856 | 1856 | 0    | 0    | 1856 | 1930 |
| Adj Flow Rate, veh/h                                                 |     |      |     | 770  | 0     | 891   | 186  | 1289 | 0    | 0    | 856  | 484  |
| Peak Hour Factor                                                     |     |      |     | 0.97 | 0.97  | 0.97  | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, %                                                 |     |      |     | 3    | 3     | 3     | 3    | 3    | 0    | 0    | 3    | 3    |
| Cap, veh/h                                                           |     |      |     | 817  | 0     | 699   | 213  | 2403 | 0    | 0    | 2620 | 844  |
| Arrive On Green                                                      |     |      |     | 0.22 | 0.00  | 0.22  | 0.16 | 0.91 | 0.00 | 0.00 | 0.52 | 0.52 |
| Sat Flow, veh/h                                                      |     |      |     | 3676 | 0     | 3145  | 1767 | 3618 | 0    | 0    | 5233 | 1631 |
| Grp Volume(v), veh/h                                                 |     |      |     | 770  | 0     | 891   | 186  | 1289 | 0    | 0    | 856  | 484  |
| Grp Sat Flow(s),veh/h/ln                                             |     |      |     | 1838 | 0     | 1572  | 1767 | 1763 | 0    | 0    | 1689 | 1631 |
| Q Serve(g_s), s                                                      |     |      |     | 26.8 | 0.0   | 28.9  | 13.4 | 8.7  | 0.0  | 0.0  | 12.8 | 26.5 |
| Cycle Q Clear(g_c), s                                                |     |      |     | 26.8 | 0.0   | 28.9  | 13.4 | 8.7  | 0.0  | 0.0  | 12.8 | 26.5 |
| Prop In Lane                                                         |     |      |     | 1.00 |       | 1.00  | 1.00 |      | 0.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h                                               |     |      |     | 817  | 0     | 699   | 213  | 2403 | 0    | 0    | 2620 | 844  |
| V/C Ratio(X)                                                         |     |      |     | 0.94 | 0.00  | 1.27  | 0.87 | 0.54 | 0.00 | 0.00 | 0.33 | 0.57 |
| Avail Cap(c_a), veh/h                                                |     |      |     | 817  | 0     | 699   | 330  | 2403 | 0    | 0    | 2620 | 844  |
| HCM Platoon Ratio                                                    |     |      |     | 1.00 | 1.00  | 1.00  | 1.33 | 1.33 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)                                                   |     |      |     | 1.00 | 0.00  | 1.00  | 0.55 | 0.55 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh                                             |     |      |     | 49.7 | 0.0   | 50.5  | 53.6 | 2.3  | 0.0  | 0.0  | 18.2 | 21.5 |
| Incr Delay (d2), s/veh                                               |     |      |     | 18.9 | 0.0   | 134.5 | 8.8  | 0.5  | 0.0  | 0.0  | 0.3  | 2.8  |
| Initial Q Delay(d3), s/veh                                           |     |      |     | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln                                             |     |      |     | 14.4 | 0.0   | 24.4  | 6.1  | 1.9  | 0.0  | 0.0  | 4.9  | 10.4 |
| Unsig. Movement Delay, s/veh                                         |     |      |     |      |       |       |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh                                                |     |      |     | 68.7 | 0.0   | 185.0 | 62.4 | 2.8  | 0.0  | 0.0  | 18.6 | 24.4 |
| LnGrp LOS                                                            |     |      |     | E    |       | F     | E    | A    |      |      | B    | C    |
| Approach Vol, veh/h                                                  |     |      |     |      | 1661  |       |      | 1475 |      |      | 1340 |      |
| Approach Delay, s/veh                                                |     |      |     |      | 131.1 |       |      | 10.3 |      |      | 20.7 |      |
| Approach LOS                                                         |     |      |     |      | F     |       |      | B    |      |      | C    |      |
| Timer - Assigned Phs                                                 |     | 2    |     |      | 5     | 6     |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s                                             |     | 95.0 |     |      | 21.4  | 73.6  |      | 35.0 |      |      |      |      |
| Change Period (Y+Rc), s                                              |     | 6.4  |     |      | 5.7   | 6.4   |      | 6.1  |      |      |      |      |
| Max Green Setting (Gmax), s                                          |     | 88.6 |     |      | 24.3  | 58.6  |      | 28.9 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s                                         |     | 10.7 |     |      | 15.4  | 28.5  |      | 30.9 |      |      |      |      |
| Green Ext Time (p_c), s                                              |     | 13.1 |     |      | 0.3   | 8.7   |      | 0.0  |      |      |      |      |
| Intersection Summary                                                 |     |      |     |      |       |       |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh                                         |     |      |     | 58.2 |       |       |      |      |      |      |      |      |
| HCM 7th LOS                                                          |     |      |     | E    |       |       |      |      |      |      |      |      |
| Notes                                                                |     |      |     |      |       |       |      |      |      |      |      |      |
| User approved volume balancing among the lanes for turning movement. |     |      |     |      |       |       |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 23: Vista Village Drive & 78 EB OFF RAMP/78 EB ON RAMP

Future Year Conditions  
PM Peak Hour



| Movement                      | EBL  | EBT  | EBR  | WBL  | WBT | WBR | NBL  | NBT  | NBR  | SBL   | SBT  | SBR  |
|-------------------------------|------|------|------|------|-----|-----|------|------|------|-------|------|------|
| Lane Configurations           |      |      |      |      |     |     |      |      |      |       |      |      |
| Traffic Volume (veh/h)        | 750  | 10   | 100  | 0    | 0   | 0   | 0    | 680  | 820  | 560   | 1010 | 0    |
| Future Volume (veh/h)         | 750  | 10   | 100  | 0    | 0   | 0   | 0    | 680  | 820  | 560   | 1010 | 0    |
| Initial Q (Qb), veh           | 0    | 0    | 0    |      |     |     | 0    | 0    | 0    | 0     | 0    | 0    |
| Lane Width Adj.               | 1.00 | 1.00 | 1.04 |      |     |     | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)           | 1.00 |      | 1.00 |      |     |     | 1.00 |      | 1.00 | 1.00  |      | 1.00 |
| Parking Bus, Adj              | 1.00 | 1.00 | 1.00 |      |     |     | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Work Zone On Approach         | No   |      |      |      |     |     | No   |      |      |       | No   |      |
| Adj Sat Flow, veh/h/ln        | 1856 | 1856 | 1930 |      |     |     | 0    | 1856 | 1856 | 1856  | 1856 | 0    |
| Adj Flow Rate, veh/h          | 772  | 0    | 82   |      |     |     | 0    | 1016 | 454  | 571   | 1031 | 0    |
| Peak Hour Factor              | 0.98 | 0.98 | 0.98 |      |     |     | 0.98 | 0.98 | 0.98 | 0.98  | 0.98 | 0.98 |
| Percent Heavy Veh, %          | 3    | 3    | 3    |      |     |     | 0    | 3    | 3    | 3     | 3    | 0    |
| Cap, veh/h                    | 786  | 0    | 364  |      |     |     | 0    | 1816 | 766  | 509   | 2403 | 0    |
| Arrive On Green               | 0.22 | 0.00 | 0.22 |      |     |     | 0.00 | 0.49 | 0.49 | 0.10  | 0.46 | 0.00 |
| Sat Flow, veh/h               | 3534 | 0    | 1635 |      |     |     | 0    | 3711 | 1567 | 3428  | 3618 | 0    |
| Grp Volume(v), veh/h          | 772  | 0    | 82   |      |     |     | 0    | 1016 | 454  | 571   | 1031 | 0    |
| Grp Sat Flow(s),veh/h/ln      | 1767 | 0    | 1635 |      |     |     | 0    | 1856 | 1567 | 1714  | 1763 | 0    |
| Q Serve(g_s), s               | 28.3 | 0.0  | 5.3  |      |     |     | 0.0  | 25.0 | 27.1 | 19.3  | 25.7 | 0.0  |
| Cycle Q Clear(g_c), s         | 28.3 | 0.0  | 5.3  |      |     |     | 0.0  | 25.0 | 27.1 | 19.3  | 25.7 | 0.0  |
| Prop In Lane                  | 1.00 |      | 1.00 |      |     |     | 0.00 |      | 1.00 | 1.00  |      | 0.00 |
| Lane Grp Cap(c), veh/h        | 786  | 0    | 364  |      |     |     | 0    | 1816 | 766  | 509   | 2403 | 0    |
| V/C Ratio(X)                  | 0.98 | 0.00 | 0.23 |      |     |     | 0.00 | 0.56 | 0.59 | 1.12  | 0.43 | 0.00 |
| Avail Cap(c_a), veh/h         | 786  | 0    | 364  |      |     |     | 0    | 1816 | 766  | 509   | 2403 | 0    |
| HCM Platoon Ratio             | 1.00 | 1.00 | 1.00 |      |     |     | 1.00 | 1.00 | 1.00 | 0.67  | 0.67 | 1.00 |
| Upstream Filter(I)            | 1.00 | 0.00 | 1.00 |      |     |     | 0.00 | 1.00 | 1.00 | 0.84  | 0.84 | 0.00 |
| Uniform Delay (d), s/veh      | 50.3 | 0.0  | 41.4 |      |     |     | 0.0  | 23.4 | 23.9 | 58.5  | 18.2 | 0.0  |
| Incr Delay (d2), s/veh        | 27.7 | 0.0  | 0.3  |      |     |     | 0.0  | 1.3  | 3.4  | 74.9  | 0.5  | 0.0  |
| Initial Q Delay(d3), s/veh    | 0.0  | 0.0  | 0.0  |      |     |     | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 15.5 | 0.0  | 2.2  |      |     |     | 0.0  | 10.9 | 10.4 | 13.8  | 11.3 | 0.0  |
| Unsig. Movement Delay, s/veh  |      |      |      |      |     |     |      |      |      |       |      |      |
| LnGrp Delay(d), s/veh         | 78.0 | 0.0  | 41.7 |      |     |     | 0.0  | 24.6 | 27.2 | 133.4 | 18.7 | 0.0  |
| LnGrp LOS                     | E    |      | D    |      |     |     |      | C    | C    | F     | B    |      |
| Approach Vol, veh/h           | 854  |      |      |      |     |     | 1470 |      |      | 1602  |      |      |
| Approach Delay, s/veh         | 74.5 |      |      |      |     |     | 25.4 |      |      | 59.6  |      |      |
| Approach LOS                  | E    |      |      |      |     |     | C    |      |      | E     |      |      |
| Timer - Assigned Phs          | 1    | 2    |      | 4    |     |     | 6    |      |      |       |      |      |
| Phs Duration (G+Y+Rc), s      | 25.0 | 70.0 |      | 35.0 |     |     | 95.0 |      |      |       |      |      |
| Change Period (Y+Rc), s       | 5.7  | 6.4  |      | 6.1  |     |     | 6.4  |      |      |       |      |      |
| Max Green Setting (Gmax), s   | 19.3 | 63.6 |      | 28.9 |     |     | 88.6 |      |      |       |      |      |
| Max Q Clear Time (g_c+0.1), s | 21.3 | 29.1 |      | 30.3 |     |     | 27.7 |      |      |       |      |      |
| Green Ext Time (p_c), s       | 0.0  | 10.7 |      | 0.0  |     |     | 9.0  |      |      |       |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 50.0  
HCM 7th LOS D

## Notes

User approved volume balancing among the lanes for turning movement.

# HCM 7th Signalized Intersection Summary 24: Civic Center Drive & S. Santa Fe Avenue

Future Year Conditions  
PM Peak Hour



| Movement                      | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               | SBR  |
|-------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|
| Lane Configurations           |  |  |  |  |  |  |  |  |      |  |  |      |
| Traffic Volume (veh/h)        | 120                                                                               | 480                                                                               | 80                                                                                | 250                                                                               | 550                                                                               | 380                                                                               | 180                                                                               | 1320                                                                              | 80   | 320                                                                               | 730                                                                               | 50   |
| Future Volume (veh/h)         | 120                                                                               | 480                                                                               | 80                                                                                | 250                                                                               | 550                                                                               | 380                                                                               | 180                                                                               | 1320                                                                              | 80   | 320                                                                               | 730                                                                               | 50   |
| Initial Q (Qb), veh           | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                 | 0                                                                                 | 0    |
| Lane Width Adj.               | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.96                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |
| Ped-Bike Adj(A_pbT)           | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.98 | 1.00                                                                              |                                                                                   | 0.98 |
| Parking Bus, Adj              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |
| Work Zone On Approach         | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |      | No                                                                                |                                                                                   |      |
| Adj Sat Flow, veh/h/ln        | 1934                                                                              | 1934                                                                              | 2011                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1856                                                                              | 1934                                                                              | 1934 | 1934                                                                              | 1934                                                                              | 1934 |
| Adj Flow Rate, veh/h          | 125                                                                               | 500                                                                               | 73                                                                                | 260                                                                               | 573                                                                               | 313                                                                               | 188                                                                               | 1375                                                                              | 36   | 333                                                                               | 760                                                                               | 31   |
| Peak Hour Factor              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96                                                                              | 0.96                                                                              | 0.96 |
| Percent Heavy Veh, %          | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    |
| Cap, veh/h                    | 151                                                                               | 743                                                                               | 340                                                                               | 275                                                                               | 990                                                                               | 593                                                                               | 242                                                                               | 1437                                                                              | 38   | 349                                                                               | 1511                                                                              | 62   |
| Arrive On Green               | 0.08                                                                              | 0.20                                                                              | 0.20                                                                              | 0.15                                                                              | 0.27                                                                              | 0.27                                                                              | 0.07                                                                              | 0.39                                                                              | 0.39 | 0.10                                                                              | 0.42                                                                              | 0.42 |
| Sat Flow, veh/h               | 1842                                                                              | 3674                                                                              | 1681                                                                              | 1842                                                                              | 3674                                                                              | 1606                                                                              | 3430                                                                              | 3656                                                                              | 96   | 3573                                                                              | 3595                                                                              | 147  |
| Grp Volume(v), veh/h          | 125                                                                               | 500                                                                               | 73                                                                                | 260                                                                               | 573                                                                               | 313                                                                               | 188                                                                               | 690                                                                               | 721  | 333                                                                               | 388                                                                               | 403  |
| Grp Sat Flow(s),veh/h/ln      | 1842                                                                              | 1837                                                                              | 1681                                                                              | 1842                                                                              | 1837                                                                              | 1606                                                                              | 1715                                                                              | 1837                                                                              | 1915 | 1786                                                                              | 1837                                                                              | 1905 |
| Q Serve(g_s), s               | 8.7                                                                               | 16.3                                                                              | 4.7                                                                               | 18.2                                                                              | 17.5                                                                              | 19.9                                                                              | 7.0                                                                               | 47.5                                                                              | 47.6 | 12.1                                                                              | 20.2                                                                              | 20.2 |
| Cycle Q Clear(g_c), s         | 8.7                                                                               | 16.3                                                                              | 4.7                                                                               | 18.2                                                                              | 17.5                                                                              | 19.9                                                                              | 7.0                                                                               | 47.5                                                                              | 47.6 | 12.1                                                                              | 20.2                                                                              | 20.2 |
| Prop In Lane                  | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.05 | 1.00                                                                              |                                                                                   | 0.08 |
| Lane Grp Cap(c), veh/h        | 151                                                                               | 743                                                                               | 340                                                                               | 275                                                                               | 990                                                                               | 593                                                                               | 242                                                                               | 722                                                                               | 753  | 349                                                                               | 772                                                                               | 801  |
| V/C Ratio(X)                  | 0.83                                                                              | 0.67                                                                              | 0.21                                                                              | 0.95                                                                              | 0.58                                                                              | 0.53                                                                              | 0.78                                                                              | 0.96                                                                              | 0.96 | 0.95                                                                              | 0.50                                                                              | 0.50 |
| Avail Cap(c_a), veh/h         | 275                                                                               | 743                                                                               | 340                                                                               | 275                                                                               | 990                                                                               | 593                                                                               | 388                                                                               | 731                                                                               | 761  | 349                                                                               | 772                                                                               | 801  |
| HCM Platoon Ratio             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |
| Upstream Filter(I)            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00                                                                              | 1.00                                                                              | 1.00 |
| Uniform Delay (d), s/veh      | 58.8                                                                              | 47.9                                                                              | 43.2                                                                              | 54.8                                                                              | 41.1                                                                              | 32.3                                                                              | 59.4                                                                              | 38.4                                                                              | 38.4 | 58.4                                                                              | 27.7                                                                              | 27.7 |
| Incr Delay (d2), s/veh        | 4.3                                                                               | 4.8                                                                               | 1.4                                                                               | 39.4                                                                              | 2.5                                                                               | 3.3                                                                               | 2.1                                                                               | 22.8                                                                              | 22.6 | 35.9                                                                              | 0.4                                                                               | 0.4  |
| Initial Q Delay(d3), s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0                                                                               | 0.0                                                                               | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 4.2                                                                               | 7.9                                                                               | 2.1                                                                               | 11.4                                                                              | 8.2                                                                               | 8.2                                                                               | 3.1                                                                               | 25.4                                                                              | 26.4 | 7.1                                                                               | 8.9                                                                               | 9.2  |
| Unsig. Movement Delay, s/veh  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |      |
| LnGrp Delay(d), s/veh         | 63.1                                                                              | 52.7                                                                              | 44.7                                                                              | 94.2                                                                              | 43.6                                                                              | 35.7                                                                              | 61.5                                                                              | 61.1                                                                              | 61.0 | 94.2                                                                              | 28.1                                                                              | 28.1 |
| LnGrp LOS                     | E                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | D                                                                                 | D                                                                                 | E                                                                                 | E                                                                                 | E    | F                                                                                 | C                                                                                 | C    |
| Approach Vol, veh/h           | 698                                                                               |                                                                                   | 1146                                                                              |                                                                                   |                                                                                   |                                                                                   | 1599                                                                              |                                                                                   |      | 1124                                                                              |                                                                                   |      |
| Approach Delay, s/veh         | 53.7                                                                              |                                                                                   | 52.9                                                                              |                                                                                   |                                                                                   |                                                                                   | 61.1                                                                              |                                                                                   |      | 47.7                                                                              |                                                                                   |      |
| Approach LOS                  | D                                                                                 |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |      | D                                                                                 |                                                                                   |      |
| Timer - Assigned Phs          | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |      |                                                                                   |                                                                                   |      |
| Phs Duration (G+Y+Rc), s      | 48.0                                                                              | 56.4                                                                              | 24.0                                                                              | 31.6                                                                              | 14.5                                                                              | 59.9                                                                              | 15.3                                                                              | 40.3                                                                              |      |                                                                                   |                                                                                   |      |
| Change Period (Y+Rc), s       | 5.3                                                                               | 5.3                                                                               | 4.6                                                                               | 5.3                                                                               | 5.3                                                                               | 5.3                                                                               | 4.6                                                                               | 5.3                                                                               |      |                                                                                   |                                                                                   |      |
| Max Green Setting (Gmax), s   | 12.5                                                                              | 51.7                                                                              | 19.4                                                                              | 25.7                                                                              | 14.7                                                                              | 49.7                                                                              | 19.4                                                                              | 25.7                                                                              |      |                                                                                   |                                                                                   |      |
| Max Q Clear Time (g_c+1/4), s | 14.5                                                                              | 49.6                                                                              | 20.2                                                                              | 18.3                                                                              | 9.0                                                                               | 22.2                                                                              | 10.7                                                                              | 21.9                                                                              |      |                                                                                   |                                                                                   |      |
| Green Ext Time (p_c), s       | 0.0                                                                               | 1.5                                                                               | 0.0                                                                               | 1.7                                                                               | 0.2                                                                               | 4.1                                                                               | 0.1                                                                               | 1.5                                                                               |      |                                                                                   |                                                                                   |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 54.6  
HCM 7th LOS D

## Notes

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

# HCM 7th Signalized Intersection Summary 25: Civic Center Drive & 78 WB OFF

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL  | EBT | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|-----|-----|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      |     |     |      | ↕    | ↕↕   | ↕    | ↕↕   |      |      | ↕↕   | ↕    |
| Traffic Volume (veh/h)       | 0    | 0   | 0   | 530  | 10   | 900  | 110  | 1020 | 0    | 0    | 700  | 480  |
| Future Volume (veh/h)        | 0    | 0   | 0   | 530  | 10   | 900  | 110  | 1020 | 0    | 0    | 700  | 480  |
| Initial Q (Qb), veh          |      |     |     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              |      |     |     | 1.00 | 1.00 | 1.04 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)          |      |     |     | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             |      |     |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |      |     |     | No   |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln       |      |     |     | 1856 | 1856 | 1930 | 1930 | 1856 | 0    | 0    | 1856 | 1856 |
| Adj Flow Rate, veh/h         |      |     |     | 558  | 11   | 947  | 116  | 1074 | 0    | 0    | 737  | 400  |
| Peak Hour Factor             |      |     |     | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         |      |     |     | 3    | 3    | 3    | 3    | 3    | 0    | 0    | 3    | 3    |
| Cap, veh/h                   |      |     |     | 631  | 12   | 1047 | 141  | 1939 | 0    | 0    | 1541 | 687  |
| Arrive On Green              |      |     |     | 0.36 | 0.36 | 0.36 | 0.08 | 0.55 | 0.00 | 0.00 | 0.44 | 0.44 |
| Sat Flow, veh/h              |      |     |     | 1735 | 34   | 2878 | 1838 | 3618 | 0    | 0    | 3618 | 1572 |
| Grp Volume(v), veh/h         |      |     |     | 569  | 0    | 947  | 116  | 1074 | 0    | 0    | 737  | 400  |
| Grp Sat Flow(s),veh/h/ln     |      |     |     | 1769 | 0    | 1439 | 1838 | 1763 | 0    | 0    | 1763 | 1572 |
| Q Serve(g_s), s              |      |     |     | 39.2 | 0.0  | 40.6 | 8.1  | 25.6 | 0.0  | 0.0  | 19.3 | 25.0 |
| Cycle Q Clear(g_c), s        |      |     |     | 39.2 | 0.0  | 40.6 | 8.1  | 25.6 | 0.0  | 0.0  | 19.3 | 25.0 |
| Prop In Lane                 |      |     |     | 0.98 |      | 1.00 | 1.00 |      | 0.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       |      |     |     | 644  | 0    | 1047 | 141  | 1939 | 0    | 0    | 1541 | 687  |
| V/C Ratio(X)                 |      |     |     | 0.88 | 0.00 | 0.90 | 0.82 | 0.55 | 0.00 | 0.00 | 0.48 | 0.58 |
| Avail Cap(c_a), veh/h        |      |     |     | 801  | 0    | 1304 | 209  | 1939 | 0    | 0    | 1541 | 687  |
| HCM Platoon Ratio            |      |     |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           |      |     |     | 1.00 | 0.00 | 1.00 | 0.09 | 0.09 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     |      |     |     | 38.8 | 0.0  | 39.2 | 59.1 | 18.9 | 0.0  | 0.0  | 26.0 | 27.6 |
| Incr Delay (d2), s/veh       |      |     |     | 8.6  | 0.0  | 6.9  | 0.9  | 0.1  | 0.0  | 0.0  | 1.1  | 3.6  |
| Initial Q Delay(d3), s/veh   |      |     |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |      |     |     | 18.2 | 0.0  | 15.0 | 3.8  | 10.2 | 0.0  | 0.0  | 8.2  | 9.9  |
| Unsig. Movement Delay, s/veh |      |     |     |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        |      |     |     | 47.3 | 0.0  | 46.1 | 60.1 | 19.0 | 0.0  | 0.0  | 27.1 | 31.2 |
| LnGrp LOS                    |      |     |     | D    |      | D    | E    | B    |      |      | C    | C    |
| Approach Vol, veh/h          |      |     |     |      | 1516 |      |      | 1190 |      |      | 1137 |      |
| Approach Delay, s/veh        |      |     |     |      | 46.6 |      |      | 23.0 |      |      | 28.5 |      |
| Approach LOS                 |      |     |     |      | D    |      |      | C    |      |      | C    |      |
| Timer - Assigned Phs         | 2    |     |     | 5    | 6    |      | 8    |      |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 77.6 |     |     | 14.7 | 62.9 |      | 52.4 |      |      |      |      |      |
| Change Period (Y+Rc), s      | 6.1  |     |     | 4.7  | 6.1  |      | 5.1  |      |      |      |      |      |
| Max Green Setting (Gmax), s  | 59.9 |     |     | 14.8 | 40.4 |      | 58.9 |      |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 27.6 |     |     | 10.1 | 27.0 |      | 42.6 |      |      |      |      |      |
| Green Ext Time (p_c), s      | 5.7  |     |     | 0.1  | 3.6  |      | 4.7  |      |      |      |      |      |
| <b>Intersection Summary</b>  |      |     |     |      |      |      |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh |      |     |     | 34.0 |      |      |      |      |      |      |      |      |
| HCM 7th LOS                  |      |     |     | C    |      |      |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 26: Civic Center Drive & SR-78 EB Ramps

Future Year Conditions  
PM Peak Hour



| Movement                                                             | EBL   | EBR   | NBL  | NBT   | SBT  | SBR  |
|----------------------------------------------------------------------|-------|-------|------|-------|------|------|
| Lane Configurations                                                  |       |       |      |       |      |      |
| Traffic Volume (veh/h)                                               | 700   | 190   | 110  | 430   | 580  | 650  |
| Future Volume (veh/h)                                                | 700   | 190   | 110  | 430   | 580  | 650  |
| Initial Q (Qb), veh                                                  | 0     | 0     | 0    | 0     | 0    | 0    |
| Lane Width Adj.                                                      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)                                                  | 1.00  | 1.00  | 1.00 |       |      | 1.00 |
| Parking Bus, Adj                                                     | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Work Zone On Approach                                                | No    |       |      | No    | No   |      |
| Adj Sat Flow, veh/h/ln                                               | 1856  | 1856  | 1856 | 1856  | 1856 | 1856 |
| Adj Flow Rate, veh/h                                                 | 458   | 478   | 116  | 453   | 611  | 479  |
| Peak Hour Factor                                                     | 0.95  | 0.95  | 0.95 | 0.95  | 0.95 | 0.95 |
| Percent Heavy Veh, %                                                 | 3     | 3     | 3    | 3     | 3    | 3    |
| Cap, veh/h                                                           | 441   | 372   | 352  | 370   | 915  | 2055 |
| Arrive On Green                                                      | 0.25  | 0.24  | 0.20 | 0.20  | 0.49 | 0.49 |
| Sat Flow, veh/h                                                      | 1767  | 1572  | 1767 | 1856  | 1856 | 2768 |
| Grp Volume(v), veh/h                                                 | 458   | 478   | 116  | 453   | 611  | 479  |
| Grp Sat Flow(s), veh/h/ln                                            | 1767  | 1572  | 1767 | 1856  | 1856 | 1384 |
| Q Serve(g_s), s                                                      | 39.9  | 37.9  | 9.0  | 31.9  | 39.8 | 8.6  |
| Cycle Q Clear(g_c), s                                                | 39.9  | 37.9  | 9.0  | 31.9  | 39.8 | 8.6  |
| Prop In Lane                                                         | 1.00  | 1.00  | 1.00 |       |      | 1.00 |
| Lane Grp Cap(c), veh/h                                               | 441   | 372   | 352  | 370   | 915  | 2055 |
| V/C Ratio(X)                                                         | 1.04  | 1.28  | 0.33 | 1.22  | 0.67 | 0.23 |
| Avail Cap(c_a), veh/h                                                | 441   | 372   | 352  | 370   | 915  | 2055 |
| HCM Platoon Ratio                                                    | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Upstream Filter(I)                                                   | 1.00  | 1.00  | 0.48 | 0.48  | 0.81 | 0.81 |
| Uniform Delay (d), s/veh                                             | 60.0  | 61.0  | 54.9 | 64.1  | 30.6 | 6.4  |
| Incr Delay (d2), s/veh                                               | 53.4  | 146.5 | 1.2  | 112.5 | 3.1  | 0.2  |
| Initial Q Delay(d3), s/veh                                           | 0.0   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln                                             | 24.3  | 30.2  | 4.1  | 26.6  | 18.5 | 5.7  |
| Unsig. Movement Delay, s/veh                                         |       |       |      |       |      |      |
| LnGrp Delay(d), s/veh                                                | 113.5 | 207.6 | 56.1 | 176.5 | 33.8 | 6.6  |
| LnGrp LOS                                                            | F     | F     | E    | F     | C    | A    |
| Approach Vol, veh/h                                                  | 936   |       |      | 569   | 1090 |      |
| Approach Delay, s/veh                                                | 161.5 |       |      | 152.0 | 21.8 |      |
| Approach LOS                                                         | F     |       |      | F     | C    |      |
| Timer - Assigned Phs                                                 | 2     |       |      | 4     |      | 6    |
| Phs Duration (G+Y+Rc), s                                             | 35.0  |       |      | 43.0  |      | 82.0 |
| Change Period (Y+Rc), s                                              | 5.1   |       |      | 5.1   |      | 5.1  |
| Max Green Setting (Gmax), s                                          | 29.9  |       |      | 37.9  |      | 76.9 |
| Max Q Clear Time (g_c+l1), s                                         | 33.9  |       |      | 41.9  |      | 41.8 |
| Green Ext Time (p_c), s                                              | 0.0   |       |      | 0.0   |      | 3.9  |
| <b>Intersection Summary</b>                                          |       |       |      |       |      |      |
| HCM 7th Control Delay, s/veh                                         |       | 100.8 |      |       |      |      |
| HCM 7th LOS                                                          |       | F     |      |       |      |      |
| <b>Notes</b>                                                         |       |       |      |       |      |      |
| User approved volume balancing among the lanes for turning movement. |       |       |      |       |      |      |

# HCM 7th Signalized Intersection Summary 27: Civic Center Drive & Sea View Place/Crest View Road

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |      | ↔    |      |      | ↔    |      |      | ↔    |      |      | ↕    | ↗    |
| Traffic Volume (veh/h)       | 30   | 10   | 10   | 30   | 10   | 40   | 10   | 470  | 60   | 150  | 550  | 30   |
| Future Volume (veh/h)        | 30   | 10   | 10   | 30   | 10   | 40   | 10   | 470  | 60   | 150  | 550  | 30   |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      | No   |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln       | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 | 1856 |
| Adj Flow Rate, veh/h         | 32   | 11   | 10   | 32   | 11   | 37   | 11   | 495  | 37   | 158  | 579  | 27   |
| Peak Hour Factor             | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                   | 91   | 33   | 20   | 73   | 23   | 55   | 15   | 671  | 50   | 184  | 675  | 736  |
| Arrive On Green              | 0.06 | 0.07 | 0.06 | 0.06 | 0.07 | 0.06 | 0.39 | 0.40 | 0.39 | 0.31 | 0.31 | 0.31 |
| Sat Flow, veh/h              | 765  | 455  | 284  | 576  | 319  | 770  | 37   | 1669 | 125  | 394  | 1442 | 1572 |
| Grp Volume(v), veh/h         | 53   | 0    | 0    | 80   | 0    | 0    | 543  | 0    | 0    | 737  | 0    | 27   |
| Grp Sat Flow(s),veh/h/ln     | 1504 | 0    | 0    | 1665 | 0    | 0    | 1831 | 0    | 0    | 1836 | 0    | 1572 |
| Q Serve(g_s), s              | 0.0  | 0.0  | 0.0  | 2.0  | 0.0  | 0.0  | 40.4 | 0.0  | 0.0  | 60.3 | 0.0  | 1.9  |
| Cycle Q Clear(g_c), s        | 5.4  | 0.0  | 0.0  | 7.4  | 0.0  | 0.0  | 40.4 | 0.0  | 0.0  | 60.3 | 0.0  | 1.9  |
| Prop In Lane                 | 0.60 |      | 0.19 | 0.40 |      | 0.46 | 0.02 |      | 0.07 | 0.21 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 126  | 0    | 0    | 131  | 0    | 0    | 736  | 0    | 0    | 859  | 0    | 736  |
| V/C Ratio(X)                 | 0.42 | 0.00 | 0.00 | 0.61 | 0.00 | 0.00 | 0.74 | 0.00 | 0.00 | 0.86 | 0.00 | 0.04 |
| Avail Cap(c_a), veh/h        | 230  | 0    | 0    | 239  | 0    | 0    | 736  | 0    | 0    | 859  | 0    | 736  |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.67 | 0.67 | 0.67 |
| Upstream Filter(I)           | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.69 | 0.00 | 0.69 |
| Uniform Delay (d), s/veh     | 72.0 | 0.0  | 0.0  | 73.1 | 0.0  | 0.0  | 40.8 | 0.0  | 0.0  | 50.0 | 0.0  | 29.9 |
| Incr Delay (d2), s/veh       | 0.8  | 0.0  | 0.0  | 1.7  | 0.0  | 0.0  | 6.5  | 0.0  | 0.0  | 7.8  | 0.0  | 0.1  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 2.2  | 0.0  | 0.0  | 3.3  | 0.0  | 0.0  | 19.5 | 0.0  | 0.0  | 30.5 | 0.0  | 0.7  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        | 72.9 | 0.0  | 0.0  | 74.8 | 0.0  | 0.0  | 47.3 | 0.0  | 0.0  | 57.8 | 0.0  | 29.9 |
| LnGrp LOS                    | E    |      |      | E    |      |      | D    |      |      | E    |      | C    |
| Approach Vol, veh/h          |      | 53   |      |      | 80   |      |      | 543  |      |      | 764  |      |
| Approach Delay, s/veh        |      | 72.9 |      |      | 74.8 |      |      | 47.3 |      |      | 56.8 |      |
| Approach LOS                 |      | E    |      |      | E    |      |      | D    |      |      | E    |      |
| Timer - Assigned Phs         |      | 2    |      | 4    |      | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |      | 67.4 |      | 14.6 |      | 78.0 |      | 14.6 |      |      |      |      |
| Change Period (Y+Rc), s      |      | 5.1  |      | 5.1  |      | 5.1  |      | 5.1  |      |      |      |      |
| Max Green Setting (Gmax), s  |      | 50.9 |      | 20.9 |      | 72.9 |      | 20.9 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |      | 42.4 |      | 7.4  |      | 62.3 |      | 9.4  |      |      |      |      |
| Green Ext Time (p_c), s      |      | 1.9  |      | 0.1  |      | 2.6  |      | 0.1  |      |      |      |      |
| Intersection Summary         |      |      |      |      |      |      |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh |      | 54.8 |      |      |      |      |      |      |      |      |      |      |
| HCM 7th LOS                  |      | D    |      |      |      |      |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 28: S Melrose Dr & Sunset Dr

Future Year Conditions  
PM Peak Hour

|                              |  |      |       |      |      |      |      |      |      |      |      |      |
|------------------------------|------------------------------------------------------------------------------------|------|-------|------|------|------|------|------|------|------|------|------|
| Movement                     | EBL                                                                                | EBT  | EBR   | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations          |                                                                                    | ↔    | ↔     |      | ↔    |      | ↔    | ↕    | ↔    | ↔    | ↕    | ↔    |
| Traffic Volume (veh/h)       | 50                                                                                 | 70   | 210   | 120  | 80   | 100  | 240  | 1700 | 210  | 70   | 1300 | 50   |
| Future Volume (veh/h)        | 50                                                                                 | 70   | 210   | 120  | 80   | 100  | 240  | 1700 | 210  | 70   | 1300 | 50   |
| Initial Q (Qb), veh          | 0                                                                                  | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              | 1.00                                                                               | 1.00 | 1.00  | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                               |      | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 0.98 | 1.00 |      | 0.98 |
| Parking Bus, Adj             | 1.00                                                                               | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No                                                                                 |      |       | No   |      |      | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln       | 1856                                                                               | 1856 | 1856  | 1856 | 1930 | 1856 | 1856 | 1856 | 1930 | 1856 | 1856 | 1856 |
| Adj Flow Rate, veh/h         | 53                                                                                 | 74   | 174   | 126  | 84   | 94   | 253  | 1789 | 174  | 74   | 1368 | 42   |
| Peak Hour Factor             | 0.95                                                                               | 0.95 | 0.95  | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3                                                                                  | 3    | 3     | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h                   | 88                                                                                 | 122  | 181   | 139  | 93   | 104  | 245  | 1796 | 814  | 94   | 1496 | 652  |
| Arrive On Green              | 0.12                                                                               | 0.12 | 0.12  | 0.19 | 0.19 | 0.19 | 0.14 | 0.51 | 0.51 | 0.05 | 0.42 | 0.42 |
| Sat Flow, veh/h              | 759                                                                                | 1059 | 1572  | 742  | 495  | 553  | 1767 | 3526 | 1598 | 1767 | 3526 | 1536 |
| Grp Volume(v), veh/h         | 127                                                                                | 0    | 174   | 304  | 0    | 0    | 253  | 1789 | 174  | 74   | 1368 | 42   |
| Grp Sat Flow(s),veh/h/ln     | 1818                                                                               | 0    | 1572  | 1790 | 0    | 0    | 1767 | 1763 | 1598 | 1767 | 1763 | 1536 |
| Q Serve(g_s), s              | 8.6                                                                                | 0.0  | 14.3  | 21.6 | 0.0  | 0.0  | 18.0 | 65.7 | 7.8  | 5.4  | 47.5 | 2.1  |
| Cycle Q Clear(g_c), s        | 8.6                                                                                | 0.0  | 14.3  | 21.6 | 0.0  | 0.0  | 18.0 | 65.7 | 7.8  | 5.4  | 47.5 | 2.1  |
| Prop In Lane                 | 0.42                                                                               |      | 1.00  | 0.41 |      | 0.31 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 210                                                                                | 0    | 181   | 335  | 0    | 0    | 245  | 1796 | 814  | 94   | 1496 | 652  |
| V/C Ratio(X)                 | 0.61                                                                               | 0.00 | 0.96  | 0.91 | 0.00 | 0.00 | 1.03 | 1.00 | 0.21 | 0.79 | 0.91 | 0.06 |
| Avail Cap(c_a), veh/h        | 210                                                                                | 0    | 181   | 399  | 0    | 0    | 245  | 1796 | 814  | 217  | 1496 | 652  |
| HCM Platoon Ratio            | 1.00                                                                               | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00                                                                               | 0.00 | 1.00  | 1.00 | 0.00 | 0.00 | 0.32 | 0.32 | 0.32 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 54.7                                                                               | 0.0  | 57.2  | 51.7 | 0.0  | 0.0  | 56.0 | 31.7 | 17.5 | 60.8 | 35.2 | 22.2 |
| Incr Delay (d2), s/veh       | 4.3                                                                                | 0.0  | 54.6  | 20.9 | 0.0  | 0.0  | 41.6 | 11.1 | 0.2  | 5.4  | 10.2 | 0.2  |
| Initial Q Delay(d3), s/veh   | 0.0                                                                                | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 4.2                                                                                | 0.0  | 8.5   | 11.7 | 0.0  | 0.0  | 10.6 | 28.5 | 2.8  | 2.5  | 21.4 | 0.8  |
| Unsig. Movement Delay, s/veh |                                                                                    |      |       |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        | 59.0                                                                               | 0.0  | 111.8 | 72.6 | 0.0  | 0.0  | 97.6 | 42.8 | 17.7 | 66.2 | 45.4 | 22.3 |
| LnGrp LOS                    | E                                                                                  |      | F     | E    |      |      | F    | D    | B    | E    | D    | C    |
| Approach Vol, veh/h          | 301                                                                                |      |       | 304  |      |      | 2216 |      |      | 1484 |      |      |
| Approach Delay, s/veh        | 89.5                                                                               |      |       | 72.6 |      |      | 47.1 |      |      | 45.8 |      |      |
| Approach LOS                 | F                                                                                  |      |       | E    |      |      | D    |      |      | D    |      |      |
| Timer - Assigned Phs         | 1                                                                                  | 2    |       | 4    | 5    | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 10.9                                                                               | 71.7 |       | 19.0 | 22.0 | 60.6 |      | 28.4 |      |      |      |      |
| Change Period (Y+Rc), s      | 4.0                                                                                | 5.5  |       | 4.0  | 4.0  | 5.5  |      | 4.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 10.0                                                                               | 52.5 |       | 15.0 | 18.0 | 50.5 |      | 29.0 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 17.4                                                                               | 67.7 |       | 16.3 | 20.0 | 49.5 |      | 23.6 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0                                                                                | 0.0  |       | 0.0  | 0.0  | 0.7  |      | 0.7  |      |      |      |      |
| <b>Intersection Summary</b>  |                                                                                    |      |       |      |      |      |      |      |      |      |      |      |
| HCM 7th Control Delay, s/veh | 51.4                                                                               |      |       |      |      |      |      |      |      |      |      |      |
| HCM 7th LOS                  | D                                                                                  |      |       |      |      |      |      |      |      |      |      |      |

# HCM 7th Signalized Intersection Summary 29: S Melrose Dr & Canon Rd

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                               | SBR                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 270                                                                               | 50                                                                                | 430                                                                               | 120                                                                               | 30                                                                                | 80                                                                                | 500                                                                               | 1900                                                                              | 200                                                                               | 150                                                                               | 1200                                                                              | 250                                                                                 |
| Future Volume (veh/h)        | 270                                                                               | 50                                                                                | 430                                                                               | 120                                                                               | 30                                                                                | 80                                                                                | 500                                                                               | 1900                                                                              | 200                                                                               | 150                                                                               | 1200                                                                              | 250                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   |
| Lane Width Adj.              | 1.00                                                                              | 1.00                                                                              | 1.04                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.04                                                                                |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.97                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1934                                                                              | 1934                                                                              | 2011                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 1934                                                                              | 2011                                                                                |
| Adj Flow Rate, veh/h         | 284                                                                               | 53                                                                                | 337                                                                               | 126                                                                               | 32                                                                                | 73                                                                                | 526                                                                               | 2000                                                                              | 179                                                                               | 158                                                                               | 1263                                                                              | 210                                                                                 |
| Peak Hour Factor             | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   |
| Cap, veh/h                   | 337                                                                               | 449                                                                               | 389                                                                               | 178                                                                               | 689                                                                               | 305                                                                               | 539                                                                               | 2399                                                                              | 213                                                                               | 181                                                                               | 2042                                                                              | 799                                                                                 |
| Arrive On Green              | 0.09                                                                              | 0.23                                                                              | 0.23                                                                              | 0.05                                                                              | 0.19                                                                              | 0.19                                                                              | 0.15                                                                              | 0.49                                                                              | 0.49                                                                              | 0.02                                                                              | 0.13                                                                              | 0.13                                                                                |
| Sat Flow, veh/h              | 3573                                                                              | 1934                                                                              | 1678                                                                              | 3573                                                                              | 3674                                                                              | 1628                                                                              | 3573                                                                              | 4928                                                                              | 438                                                                               | 3573                                                                              | 5279                                                                              | 1650                                                                                |
| Grp Volume(v), veh/h         | 284                                                                               | 53                                                                                | 337                                                                               | 126                                                                               | 32                                                                                | 73                                                                                | 526                                                                               | 1424                                                                              | 755                                                                               | 158                                                                               | 1263                                                                              | 210                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1786                                                                              | 1934                                                                              | 1678                                                                              | 1786                                                                              | 1837                                                                              | 1628                                                                              | 1786                                                                              | 1760                                                                              | 1847                                                                              | 1786                                                                              | 1760                                                                              | 1650                                                                                |
| Q Serve(g_s), s              | 10.2                                                                              | 2.8                                                                               | 25.1                                                                              | 4.5                                                                               | 0.9                                                                               | 5.0                                                                               | 19.1                                                                              | 45.3                                                                              | 46.2                                                                              | 5.7                                                                               | 29.5                                                                              | 12.7                                                                                |
| Cycle Q Clear(g_c), s        | 10.2                                                                              | 2.8                                                                               | 25.1                                                                              | 4.5                                                                               | 0.9                                                                               | 5.0                                                                               | 19.1                                                                              | 45.3                                                                              | 46.2                                                                              | 5.7                                                                               | 29.5                                                                              | 12.7                                                                                |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.24                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 337                                                                               | 449                                                                               | 389                                                                               | 178                                                                               | 689                                                                               | 305                                                                               | 539                                                                               | 1713                                                                              | 899                                                                               | 181                                                                               | 2042                                                                              | 799                                                                                 |
| V/C Ratio(X)                 | 0.84                                                                              | 0.12                                                                              | 0.87                                                                              | 0.71                                                                              | 0.05                                                                              | 0.24                                                                              | 0.98                                                                              | 0.83                                                                              | 0.84                                                                              | 0.87                                                                              | 0.62                                                                              | 0.26                                                                                |
| Avail Cap(c_a), veh/h        | 355                                                                               | 672                                                                               | 583                                                                               | 190                                                                               | 1108                                                                              | 491                                                                               | 539                                                                               | 1713                                                                              | 899                                                                               | 181                                                                               | 2042                                                                              | 799                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.33                                                                              | 0.33                                                                              | 0.33                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.24                                                                              | 0.24                                                                              | 0.24                                                                                |
| Uniform Delay (d), s/veh     | 57.9                                                                              | 39.4                                                                              | 48.0                                                                              | 60.8                                                                              | 43.3                                                                              | 44.9                                                                              | 55.0                                                                              | 28.8                                                                              | 29.0                                                                              | 63.5                                                                              | 47.6                                                                              | 29.6                                                                                |
| Incr Delay (d2), s/veh       | 16.2                                                                              | 0.1                                                                               | 8.8                                                                               | 10.8                                                                              | 0.0                                                                               | 0.4                                                                               | 32.7                                                                              | 4.9                                                                               | 9.3                                                                               | 10.8                                                                              | 0.3                                                                               | 0.2                                                                                 |
| Initial Q Delay(d3), s/veh   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 5.4                                                                               | 1.4                                                                               | 11.1                                                                              | 2.3                                                                               | 0.4                                                                               | 2.0                                                                               | 10.8                                                                              | 19.1                                                                              | 21.5                                                                              | 2.9                                                                               | 13.9                                                                              | 5.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| LnGrp Delay(d), s/veh        | 74.1                                                                              | 39.5                                                                              | 56.8                                                                              | 71.7                                                                              | 43.3                                                                              | 45.3                                                                              | 87.7                                                                              | 33.6                                                                              | 38.3                                                                              | 74.3                                                                              | 48.0                                                                              | 29.8                                                                                |
| LnGrp LOS                    | E                                                                                 | D                                                                                 | E                                                                                 | E                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | C                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 | C                                                                                   |
| Approach Vol, veh/h          | 674                                                                               |                                                                                   |                                                                                   | 231                                                                               |                                                                                   |                                                                                   | 2705                                                                              |                                                                                   |                                                                                   | 1631                                                                              |                                                                                   |                                                                                     |
| Approach Delay, s/veh        | 62.7                                                                              |                                                                                   |                                                                                   | 59.4                                                                              |                                                                                   |                                                                                   | 45.4                                                                              |                                                                                   |                                                                                   | 48.2                                                                              |                                                                                   |                                                                                     |
| Approach LOS                 | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 16.6                                                                              | 36.0                                                                              | 25.0                                                                              | 57.5                                                                              | 17.3                                                                              | 30.2                                                                              | 12.0                                                                              | 70.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Change Period (Y+Rc), s      | 5.1                                                                               | 5.8                                                                               | 5.4                                                                               | 7.2                                                                               | 5.1                                                                               | 5.8                                                                               | 5.4                                                                               | 7.2                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Max Green Setting (Gmax), s  | 6.9                                                                               | 45.2                                                                              | 19.6                                                                              | 34.8                                                                              | 12.9                                                                              | 39.2                                                                              | 6.6                                                                               | 47.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Max Q Clear Time (g_c+I), s  | 10.5                                                                              | 27.1                                                                              | 21.1                                                                              | 31.5                                                                              | 12.2                                                                              | 7.0                                                                               | 7.7                                                                               | 48.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 1.4                                                                               | 0.0                                                                               | 2.7                                                                               | 0.1                                                                               | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |

## Intersection Summary

HCM 7th Control Delay, s/veh 49.1  
HCM 7th LOS D

## Notes

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

# HCM 7th Signalized Intersection Summary 30: S Melrose Dr & Longhorn Dr/Live Oak Rd

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL                                                                               | EBT                                                                               | EBR  | WBL  | WBT  | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Configurations          |  |  |      |      |      |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 200                                                                               | 70                                                                                | 100  | 70   | 80   | 150                                                                               | 230                                                                                 | 2100                                                                                | 100                                                                                 | 200                                                                                 | 1100                                                                                | 240                                                                                 |
| Future Volume (veh/h)        | 200                                                                               | 70                                                                                | 100  | 70   | 80   | 150                                                                               | 230                                                                                 | 2100                                                                                | 100                                                                                 | 200                                                                                 | 1100                                                                                | 240                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0    | 0    | 0    | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.              | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00 | 1.00 | 1.04                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 0.77 | 1.00 |      | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.88                                                                                | 1.00                                                                                |                                                                                     | 0.75                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00 | 1.00 | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |      |      | No   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856 | 1856 | 1856 | 1930                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 187                                                                               | 102                                                                               | 94   | 73   | 83   | 125                                                                               | 240                                                                                 | 2188                                                                                | 94                                                                                  | 208                                                                                 | 1146                                                                                | 198                                                                                 |
| Peak Hour Factor             | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96 | 0.96 | 0.96                                                                              | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3    | 3    | 3    | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 401                                                                               | 175                                                                               | 161  | 88   | 100  | 169                                                                               | 256                                                                                 | 2238                                                                                | 95                                                                                  | 133                                                                                 | 1939                                                                                | 809                                                                                 |
| Arrive On Green              | 0.23                                                                              | 0.23                                                                              | 0.23 | 0.10 | 0.10 | 0.10                                                                              | 0.29                                                                                | 0.90                                                                                | 0.90                                                                                | 0.08                                                                                | 0.38                                                                                | 0.38                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 772                                                                               | 711  | 848  | 965  | 1635                                                                              | 1767                                                                                | 4951                                                                                | 211                                                                                 | 1767                                                                                | 5066                                                                                | 1182                                                                                |
| Grp Volume(v), veh/h         | 187                                                                               | 0                                                                                 | 196  | 156  | 0    | 125                                                                               | 240                                                                                 | 1487                                                                                | 795                                                                                 | 208                                                                                 | 1146                                                                                | 198                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 0                                                                                 | 1483 | 1813 | 0    | 1635                                                                              | 1767                                                                                | 1689                                                                                | 1785                                                                                | 1767                                                                                | 1689                                                                                | 1182                                                                                |
| Q Serve(g_s), s              | 11.9                                                                              | 0.0                                                                               | 15.3 | 11.0 | 0.0  | 9.6                                                                               | 17.2                                                                                | 46.0                                                                                | 51.1                                                                                | 9.8                                                                                 | 23.5                                                                                | 10.2                                                                                |
| Cycle Q Clear(g_c), s        | 11.9                                                                              | 0.0                                                                               | 15.3 | 11.0 | 0.0  | 9.6                                                                               | 17.2                                                                                | 46.0                                                                                | 51.1                                                                                | 9.8                                                                                 | 23.5                                                                                | 10.2                                                                                |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.48 | 0.47 |      | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.12                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 401                                                                               | 0                                                                                 | 336  | 187  | 0    | 169                                                                               | 256                                                                                 | 1526                                                                                | 807                                                                                 | 133                                                                                 | 1939                                                                                | 809                                                                                 |
| V/C Ratio(X)                 | 0.47                                                                              | 0.00                                                                              | 0.58 | 0.83 | 0.00 | 0.74                                                                              | 0.94                                                                                | 0.97                                                                                | 0.99                                                                                | 1.56                                                                                | 0.59                                                                                | 0.24                                                                                |
| Avail Cap(c_a), veh/h        | 412                                                                               | 0                                                                                 | 346  | 250  | 0    | 225                                                                               | 256                                                                                 | 1526                                                                                | 807                                                                                 | 133                                                                                 | 1939                                                                                | 809                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00 | 1.00 | 1.00 | 1.00                                                                              | 2.00                                                                                | 2.00                                                                                | 2.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00 | 1.00 | 0.00 | 1.00                                                                              | 0.09                                                                                | 0.09                                                                                | 0.09                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 43.4                                                                              | 0.0                                                                               | 44.8 | 57.2 | 0.0  | 56.6                                                                              | 45.6                                                                                | 5.6                                                                                 | 5.9                                                                                 | 60.1                                                                                | 32.0                                                                                | 11.9                                                                                |
| Incr Delay (d2), s/veh       | 0.6                                                                               | 0.0                                                                               | 2.0  | 14.8 | 0.0  | 7.2                                                                               | 6.9                                                                                 | 3.1                                                                                 | 6.8                                                                                 | 285.8                                                                               | 1.3                                                                                 | 0.7                                                                                 |
| Initial Q Delay(d3), s/veh   | 0.0                                                                               | 0.0                                                                               | 0.0  | 0.0  | 0.0  | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 5.3                                                                               | 0.0                                                                               | 5.8  | 5.8  | 0.0  | 4.4                                                                               | 6.6                                                                                 | 3.0                                                                                 | 4.0                                                                                 | 14.9                                                                                | 9.5                                                                                 | 4.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |      |      |      |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh        | 44.1                                                                              | 0.0                                                                               | 46.8 | 71.9 | 0.0  | 63.8                                                                              | 52.6                                                                                | 8.8                                                                                 | 12.7                                                                                | 345.9                                                                               | 33.3                                                                                | 12.6                                                                                |
| LnGrp LOS                    | D                                                                                 |                                                                                   | D    | E    |      | E                                                                                 | D                                                                                   | A                                                                                   | B                                                                                   | F                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 383                                                                               |                                                                                   |      |      | 281  |                                                                                   | 2522                                                                                |                                                                                     | 1552                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 45.5                                                                              |                                                                                   |      |      | 68.3 |                                                                                   | 14.2                                                                                |                                                                                     | 72.6                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |      |      | E    |                                                                                   | B                                                                                   |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4    |      | 5    | 6                                                                                 | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 4.0                                                                               | 64.3                                                                              | 34.1 |      | 23.0 | 55.3                                                                              | 17.6                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.2                                                                               | 5.5                                                                               | 4.6  |      | 4.2  | 5.5                                                                               | 4.2                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.8                                                                               | 53.5                                                                              | 30.3 |      | 18.8 | 44.5                                                                              | 17.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 11.8                                                                              | 53.1                                                                              | 17.3 |      | 19.2 | 25.5                                                                              | 13.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 0.3                                                                               | 1.2  |      | 0.0  | 5.6                                                                               | 0.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Intersection Summary

|                              |      |
|------------------------------|------|
| HCM 7th Control Delay, s/veh | 39.0 |
| HCM 7th LOS                  | D    |

## Notes

User approved pedestrian interval to be less than phase max green.  
User approved volume balancing among the lanes for turning movement.

# HCM 7th Signalized Intersection Summary 31: S Melrose Dr & Shadowridge Dr

Future Year Conditions  
PM Peak Hour



| Movement                       | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                               | SBR                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations            |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)         | 80                                                                                | 150                                                                               | 180                                                                               | 180                                                                               | 230                                                                               | 300                                                                               | 400                                                                               | 2000                                                                              | 550                                                                               | 350                                                                               | 800                                                                               | 120                                                                               |
| Future Volume (veh/h)          | 80                                                                                | 150                                                                               | 180                                                                               | 180                                                                               | 230                                                                               | 300                                                                               | 400                                                                               | 2000                                                                              | 550                                                                               | 350                                                                               | 800                                                                               | 120                                                                               |
| Initial Q (Qb), veh            | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |
| Lane Width 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                                                                              |
| Ped-Bike Adj(A_pbT)            | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.99                                                                              | 1.00                                                                              |                                                                                   | 0.98                                                                              |
| Parking Bus, Adj               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |
| Work Zone On Approach          | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   |
| Adj Sat Flow, veh/h/ln         | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              |
| Adj Flow Rate, veh/h           | 84                                                                                | 158                                                                               | 147                                                                               | 189                                                                               | 242                                                                               | 253                                                                               | 421                                                                               | 2105                                                                              | 521                                                                               | 368                                                                               | 842                                                                               | 110                                                                               |
| Peak Hour Factor               | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              |
| Percent Heavy Veh, %           | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Cap, veh/h                     | 101                                                                               | 297                                                                               | 251                                                                               | 195                                                                               | 297                                                                               | 246                                                                               | 444                                                                               | 1723                                                                              | 404                                                                               | 659                                                                               | 1639                                                                              | 213                                                                               |
| Arrive On Green                | 0.06                                                                              | 0.16                                                                              | 0.16                                                                              | 0.06                                                                              | 0.16                                                                              | 0.16                                                                              | 0.25                                                                              | 0.42                                                                              | 0.42                                                                              | 0.13                                                                              | 0.24                                                                              | 0.24                                                                              |
| Sat Flow, veh/h                | 1767                                                                              | 1856                                                                              | 1567                                                                              | 3428                                                                              | 1856                                                                              | 1534                                                                              | 1767                                                                              | 4087                                                                              | 958                                                                               | 3428                                                                              | 4522                                                                              | 587                                                                               |
| Grp Volume(v), veh/h           | 84                                                                                | 158                                                                               | 147                                                                               | 189                                                                               | 242                                                                               | 253                                                                               | 421                                                                               | 1719                                                                              | 907                                                                               | 368                                                                               | 628                                                                               | 324                                                                               |
| Grp Sat Flow(s),veh/h/ln       | 1767                                                                              | 1856                                                                              | 1567                                                                              | 1714                                                                              | 1856                                                                              | 1534                                                                              | 1767                                                                              | 1689                                                                              | 1668                                                                              | 1714                                                                              | 1689                                                                              | 1732                                                                              |
| Q Serve(g_s), s                | 6.1                                                                               | 10.2                                                                              | 11.3                                                                              | 7.2                                                                               | 16.4                                                                              | 13.9                                                                              | 30.4                                                                              | 54.8                                                                              | 54.8                                                                              | 13.1                                                                              | 20.9                                                                              | 21.1                                                                              |
| Cycle Q Clear(g_c), s          | 6.1                                                                               | 10.2                                                                              | 11.3                                                                              | 7.2                                                                               | 16.4                                                                              | 13.9                                                                              | 30.4                                                                              | 54.8                                                                              | 54.8                                                                              | 13.1                                                                              | 20.9                                                                              | 21.1                                                                              |
| Prop In Lane                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.57                                                                              | 1.00                                                                              |                                                                                   | 0.34                                                                              |
| Lane Grp Cap(c), veh/h         | 101                                                                               | 297                                                                               | 251                                                                               | 195                                                                               | 297                                                                               | 246                                                                               | 444                                                                               | 1424                                                                              | 703                                                                               | 659                                                                               | 1224                                                                              | 628                                                                               |
| V/C Ratio(X)                   | 0.84                                                                              | 0.53                                                                              | 0.59                                                                              | 0.97                                                                              | 0.81                                                                              | 1.03                                                                              | 0.95                                                                              | 1.21                                                                              | 1.29                                                                              | 0.56                                                                              | 0.51                                                                              | 0.52                                                                              |
| Avail Cap(c_a), veh/h          | 101                                                                               | 428                                                                               | 362                                                                               | 195                                                                               | 428                                                                               | 354                                                                               | 478                                                                               | 1424                                                                              | 703                                                                               | 659                                                                               | 1224                                                                              | 628                                                                               |
| HCM Platoon Ratio              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.67                                                                              | 0.67                                                                              | 0.67                                                                              |
| Upstream Filter(I)             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.76                                                                              | 0.76                                                                              | 0.76                                                                              |
| Uniform Delay (d), s/veh       | 60.7                                                                              | 50.1                                                                              | 50.6                                                                              | 61.2                                                                              | 52.7                                                                              | 24.4                                                                              | 47.8                                                                              | 37.6                                                                              | 37.6                                                                              | 51.5                                                                              | 39.3                                                                              | 39.4                                                                              |
| Incr Delay (d2), s/veh         | 40.7                                                                              | 1.1                                                                               | 1.6                                                                               | 55.0                                                                              | 6.6                                                                               | 49.3                                                                              | 26.9                                                                              | 100.1                                                                             | 141.3                                                                             | 0.5                                                                               | 1.2                                                                               | 2.3                                                                               |
| Initial Q Delay(d3), s/veh     | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |
| %ile BackOfQ(50%),veh/ln       | 8.8                                                                               | 4.7                                                                               | 4.5                                                                               | 4.6                                                                               | 8.1                                                                               | 8.3                                                                               | 16.2                                                                              | 40.8                                                                              | 48.4                                                                              | 5.8                                                                               | 9.1                                                                               | 9.7                                                                               |
| Unsig. Movement Delay, s/veh   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| LnGrp Delay(d), s/veh          | 101.4                                                                             | 51.2                                                                              | 52.2                                                                              | 116.2                                                                             | 59.4                                                                              | 73.7                                                                              | 74.7                                                                              | 137.7                                                                             | 178.9                                                                             | 51.9                                                                              | 40.4                                                                              | 41.7                                                                              |
| LnGrp LOS                      | F                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | E                                                                                 | F                                                                                 | E                                                                                 | F                                                                                 | F                                                                                 | D                                                                                 | D                                                                                 | D                                                                                 |
| Approach Vol, veh/h            | 389                                                                               |                                                                                   |                                                                                   | 684                                                                               |                                                                                   |                                                                                   | 3047                                                                              |                                                                                   |                                                                                   | 1320                                                                              |                                                                                   |                                                                                   |
| Approach Delay, s/veh          | 62.4                                                                              |                                                                                   |                                                                                   | 80.4                                                                              |                                                                                   |                                                                                   | 141.3                                                                             |                                                                                   |                                                                                   | 44.0                                                                              |                                                                                   |                                                                                   |
| Approach LOS                   | E                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |
| Timer - Assigned Phs           | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Phs Duration (G+Y+Rc), s       | 38.9                                                                              | 53.3                                                                              | 12.0                                                                              | 25.8                                                                              | 31.2                                                                              | 61.0                                                                              | 12.0                                                                              | 25.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Change Period (Y+Rc), s        | 6.2                                                                               | 6.2                                                                               | 4.6                                                                               | 5.0                                                                               | 6.2                                                                               | 6.2                                                                               | 4.6                                                                               | 5.0                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Max Green Setting (Gmax), s    | 35.2                                                                              | 35.4                                                                              | 7.4                                                                               | 30.0                                                                              | 15.8                                                                              | 54.8                                                                              | 7.4                                                                               | 30.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Max Q Clear Time (g_c+0.25), s | 12.4                                                                              | 23.1                                                                              | 8.1                                                                               | 18.4                                                                              | 15.1                                                                              | 56.8                                                                              | 9.2                                                                               | 13.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Green Ext Time (p_c), s        | 0.2                                                                               | 5.3                                                                               | 0.0                                                                               | 1.4                                                                               | 0.1                                                                               | 0.0                                                                               | 0.0                                                                               | 0.9                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Intersection Summary           |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| HCM 7th Control Delay, s/veh   | 104.4                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| HCM 7th LOS                    | F                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |

HCM 7th AWSC  
32: Thibodo Road & Mar Vista Drive

Future Year Conditions  
PM Peak Hour

Intersection

Intersection Delay, s/veh 28.7

Intersection LOS D

| Movement            | EBT                                                                               | EBR  | WBL  | WBT                                                                               | NBL                                                                               | NBR                                                                               |
|---------------------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Lane Configurations |  |      |      |  |  |  |
| Traffic Vol, veh/h  | 140                                                                               | 40   | 320  | 140                                                                               | 230                                                                               | 530                                                                               |
| Future Vol, veh/h   | 140                                                                               | 40   | 320  | 140                                                                               | 230                                                                               | 530                                                                               |
| Peak Hour Factor    | 0.98                                                                              | 0.98 | 0.98 | 0.98                                                                              | 0.98                                                                              | 0.98                                                                              |
| Heavy Vehicles, %   | 3                                                                                 | 3    | 3    | 3                                                                                 | 3                                                                                 | 3                                                                                 |
| Mvmt Flow           | 143                                                                               | 41   | 327  | 143                                                                               | 235                                                                               | 541                                                                               |
| Number of Lanes     | 1                                                                                 | 0    | 0    | 1                                                                                 | 1                                                                                 | 1                                                                                 |

| Approach                   | EB | WB   | NB   |
|----------------------------|----|------|------|
| Opposing Approach          | WB | EB   |      |
| Opposing Lanes             | 1  | 1    | 0    |
| Conflicting Approach Left  |    | NB   | EB   |
| Conflicting Lanes Left     | 0  | 2    | 1    |
| Conflicting Approach Right | NB |      | WB   |
| Conflicting Lanes Right    | 2  | 0    | 1    |
| HCM Control Delay, s/veh   | 13 | 31.8 | 30.5 |
| HCM LOS                    | B  | D    | D    |

| Lane                     | NBLn1 | NBLn2 | EBLn1 | WBLn1 |
|--------------------------|-------|-------|-------|-------|
| Vol Left, %              | 100%  | 0%    | 0%    | 70%   |
| Vol Thru, %              | 0%    | 0%    | 78%   | 30%   |
| Vol Right, %             | 0%    | 100%  | 22%   | 0%    |
| Sign Control             | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane      | 230   | 530   | 180   | 460   |
| LT Vol                   | 230   | 0     | 0     | 320   |
| Through Vol              | 0     | 0     | 140   | 140   |
| RT Vol                   | 0     | 530   | 40    | 0     |
| Lane Flow Rate           | 235   | 541   | 184   | 469   |
| Geometry Grp             | 5     | 5     | 2     | 2     |
| Degree of Util (X)       | 0.461 | 0.879 | 0.336 | 0.819 |
| Departure Headway (Hd)   | 7.074 | 5.853 | 6.587 | 6.28  |
| Convergence, Y/N         | Yes   | Yes   | Yes   | Yes   |
| Cap                      | 507   | 617   | 544   | 577   |
| Service Time             | 4.839 | 3.618 | 4.665 | 4.337 |
| HCM Lane V/C Ratio       | 0.464 | 0.877 | 0.338 | 0.813 |
| HCM Control Delay, s/veh | 15.8  | 36.9  | 13    | 31.8  |
| HCM Lane LOS             | C     | E     | B     | D     |
| HCM 95th-tile Q          | 2.4   | 10.3  | 1.5   | 8.3   |

HCM 7th TWSC  
33: SR-78 EB Ramps & Mar Vista Drive

Future Year Conditions  
PM Peak Hour

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 28.1 |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↱    |      |      | ↰    |      |      |      |      | ↱    |      | ↰    |
| Traffic Vol, veh/h       | 0    | 580  | 90   | 120  | 210  | 0    | 0    | 0    | 0    | 240  | 0    | 250  |
| Future Vol, veh/h        | 0    | 580  | 90   | 120  | 210  | 0    | 0    | 0    | 0    | 240  | 0    | 250  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | 0    | -    | 45   |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 592  | 92   | 122  | 214  | 0    | 0    | 0    | 0    | 245  | 0    | 255  |

| Major/Minor          | Major1 |   |   | Major2 |   |   | Minor2 |   |       |
|----------------------|--------|---|---|--------|---|---|--------|---|-------|
| Conflicting Flow All | -      | 0 | 0 | 684    | 0 | 0 | 1051   | - | 214   |
| Stage 1              | -      | - | - | -      | - | - | 459    | - | -     |
| Stage 2              | -      | - | - | -      | - | - | 592    | - | -     |
| Critical Hdwy        | -      | - | - | 4.13   | - | - | 6.43   | - | 6.23  |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | - | 5.43   | - | -     |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | - | 5.43   | - | -     |
| Follow-up Hdwy       | -      | - | - | 2.227  | - | - | 3.527  | - | 3.327 |
| Pot Cap-1 Maneuver   | 0      | - | - | 905    | - | 0 | 250    | 0 | 823   |
| Stage 1              | 0      | - | - | -      | - | 0 | 634    | 0 | -     |
| Stage 2              | 0      | - | - | -      | - | 0 | 551    | 0 | -     |
| Platoon blocked, %   | -      | - | - | -      | - | - | -      | - | -     |
| Mov Cap-1 Maneuver   | -      | - | - | 905    | - | - | ~ 212  | 0 | 823   |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | - | ~ 212  | 0 | -     |
| Stage 1              | -      | - | - | -      | - | - | 634    | 0 | -     |
| Stage 2              | -      | - | - | -      | - | - | 466    | 0 | -     |

| Approach          | EB | WB   | SB    |
|-------------------|----|------|-------|
| HCM Ctrl Dly, s/v | 0  | 3.49 | 83.03 |
| HCM LOS           |    |      | F     |

| Minor Lane/Major Mvmt | EBT | EBR | WBL   | WBT | SBLn1 | SBLn2 |
|-----------------------|-----|-----|-------|-----|-------|-------|
| Capacity (veh/h)      | -   | -   | 655   | -   | 212   | 823   |
| HCM Lane V/C Ratio    | -   | -   | 0.135 | -   | 1.157 | 0.31  |
| HCM Ctrl Dly (s/v)    | -   | -   | 9.6   | 0   | 157.7 | 11.3  |
| HCM Lane LOS          | -   | -   | A     | A   | F     | B     |
| HCM 95th %tile Q(veh) | -   | -   | 0.5   | -   | 11.9  | 1.3   |

| Notes                      |                                |
|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$. Delay exceeds 300s         |
| +: Computation Not Defined | *: All major volume in platoon |

Vista GPU

HCM 7th TWSC  
34: SR-78 WB Ramps & Mar Vista Drive

Future Year Conditions  
PM Peak Hour

| Intersection             |                                                                                   |        |       |                                                                                   |                                                                                   |       |
|--------------------------|-----------------------------------------------------------------------------------|--------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|
| Int Delay, s/veh         | 42.6                                                                              |        |       |                                                                                   |                                                                                   |       |
| Movement                 | EBT                                                                               | EBR    | WBL   | WBT                                                                               | NBL                                                                               | NBR   |
| Lane Configurations      |  |        |       |  |  |       |
| Traffic Vol, veh/h       | 510                                                                               | 310    | 160   | 230                                                                               | 100                                                                               | 320   |
| Future Vol, veh/h        | 510                                                                               | 310    | 160   | 230                                                                               | 100                                                                               | 320   |
| Conflicting Peds, #/hr   | 0                                                                                 | 0      | 0     | 0                                                                                 | 0                                                                                 | 0     |
| Sign Control             | Free                                                                              | Free   | Free  | Free                                                                              | Stop                                                                              | Stop  |
| RT Channelized           | -                                                                                 | Free   | -     | None                                                                              | -                                                                                 | None  |
| Storage Length           | -                                                                                 | -      | -     | -                                                                                 | 0                                                                                 | -     |
| Veh in Median Storage, # | 0                                                                                 | -      | -     | 0                                                                                 | 0                                                                                 | -     |
| Grade, %                 | 0                                                                                 | -      | -     | 0                                                                                 | 0                                                                                 | -     |
| Peak Hour Factor         | 96                                                                                | 96     | 96    | 96                                                                                | 96                                                                                | 96    |
| Heavy Vehicles, %        | 3                                                                                 | 3      | 3     | 3                                                                                 | 3                                                                                 | 3     |
| Mvmt Flow                | 531                                                                               | 323    | 167   | 240                                                                               | 104                                                                               | 333   |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
| Major/Minor              | Major1                                                                            | Major2 |       | Minor1                                                                            |                                                                                   |       |
| Conflicting Flow All     | 0                                                                                 | -      | 531   | 0                                                                                 | 1104                                                                              | 531   |
| Stage 1                  | -                                                                                 | -      | -     | -                                                                                 | 531                                                                               | -     |
| Stage 2                  | -                                                                                 | -      | -     | -                                                                                 | 573                                                                               | -     |
| Critical Hdwy            | -                                                                                 | -      | 4.13  | -                                                                                 | 6.43                                                                              | 6.23  |
| Critical Hdwy Stg 1      | -                                                                                 | -      | -     | -                                                                                 | 5.43                                                                              | -     |
| Critical Hdwy Stg 2      | -                                                                                 | -      | -     | -                                                                                 | 5.43                                                                              | -     |
| Follow-up Hdwy           | -                                                                                 | -      | 2.227 | -                                                                                 | 3.527                                                                             | 3.327 |
| Pot Cap-1 Maneuver       | -                                                                                 | 0      | 1031  | -                                                                                 | 232                                                                               | 546   |
| Stage 1                  | -                                                                                 | 0      | -     | -                                                                                 | 588                                                                               | -     |
| Stage 2                  | -                                                                                 | 0      | -     | -                                                                                 | 562                                                                               | -     |
| Platoon blocked, %       | -                                                                                 | -      |       |                                                                                   |                                                                                   |       |
| Mov Cap-1 Maneuver       | -                                                                                 | -      | 1031  | -                                                                                 | 189                                                                               | 546   |
| Mov Cap-2 Maneuver       | -                                                                                 | -      | -     | -                                                                                 | 189                                                                               | -     |
| Stage 1                  | -                                                                                 | -      | -     | -                                                                                 | 588                                                                               | -     |
| Stage 2                  | -                                                                                 | -      | -     | -                                                                                 | 457                                                                               | -     |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
| Approach                 | EB                                                                                | WB     |       | NB                                                                                |                                                                                   |       |
| HCM Ctrl Dly, s/v        | 0                                                                                 | 3.76   |       | 130.28                                                                            |                                                                                   |       |
| HCM LOS                  | F                                                                                 |        |       |                                                                                   |                                                                                   |       |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
|                          |                                                                                   |        |       |                                                                                   |                                                                                   |       |
| Minor Lane/Major Mvmt    | NBLn1                                                                             | EBT    | WBL   | WBT                                                                               |                                                                                   |       |
| Capacity (veh/h)         | 377                                                                               | -      | 738   | -                                                                                 |                                                                                   |       |
| HCM Lane V/C Ratio       | 1.161                                                                             | -      | 0.162 | -                                                                                 |                                                                                   |       |
| HCM Ctrl Dly (s/v)       | 130.3                                                                             | -      | 9.2   | 0                                                                                 |                                                                                   |       |
| HCM Lane LOS             | F                                                                                 | -      | A     | A                                                                                 |                                                                                   |       |
| HCM 95th %tile Q(veh)    | 17.2                                                                              | -      | 0.6   | -                                                                                 |                                                                                   |       |

# HCM 7th Signalized Intersection Summary 35: Sycamore Avenue & 78 WB ON/78 WB OFF

Future Year Conditions  
PM Peak Hour

|                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                                                             | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations                                                  |                                                                                   |                                                                                   |                                                                                   |  |  |  |    |  |                                                                                     |                                                                                     |  |  |
| Traffic Volume (veh/h)                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 700                                                                               | 10                                                                                | 520                                                                               | 810                                                                                 | 1360                                                                                | 0                                                                                   | 0                                                                                   | 680                                                                                 | 560                                                                                 |
| Future Volume (veh/h)                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 700                                                                               | 10                                                                                | 520                                                                               | 810                                                                                 | 1360                                                                                | 0                                                                                   | 0                                                                                   | 680                                                                                 | 560                                                                                 |
| Initial Q (Qb), veh                                                  |                                                                                   |                                                                                   |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Width Adj.                                                      |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.04                                                                                |
| Ped-Bike Adj(A_pbT)                                                  |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.99                                                                                |
| Parking Bus, Adj                                                     |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach                                                |                                                                                   |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln                                               |                                                                                   |                                                                                   |                                                                                   | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0                                                                                   | 0                                                                                   | 1856                                                                                | 1930                                                                                |
| Adj Flow Rate, veh/h                                                 |                                                                                   |                                                                                   |                                                                                   | 729                                                                               | 0                                                                                 | 361                                                                               | 835                                                                                 | 1402                                                                                | 0                                                                                   | 0                                                                                   | 701                                                                                 | 458                                                                                 |
| Peak Hour Factor                                                     |                                                                                   |                                                                                   |                                                                                   | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Percent Heavy Veh, %                                                 |                                                                                   |                                                                                   |                                                                                   | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                                                           |                                                                                   |                                                                                   |                                                                                   | 769                                                                               | 0                                                                                 | 681                                                                               | 694                                                                                 | 3478                                                                                | 0                                                                                   | 0                                                                                   | 2254                                                                                | 718                                                                                 |
| Arrive On Green                                                      |                                                                                   |                                                                                   |                                                                                   | 0.22                                                                              | 0.00                                                                              | 0.22                                                                              | 0.41                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 0.45                                                                                | 0.45                                                                                |
| Sat Flow, veh/h                                                      |                                                                                   |                                                                                   |                                                                                   | 3534                                                                              | 0                                                                                 | 3132                                                                              | 3428                                                                                | 5233                                                                                | 0                                                                                   | 0                                                                                   | 5233                                                                                | 1614                                                                                |
| Grp Volume(v), veh/h                                                 |                                                                                   |                                                                                   |                                                                                   | 729                                                                               | 0                                                                                 | 361                                                                               | 835                                                                                 | 1402                                                                                | 0                                                                                   | 0                                                                                   | 701                                                                                 | 458                                                                                 |
| Grp Sat Flow(s),veh/h/ln                                             |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 0                                                                                 | 1566                                                                              | 1714                                                                                | 1689                                                                                | 0                                                                                   | 0                                                                                   | 1689                                                                                | 1614                                                                                |
| Q Serve(g_s), s                                                      |                                                                                   |                                                                                   |                                                                                   | 24.4                                                                              | 0.0                                                                               | 12.2                                                                              | 24.3                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 10.7                                                                                | 26.4                                                                                |
| Cycle Q Clear(g_c), s                                                |                                                                                   |                                                                                   |                                                                                   | 24.4                                                                              | 0.0                                                                               | 12.2                                                                              | 24.3                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 10.7                                                                                | 26.4                                                                                |
| Prop In Lane                                                         |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h                                               |                                                                                   |                                                                                   |                                                                                   | 769                                                                               | 0                                                                                 | 681                                                                               | 694                                                                                 | 3478                                                                                | 0                                                                                   | 0                                                                                   | 2254                                                                                | 718                                                                                 |
| V/C Ratio(X)                                                         |                                                                                   |                                                                                   |                                                                                   | 0.95                                                                              | 0.00                                                                              | 0.53                                                                              | 1.20                                                                                | 0.40                                                                                | 0.00                                                                                | 0.00                                                                                | 0.31                                                                                | 0.64                                                                                |
| Avail Cap(c_a), veh/h                                                |                                                                                   |                                                                                   |                                                                                   | 769                                                                               | 0                                                                                 | 681                                                                               | 694                                                                                 | 3478                                                                                | 0                                                                                   | 0                                                                                   | 2254                                                                                | 718                                                                                 |
| HCM Platoon Ratio                                                    |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 2.00                                                                                | 2.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)                                                   |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 0.53                                                                                | 0.53                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh                                             |                                                                                   |                                                                                   |                                                                                   | 46.3                                                                              | 0.0                                                                               | 41.5                                                                              | 35.7                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 21.4                                                                                | 25.8                                                                                |
| Incr Delay (d2), s/veh                                               |                                                                                   |                                                                                   |                                                                                   | 20.6                                                                              | 0.0                                                                               | 0.4                                                                               | 98.8                                                                                | 0.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.4                                                                                 | 4.3                                                                                 |
| Initial Q Delay(d3), s/veh                                           |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln                                             |                                                                                   |                                                                                   |                                                                                   | 12.8                                                                              | 0.0                                                                               | 4.8                                                                               | 17.2                                                                                | 0.1                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.2                                                                                 | 10.5                                                                                |
| Unsig. Movement Delay, s/veh                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d), s/veh                                                |                                                                                   |                                                                                   |                                                                                   | 66.9                                                                              | 0.0                                                                               | 41.9                                                                              | 134.5                                                                               | 0.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 21.8                                                                                | 30.1                                                                                |
| LnGrp LOS                                                            |                                                                                   |                                                                                   |                                                                                   | E                                                                                 |                                                                                   | D                                                                                 | F                                                                                   | A                                                                                   |                                                                                     |                                                                                     | C                                                                                   | C                                                                                   |
| Approach Vol, veh/h                                                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1090                                                                              |                                                                                   |                                                                                     | 2237                                                                                |                                                                                     |                                                                                     | 1159                                                                                |                                                                                     |
| Approach Delay, s/veh                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 58.6                                                                              |                                                                                   |                                                                                     | 50.3                                                                                |                                                                                     |                                                                                     | 25.1                                                                                |                                                                                     |
| Approach LOS                                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| Timer - Assigned Phs                                                 | 2                                                                                 |                                                                                   |                                                                                   | 5                                                                                 |                                                                                   |                                                                                   | 6                                                                                   |                                                                                     |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s                                             | 87.8                                                                              |                                                                                   |                                                                                   | 29.0                                                                              |                                                                                   |                                                                                   | 58.8                                                                                |                                                                                     |                                                                                     | 32.2                                                                                |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s                                              | 5.4                                                                               |                                                                                   |                                                                                   | 4.7                                                                               |                                                                                   |                                                                                   | 5.4                                                                                 |                                                                                     |                                                                                     | 6.1                                                                                 |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s                                          | 82.4                                                                              |                                                                                   |                                                                                   | 24.3                                                                              |                                                                                   |                                                                                   | 53.4                                                                                |                                                                                     |                                                                                     | 26.1                                                                                |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s                                         | 2.0                                                                               |                                                                                   |                                                                                   | 26.3                                                                              |                                                                                   |                                                                                   | 28.4                                                                                |                                                                                     |                                                                                     | 26.4                                                                                |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s                                              | 8.2                                                                               |                                                                                   |                                                                                   | 0.0                                                                               |                                                                                   |                                                                                   | 4.0                                                                                 |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |                                                                                     |
| Intersection Summary                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th Control Delay, s/veh                                         |                                                                                   |                                                                                   |                                                                                   | 45.8                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 7th LOS                                                          |                                                                                   |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| User approved volume balancing among the lanes for turning movement. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 7th Signalized Intersection Summary 36: Sycamore Avenue & 78 EB OFF/78 EB ON

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT | WBR | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|------|------|------|------|-----|-----|------|------|------|------|------|------|
| Lane Configurations          |      |      |      |      |     |     |      |      |      |      |      |      |
| Traffic Volume (veh/h)       | 510  | 10   | 480  | 0    | 0   | 0   | 0    | 1660 | 870  | 280  | 1100 | 0    |
| Future Volume (veh/h)        | 510  | 10   | 480  | 0    | 0   | 0   | 0    | 1660 | 870  | 280  | 1100 | 0    |
| Initial Q (Qb), veh          | 0    | 0    | 0    |      |     |     | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Width Adj.              | 1.04 | 1.00 | 1.00 |      |     |     | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 1.00 |      |     |     | 1.00 |      | 0.99 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 |      |     |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      |      |     |     | No   |      |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1930 | 1856 | 1856 |      |     |     | 0    | 1856 | 1930 | 1856 | 1856 | 0    |
| Adj Flow Rate, veh/h         | 527  | 0    | 337  |      |     |     | 0    | 1857 | 601  | 286  | 1122 | 0    |
| Peak Hour Factor             | 0.98 | 0.98 | 0.98 |      |     |     | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, %         | 3    | 3    | 3    |      |     |     | 0    | 3    | 3    | 3    | 3    | 0    |
| Cap, veh/h                   | 619  | 0    | 528  |      |     |     | 0    | 3323 | 963  | 342  | 3727 | 0    |
| Arrive On Green              | 0.17 | 0.00 | 0.17 |      |     |     | 0.00 | 0.60 | 0.60 | 0.20 | 1.00 | 0.00 |
| Sat Flow, veh/h              | 3676 | 0    | 3134 |      |     |     | 0    | 5567 | 1613 | 3428 | 5233 | 0    |
| Grp Volume(v), veh/h         | 527  | 0    | 337  |      |     |     | 0    | 1857 | 601  | 286  | 1122 | 0    |
| Grp Sat Flow(s), veh/h/ln    | 1838 | 0    | 1567 |      |     |     | 0    | 1856 | 1613 | 1714 | 1689 | 0    |
| Q Serve(g_s), s              | 16.7 | 0.0  | 12.0 |      |     |     | 0.0  | 24.2 | 28.7 | 9.6  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s        | 16.7 | 0.0  | 12.0 |      |     |     | 0.0  | 24.2 | 28.7 | 9.6  | 0.0  | 0.0  |
| Prop In Lane                 | 1.00 |      | 1.00 |      |     |     | 0.00 |      | 1.00 | 1.00 |      | 0.00 |
| Lane Grp Cap(c), veh/h       | 619  | 0    | 528  |      |     |     | 0    | 3323 | 963  | 342  | 3727 | 0    |
| V/C Ratio(X)                 | 0.85 | 0.00 | 0.64 |      |     |     | 0.00 | 0.56 | 0.62 | 0.84 | 0.30 | 0.00 |
| Avail Cap(c_a), veh/h        | 855  | 0    | 729  |      |     |     | 0    | 3323 | 963  | 437  | 3727 | 0    |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 |      |     |     | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 0.00 | 1.00 |      |     |     | 0.00 | 1.00 | 1.00 | 0.81 | 0.81 | 0.00 |
| Uniform Delay (d), s/veh     | 48.4 | 0.0  | 46.5 |      |     |     | 0.0  | 14.6 | 15.5 | 47.1 | 0.0  | 0.0  |
| Incr Delay (d2), s/veh       | 4.6  | 0.0  | 0.5  |      |     |     | 0.0  | 0.7  | 3.0  | 8.9  | 0.2  | 0.0  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  |      |     |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 8.0  | 0.0  | 4.7  |      |     |     | 0.0  | 9.6  | 10.5 | 4.1  | 0.1  | 0.0  |
| Unsig. Movement Delay, s/veh |      |      |      |      |     |     |      |      |      |      |      |      |
| LnGrp Delay(d), s/veh        | 53.1 | 0.0  | 47.0 |      |     |     | 0.0  | 15.3 | 18.6 | 56.1 | 0.2  | 0.0  |
| LnGrp LOS                    | D    |      | D    |      |     |     |      | B    | B    | E    | A    |      |
| Approach Vol, veh/h          | 864  |      |      |      |     |     | 2458 |      |      | 1408 |      |      |
| Approach Delay, s/veh        | 50.7 |      |      |      |     |     | 16.1 |      |      | 11.5 |      |      |
| Approach LOS                 | D    |      |      |      |     |     | B    |      |      | B    |      |      |
| Timer - Assigned Phs         | 1    | 2    |      | 4    |     |     | 6    |      |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 66.7 | 77.0 |      | 26.3 |     |     | 93.7 |      |      |      |      |      |
| Change Period (Y+Rc), s      | 4.7  | 5.4  |      | 6.1  |     |     | 5.4  |      |      |      |      |      |
| Max Green Setting (Gmax), s  | 15.3 | 60.6 |      | 27.9 |     |     | 80.6 |      |      |      |      |      |
| Max Q Clear Time (g_c+11), s | 11.6 | 30.7 |      | 18.7 |     |     | 2.0  |      |      |      |      |      |
| Green Ext Time (p_c), s      | 0.3  | 13.7 |      | 1.5  |     |     | 5.9  |      |      |      |      |      |

## Intersection Summary

|                              |      |
|------------------------------|------|
| HCM 7th Control Delay, s/veh | 21.1 |
| HCM 7th LOS                  | C    |

## Notes

User approved volume balancing among the lanes for turning movement.

# HCM 7th Signalized Intersection Summary 37: Sycamore Avenue & Watson Way/Hibiscus Avenue

Future Year Conditions  
PM Peak Hour



| Movement                      | EBL   | EBT   | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL   | SBT  | SBR  |
|-------------------------------|-------|-------|------|------|------|------|------|------|------|-------|------|------|
| Lane Configurations           |       | ↔     | ↔    |      | ↔    | ↔    | ↔    | ↔    |      | ↔     | ↔    | ↔    |
| Traffic Volume (veh/h)        | 80    | 20    | 20   | 60   | 20   | 260  | 80   | 1850 | 120  | 270   | 650  | 50   |
| Future Volume (veh/h)         | 80    | 20    | 20   | 60   | 20   | 260  | 80   | 1850 | 120  | 270   | 650  | 50   |
| Initial Q (Qb), veh           | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    |
| Lane Width Adj.               | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)           | 1.00  |       | 1.00 | 1.00 |      | 0.98 | 1.00 |      | 0.98 | 1.00  |      | 1.00 |
| Parking Bus, Adj              | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Work Zone On Approach         | No    |       |      | No   |      |      | No   |      |      | No    |      |      |
| Adj Sat Flow, veh/h/ln        | 1934  | 1934  | 1934 | 1934 | 1934 | 2011 | 1934 | 1934 | 1934 | 1934  | 1934 | 1934 |
| Adj Flow Rate, veh/h          | 84    | 21    | 16   | 63   | 21   | 216  | 84   | 1947 | 110  | 284   | 684  | 48   |
| Peak Hour Factor              | 0.95  | 0.95  | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95  | 0.95 | 0.95 |
| Percent Heavy Veh, %          | 3     | 3     | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3     | 3    | 3    |
| Cap, veh/h                    | 92    | 23    | 101  | 247  | 82   | 253  | 335  | 2273 | 128  | 264   | 2048 | 143  |
| Arrive On Green               | 0.06  | 0.06  | 0.06 | 0.18 | 0.18 | 0.18 | 0.18 | 0.45 | 0.45 | 0.14  | 0.41 | 0.41 |
| Sat Flow, veh/h               | 1487  | 372   | 1639 | 1398 | 466  | 1432 | 1842 | 5106 | 287  | 1842  | 5037 | 351  |
| Grp Volume(v), veh/h          | 105   | 0     | 16   | 84   | 0    | 216  | 84   | 1340 | 717  | 284   | 477  | 255  |
| Grp Sat Flow(s),veh/h/ln      | 1859  | 0     | 1639 | 1864 | 0    | 1432 | 1842 | 1760 | 1874 | 1842  | 1760 | 1869 |
| Q Serve(g_s), s               | 6.7   | 0.0   | 1.1  | 4.7  | 0.0  | 17.6 | 4.7  | 40.9 | 41.3 | 17.2  | 11.2 | 11.3 |
| Cycle Q Clear(g_c), s         | 6.7   | 0.0   | 1.1  | 4.7  | 0.0  | 17.6 | 4.7  | 40.9 | 41.3 | 17.2  | 11.2 | 11.3 |
| Prop In Lane                  | 0.80  |       | 1.00 | 0.75 |      | 1.00 | 1.00 |      | 0.15 | 1.00  |      | 0.19 |
| Lane Grp Cap(c), veh/h        | 115   | 0     | 101  | 329  | 0    | 253  | 335  | 1566 | 834  | 264   | 1431 | 760  |
| V/C Ratio(X)                  | 0.92  | 0.00  | 0.16 | 0.26 | 0.00 | 0.85 | 0.25 | 0.86 | 0.86 | 1.08  | 0.33 | 0.34 |
| Avail Cap(c_a), veh/h         | 115   | 0     | 101  | 472  | 0    | 363  | 335  | 1566 | 834  | 264   | 1431 | 760  |
| HCM Platoon Ratio             | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Upstream Filter(I)            | 1.00  | 0.00  | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Uniform Delay (d), s/veh      | 56.0  | 0.0   | 53.3 | 42.6 | 0.0  | 47.9 | 42.1 | 29.8 | 29.9 | 51.4  | 24.4 | 24.5 |
| Incr Delay (d2), s/veh        | 57.4  | 0.0   | 0.3  | 0.3  | 0.0  | 11.4 | 0.1  | 6.2  | 11.2 | 77.0  | 0.6  | 1.2  |
| Initial Q Delay(d3), s/veh    | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 5.0   | 0.0   | 0.5  | 2.2  | 0.0  | 7.0  | 2.1  | 17.5 | 20.0 | 13.4  | 4.6  | 5.1  |
| Unsig. Movement Delay, s/veh  |       |       |      |      |      |      |      |      |      |       |      |      |
| LnGrp Delay(d), s/veh         | 113.4 | 0.0   | 53.6 | 42.9 | 0.0  | 59.3 | 42.2 | 36.0 | 41.2 | 128.4 | 25.1 | 25.7 |
| LnGrp LOS                     | F     |       | D    | D    |      | E    | D    | D    | D    | F     | C    | C    |
| Approach Vol, veh/h           |       | 121   |      |      | 300  |      |      | 2141 |      |       | 1016 |      |
| Approach Delay, s/veh         |       | 105.5 |      |      | 54.7 |      |      | 38.0 |      |       | 54.1 |      |
| Approach LOS                  |       | F     |      |      | D    |      |      | D    |      |       | D    |      |
| Timer - Assigned Phs          | 1     | 2     |      | 4    | 5    | 6    |      | 8    |      |       |      |      |
| Phs Duration (G+Y+Rc), s      | 30.0  | 59.2  |      | 12.0 | 27.6 | 54.6 |      | 25.8 |      |       |      |      |
| Change Period (Y+Rc), s       | 5.8   | 5.8   |      | 4.6  | 5.8  | 5.8  |      | 4.6  |      |       |      |      |
| Max Green Setting (Gmax), s   | 44.2  |       |      | 7.4  | 12.6 | 48.8 |      | 30.4 |      |       |      |      |
| Max Q Clear Time (g_c+119, s) | 43.3  |       |      | 8.7  | 6.7  | 13.3 |      | 19.6 |      |       |      |      |
| Green Ext Time (p_c), s       | 0.0   | 0.8   |      | 0.0  | 0.0  | 3.0  |      | 0.7  |      |       |      |      |
| Intersection Summary          |       |       |      |      |      |      |      |      |      |       |      |      |
| HCM 7th Control Delay, s/veh  |       |       | 46.3 |      |      |      |      |      |      |       |      |      |
| HCM 7th LOS                   |       |       | D    |      |      |      |      |      |      |       |      |      |

# HCM 7th Signalized Intersection Summary 38: Sycamore Avenue & La Mirada Avenue

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL   | EBT   | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR   | SBL  | SBT  | SBR  |
|------------------------------|-------|-------|------|------|------|------|------|------|-------|------|------|------|
| Lane Configurations          |       | ↔     | ↔    |      | ↔    | ↔    | ↔    | ↔    |       | ↔    | ↔    | ↔    |
| Traffic Volume (veh/h)       | 120   | 50    | 90   | 200  | 50   | 430  | 50   | 1450 | 160   | 140  | 580  | 70   |
| Future Volume (veh/h)        | 120   | 50    | 90   | 200  | 50   | 430  | 50   | 1450 | 160   | 140  | 580  | 70   |
| Initial Q (Qb), veh          | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    |
| Lane Width Adj.              | 1.00  | 1.00  | 1.04 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)          | 1.00  |       | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 0.99  | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No    |       |      | No   |      |      | No   |      |       | No   |      |      |
| Adj Sat Flow, veh/h/ln       | 1856  | 1856  | 1930 | 1856 | 1856 | 1930 | 1856 | 1856 | 1856  | 1856 | 1856 | 1856 |
| Adj Flow Rate, veh/h         | 126   | 53    | 74   | 211  | 53   | 358  | 53   | 1526 | 131   | 147  | 611  | 63   |
| Peak Hour Factor             | 0.95  | 0.95  | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95  | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 3     | 3     | 3    | 3    | 3    | 3    | 3    | 3    | 3     | 3    | 3    | 3    |
| Cap, veh/h                   | 109   | 46    | 142  | 331  | 83   | 380  | 68   | 1390 | 118   | 284  | 2183 | 223  |
| Arrive On Green              | 0.09  | 0.09  | 0.09 | 0.23 | 0.23 | 0.23 | 0.04 | 0.42 | 0.42  | 0.08 | 0.47 | 0.47 |
| Sat Flow, veh/h              | 1262  | 531   | 1635 | 1426 | 358  | 1635 | 1767 | 3284 | 280   | 3428 | 4669 | 477  |
| Grp Volume(v), veh/h         | 179   | 0     | 74   | 264  | 0    | 358  | 53   | 814  | 843   | 147  | 440  | 234  |
| Grp Sat Flow(s),veh/h/ln     | 1792  | 0     | 1635 | 1784 | 0    | 1635 | 1767 | 1763 | 1801  | 1714 | 1689 | 1769 |
| Q Serve(g_s), s              | 10.4  | 0.0   | 5.2  | 16.0 | 0.0  | 25.8 | 3.6  | 50.8 | 50.8  | 4.9  | 9.6  | 9.7  |
| Cycle Q Clear(g_c), s        | 10.4  | 0.0   | 5.2  | 16.0 | 0.0  | 25.8 | 3.6  | 50.8 | 50.8  | 4.9  | 9.6  | 9.7  |
| Prop In Lane                 | 0.70  |       | 1.00 | 0.80 |      | 1.00 | 1.00 |      | 0.16  | 1.00 |      | 0.27 |
| Lane Grp Cap(c), veh/h       | 155   | 0     | 142  | 414  | 0    | 380  | 68   | 746  | 762   | 284  | 1579 | 827  |
| V/C Ratio(X)                 | 1.15  | 0.00  | 0.52 | 0.64 | 0.00 | 0.94 | 0.78 | 1.09 | 1.11  | 0.52 | 0.28 | 0.28 |
| Avail Cap(c_a), veh/h        | 155   | 0     | 142  | 416  | 0    | 382  | 144  | 746  | 762   | 286  | 1579 | 827  |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 54.8  | 0.0   | 52.4 | 41.5 | 0.0  | 45.3 | 57.2 | 34.6 | 34.6  | 52.7 | 19.6 | 19.6 |
| Incr Delay (d2), s/veh       | 119.0 | 0.0   | 2.7  | 2.9  | 0.0  | 31.4 | 6.9  | 60.2 | 65.7  | 0.7  | 0.4  | 0.9  |
| Initial Q Delay(d3), s/veh   | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 0.9   | 0.0   | 2.2  | 7.2  | 0.0  | 13.5 | 1.7  | 32.8 | 34.6  | 2.1  | 3.7  | 4.0  |
| Unsig. Movement Delay, s/veh |       |       |      |      |      |      |      |      |       |      |      |      |
| LnGrp Delay(d), s/veh        | 173.8 | 0.0   | 55.1 | 44.4 | 0.0  | 76.7 | 64.1 | 94.8 | 100.3 | 53.5 | 20.0 | 20.5 |
| LnGrp LOS                    | F     |       | E    | D    |      | E    | E    | F    | F     | D    | C    | C    |
| Approach Vol, veh/h          |       | 253   |      |      | 622  |      |      | 1710 |       |      | 821  |      |
| Approach Delay, s/veh        |       | 139.1 |      |      | 63.0 |      |      | 96.6 |       |      | 26.1 |      |
| Approach LOS                 |       | F     |      |      | E    |      |      | F    |       |      | C    |      |
| Timer - Assigned Phs         | 1     | 2     |      | 4    | 5    | 6    |      | 8    |       |      |      |      |
| Phs Duration (G+Y+Rc), s     | 5.7   | 56.6  |      | 15.0 | 10.4 | 61.9 |      | 32.5 |       |      |      |      |
| Change Period (Y+Rc), s      | 5.8   | 5.8   |      | 4.6  | 5.8  | 5.8  |      | 4.6  |       |      |      |      |
| Max Green Setting (Gmax), s  | 10.0  | 50.8  |      | 10.4 | 9.8  | 51.0 |      | 28.0 |       |      |      |      |
| Max Q Clear Time (g_c+I), s  | 10.9  | 52.8  |      | 12.4 | 5.6  | 11.7 |      | 27.8 |       |      |      |      |
| Green Ext Time (p_c), s      | 0.1   | 0.0   |      | 0.0  | 0.0  | 2.6  |      | 0.1  |       |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 76.6  
HCM 7th LOS E

## Notes

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

# HCM 7th Signalized Intersection Summary 39: S Melrose Dr & Sycamore Av/Sycamore Av

Future Year Conditions  
PM Peak Hour



| Movement                      | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL   | NBT   | NBR  | SBL  | SBT  | SBR  |
|-------------------------------|------|------|------|------|------|------|-------|-------|------|------|------|------|
| Lane Configurations           |      |      |      |      |      |      |       |       |      |      |      |      |
| Traffic Volume (veh/h)        | 150  | 90   | 80   | 450  | 130  | 500  | 250   | 2350  | 650  | 220  | 850  | 80   |
| Future Volume (veh/h)         | 150  | 90   | 80   | 450  | 130  | 500  | 250   | 2350  | 650  | 220  | 850  | 80   |
| Initial Q (Qb), veh           | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |
| Lane Width Adj.               | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped-Bike Adj(A_pbT)           | 1.00 |      | 1.00 | 1.00 |      | 0.99 | 1.00  |       | 0.97 | 1.00 |      | 1.00 |
| Parking Bus, Adj              | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach         | No   |      |      | No   |      |      | No    |       |      | No   |      |      |
| Adj Sat Flow, veh/h/ln        | 1856 | 1856 | 1930 | 1856 | 1856 | 1856 | 1856  | 1856  | 1856 | 1856 | 1856 | 1856 |
| Adj Flow Rate, veh/h          | 153  | 92   | 62   | 427  | 178  | 408  | 255   | 2398  | 530  | 224  | 867  | 72   |
| Peak Hour Factor              | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98  | 0.98  | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, %          | 3    | 3    | 3    | 3    | 3    | 3    | 3     | 3     | 3    | 3    | 3    | 3    |
| Cap, veh/h                    | 186  | 196  | 173  | 555  | 291  | 610  | 275   | 1749  | 772  | 796  | 2010 | 166  |
| Arrive On Green               | 0.11 | 0.11 | 0.11 | 0.16 | 0.16 | 0.16 | 0.16  | 0.35  | 0.35 | 0.23 | 0.42 | 0.42 |
| Sat Flow, veh/h               | 1767 | 1856 | 1635 | 3534 | 1856 | 1557 | 1767  | 5066  | 1522 | 3428 | 4767 | 394  |
| Grp Volume(v), veh/h          | 153  | 92   | 62   | 427  | 178  | 408  | 255   | 2398  | 530  | 224  | 613  | 326  |
| Grp Sat Flow(s),veh/h/ln      | 1767 | 1856 | 1635 | 3534 | 1856 | 1557 | 1767  | 5066  | 1522 | 3428 | 4767 | 394  |
| Q Serve(g_s), s               | 12.7 | 7.0  | 5.3  | 17.4 | 13.4 | 0.0  | 21.4  | 51.8  | 39.9 | 8.1  | 19.3 | 19.4 |
| Cycle Q Clear(g_c), s         | 12.7 | 7.0  | 5.3  | 17.4 | 13.4 | 0.0  | 21.4  | 51.8  | 39.9 | 8.1  | 19.3 | 19.4 |
| Prop In Lane                  | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00  |       | 1.00 | 1.00 |      | 0.22 |
| Lane Grp Cap(c), veh/h        | 186  | 196  | 173  | 555  | 291  | 610  | 275   | 1749  | 772  | 796  | 1424 | 752  |
| V/C Ratio(X)                  | 0.82 | 0.47 | 0.36 | 0.77 | 0.61 | 0.67 | 0.93  | 1.37  | 0.69 | 0.28 | 0.43 | 0.43 |
| Avail Cap(c_a), veh/h         | 403  | 423  | 373  | 806  | 423  | 720  | 280   | 1749  | 772  | 796  | 1424 | 752  |
| HCM Platoon Ratio             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh      | 65.7 | 63.1 | 62.4 | 60.6 | 59.0 | 37.8 | 62.5  | 49.1  | 28.5 | 47.3 | 30.7 | 30.7 |
| Incr Delay (d2), s/veh        | 8.6  | 1.7  | 1.3  | 2.8  | 2.1  | 1.9  | 33.8  | 170.6 | 4.9  | 0.1  | 1.0  | 1.8  |
| Initial Q Delay(d3), s/veh    | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln      | 6.2  | 3.4  | 2.3  | 7.9  | 6.4  | 12.9 | 11.9  | 48.5  | 20.2 | 3.4  | 7.8  | 8.5  |
| Unsig. Movement Delay, s/veh  |      |      |      |      |      |      |       |       |      |      |      |      |
| LnGrp Delay(d), s/veh         | 74.3 | 64.9 | 63.6 | 63.4 | 61.0 | 39.7 | 96.3  | 219.7 | 33.4 | 47.5 | 31.6 | 32.5 |
| LnGrp LOS                     | E    | E    | E    | E    | E    | D    | F     | F     | C    | D    | C    | C    |
| Approach Vol, veh/h           | 307  |      |      | 1013 |      |      | 3183  |       |      | 1163 |      |      |
| Approach Delay, s/veh         | 69.3 |      |      | 53.4 |      |      | 178.8 |       |      | 34.9 |      |      |
| Approach LOS                  | E    |      |      | D    |      |      | F     |       |      | C    |      |      |
| Timer - Assigned Phs          | 1    | 2    |      | 4    | 5    | 6    |       | 8     |      |      |      |      |
| Phs Duration (G+Y+Rc), s      | 41.0 | 58.0 |      | 29.3 | 29.6 | 69.5 |       | 21.6  |      |      |      |      |
| Change Period (Y+Rc), s       | 6.2  | 6.2  |      | 5.8  | 6.2  | 6.2  |       | 5.8   |      |      |      |      |
| Max Green Setting (Gmax), s   | 51.8 | 51.8 |      | 34.2 | 23.8 | 33.8 |       | 34.2  |      |      |      |      |
| Max Q Clear Time (g_c+I10), s | 53.8 | 53.8 |      | 19.4 | 23.4 | 21.4 |       | 14.7  |      |      |      |      |
| Green Ext Time (p_c), s       | 0.0  | 0.0  |      | 3.6  | 0.0  | 2.9  |       | 1.1   |      |      |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 120.9  
HCM 7th LOS F

## Notes

User approved volume balancing among the lanes for turning movement.

# HCM 7th Signalized Intersection Summary 40: S Melrose Dr & Faraday Ave/Park Center Dr

Future Year Conditions  
PM Peak Hour



| Movement                     | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL   | SBT  | SBR  |
|------------------------------|------|------|------|------|------|------|------|------|------|-------|------|------|
| Lane Configurations          | ↔↔   | ↑↓   |      | ↔↔   | ↑↓   |      | ↔↔↑↓ | ↑↑↑↓ |      | ↔     | ↑↑↑  | ↔    |
| Traffic Volume (veh/h)       | 900  | 400  | 350  | 140  | 180  | 70   | 170  | 1900 | 100  | 100   | 950  | 280  |
| Future Volume (veh/h)        | 900  | 400  | 350  | 140  | 180  | 70   | 170  | 1900 | 100  | 100   | 950  | 280  |
| Initial Q (Qb), veh          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT)          | 1.00 |      | 0.99 | 1.00 |      | 1.00 | 1.00 |      | 0.99 | 1.00  |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Work Zone On Approach        | No   |      |      | No   |      |      | No   |      |      | No    |      |      |
| Adj Sat Flow, veh/h/ln       | 2012 | 2012 | 2012 | 2012 | 2012 | 2012 | 2012 | 2012 | 2012 | 2012  | 2012 | 2012 |
| Adj Flow Rate, veh/h         | 938  | 417  | 329  | 146  | 188  | 63   | 177  | 1979 | 94   | 104   | 990  | 230  |
| Peak Hour Factor             | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96  | 0.96 | 0.96 |
| Percent Heavy Veh, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3     | 3    | 3    |
| Cap, veh/h                   | 947  | 586  | 459  | 197  | 249  | 81   | 202  | 2421 | 115  | 100   | 2183 | 1112 |
| Arrive On Green              | 0.25 | 0.29 | 0.29 | 0.05 | 0.09 | 0.09 | 0.11 | 0.45 | 0.45 | 0.05  | 0.40 | 0.40 |
| Sat Flow, veh/h              | 3718 | 2025 | 1585 | 3718 | 2834 | 920  | 1916 | 5370 | 254  | 1916  | 5494 | 1705 |
| Grp Volume(v), veh/h         | 938  | 393  | 353  | 146  | 125  | 126  | 177  | 1348 | 725  | 104   | 990  | 230  |
| Grp Sat Flow(s),veh/h/ln     | 1859 | 1912 | 1699 | 1859 | 1912 | 1843 | 1916 | 1831 | 1962 | 1916  | 1831 | 1705 |
| Q Serve(g_s), s              | 37.7 | 27.6 | 27.9 | 5.8  | 9.6  | 10.1 | 13.7 | 48.0 | 48.3 | 7.8   | 19.9 | 8.1  |
| Cycle Q Clear(g_c), s        | 37.7 | 27.6 | 27.9 | 5.8  | 9.6  | 10.1 | 13.7 | 48.0 | 48.3 | 7.8   | 19.9 | 8.1  |
| Prop In Lane                 | 1.00 |      | 0.93 | 1.00 |      | 0.50 | 1.00 |      | 0.13 | 1.00  |      | 1.00 |
| Lane Grp Cap(c), veh/h       | 947  | 553  | 492  | 197  | 168  | 162  | 202  | 1651 | 885  | 100   | 2183 | 1112 |
| V/C Ratio(X)                 | 0.99 | 0.71 | 0.72 | 0.74 | 0.74 | 0.78 | 0.88 | 0.82 | 0.82 | 1.04  | 0.45 | 0.21 |
| Avail Cap(c_a), veh/h        | 947  | 619  | 550  | 511  | 395  | 381  | 342  | 1651 | 885  | 100   | 2183 | 1112 |
| HCM Platoon Ratio            | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     | 55.7 | 47.7 | 47.8 | 70.0 | 66.8 | 67.0 | 66.1 | 35.8 | 35.9 | 71.1  | 33.2 | 10.5 |
| Incr Delay (d2), s/veh       | 26.8 | 2.6  | 3.1  | 2.0  | 2.4  | 3.1  | 6.3  | 4.6  | 8.4  | 102.4 | 0.7  | 0.4  |
| Initial Q Delay(d3), s/veh   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 20.6 | 13.2 | 11.9 | 2.8  | 4.7  | 4.8  | 6.9  | 21.4 | 24.0 | 6.6   | 8.7  | 3.1  |
| Unsig. Movement Delay, s/veh |      |      |      |      |      |      |      |      |      |       |      |      |
| LnGrp Delay(d), s/veh        | 82.6 | 50.3 | 50.9 | 72.0 | 69.2 | 70.0 | 72.5 | 40.4 | 44.3 | 173.5 | 33.9 | 10.9 |
| LnGrp LOS                    | F    | D    | D    | E    | E    | E    | E    | D    | D    | F     | C    | B    |
| Approach Vol, veh/h          | 1684 |      |      |      |      | 397  |      | 2250 |      | 1324  |      |      |
| Approach Delay, s/veh        | 68.4 |      |      |      |      | 70.5 |      | 44.2 |      | 40.9  |      |      |
| Approach LOS                 | E    |      |      |      |      | E    |      | D    |      | D     |      |      |
| Timer - Assigned Phs         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |      |       |      |      |
| Phs Duration (G+Y+Rc), s     | 40.0 | 73.8 | 13.4 | 48.8 | 22.0 | 65.8 | 43.6 | 18.6 |      |       |      |      |
| Change Period (Y+Rc), s      | 6.2  | 6.2  | 5.4  | 5.4  | 6.2  | 6.2  | 5.4  | 5.4  |      |       |      |      |
| Max Green Setting (Gmax), s  | 7.8  | 49.8 | 20.6 | 48.6 | 26.8 | 30.8 | 38.2 | 31.0 |      |       |      |      |
| Max Q Clear Time (g_c+I), s  | 19.8 | 50.3 | 7.8  | 29.9 | 15.7 | 21.9 | 39.7 | 12.1 |      |       |      |      |
| Green Ext Time (p_c), s      | 0.0  | 0.0  | 0.2  | 2.5  | 0.2  | 3.2  | 0.0  | 0.8  |      |       |      |      |

## Intersection Summary

HCM 7th Control Delay, s/veh 52.5  
HCM 7th LOS D

## Notes

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

## **Appendix E**

Detailed Freeway Analysis Inputs and Calculations  
Vista GPU Conditions



| Freeway | Segment                                   | Freeway Inputs and Analysis Results: Vista GPU |           |       |        |       |       |         |       |         |     |
|---------|-------------------------------------------|------------------------------------------------|-----------|-------|--------|-------|-------|---------|-------|---------|-----|
|         |                                           | Peak Hour                                      | Direction | Lanes | D      | K     | HVF   | AADT    | Speed | Density | LOS |
| SR-78   | Western City Limits to Emerald Drive      | AM                                             | E         | 4     | 42.24% | 7.27% | 4.77% | 129,000 | 69.6  | 14.6    | B   |
|         |                                           |                                                | W         | 4     | 57.76% | 7.27% | 4.77% | 129,000 | 68.7  | 21.7    | C   |
|         |                                           | PM                                             | E         | 4     | 44.45% | 7.09% | 4.77% | 129,000 | 69.6  | 16.1    | B   |
|         |                                           |                                                | W         | 4     | 55.55% | 7.09% | 4.77% | 129,000 | 69.2  | 20.3    | C   |
|         | Emerald Drive to Melrose Drive            | AM                                             | E         | 4     | 42.24% | 7.27% | 4.77% | 129,000 | 69.6  | 15.7    | B   |
|         |                                           |                                                | W         | 4     | 57.76% | 7.27% | 4.77% | 129,000 | 68.7  | 21.7    | C   |
|         |                                           | PM                                             | E         | 4     | 44.45% | 7.09% | 4.77% | 129,000 | 69.6  | 16.1    | B   |
|         |                                           |                                                | W         | 4     | 55.55% | 7.09% | 4.77% | 129,000 | 69.2  | 20.3    | C   |
|         | Melrose Drive to Vista Village Drive      | AM                                             | E         | 4     | 42.24% | 7.27% | 5.17% | 131,000 | 69.2  | 16.1    | B   |
|         |                                           |                                                | W         | 4     | 57.76% | 7.27% | 5.17% | 131,000 | 68.2  | 22.3    | C   |
|         |                                           | PM                                             | E         | 4     | 44.45% | 7.09% | 5.17% | 131,000 | 69.2  | 16.5    | B   |
|         |                                           |                                                | W         | 4     | 55.55% | 7.09% | 5.17% | 131,000 | 68.7  | 20.8    | C   |
|         | Vista Village Drive to Civic Center Drive | AM                                             | E         | 4     | 51.57% | 7.71% | 5.17% | 126,000 | 69.3  | 20.0    | C   |
|         |                                           |                                                | W         | 4     | 48.43% | 7.71% | 5.17% | 126,000 | 70.0  | 18.6    | C   |
|         |                                           | PM                                             | E         | 4     | 43.30% | 7.17% | 5.17% | 126,000 | 69.6  | 15.5    | B   |
|         |                                           |                                                | W         | 4     | 56.70% | 7.17% | 5.17% | 126,000 | 69.5  | 20.4    | C   |
|         | Civic Center Drive to Mar Vista Drive     | AM                                             | E         | 4     | 51.57% | 7.71% | 5.17% | 133,000 | 69.5  | 21.1    | C   |
|         |                                           |                                                | W         | 4     | 48.43% | 7.71% | 5.17% | 133,000 | 70.0  | 19.6    | C   |
|         |                                           | PM                                             | E         | 4     | 43.30% | 7.17% | 5.17% | 133,000 | 70.4  | 16.2    | B   |
|         |                                           |                                                | W         | 4     | 56.70% | 7.17% | 5.17% | 133,000 | 69.3  | 21.6    | C   |
|         | Mar Vista Drive to Sycamore Avenue        | AM                                             | E         | 4     | 51.57% | 7.71% | 5.17% | 130,000 | 68.7  | 20.8    | C   |
|         |                                           |                                                | W         | 4     | 48.43% | 7.71% | 5.17% | 130,000 | 69.1  | 19.4    | C   |
|         |                                           | PM                                             | E         | 4     | 43.30% | 7.17% | 5.17% | 130,000 | 69.2  | 16.1    | B   |
|         |                                           |                                                | W         | 4     | 56.70% | 7.17% | 5.17% | 130,000 | 68.6  | 21.3    | C   |
|         | Sycamore Avenue to N Rancho Santa Fe Road | AM                                             | E         | 4     | 51.57% | 7.71% | 4.63% | 145,000 | 68.0  | 23.3    | C   |
|         |                                           |                                                | W         | 4     | 48.43% | 7.71% | 4.63% | 145,000 | 68.4  | 21.8    | C   |
|         |                                           | PM                                             | E         | 4     | 43.30% | 7.17% | 4.63% | 145,000 | 69.6  | 17.8    | B   |
|         |                                           |                                                | W         | 4     | 56.70% | 7.17% | 4.63% | 145,000 | 67.4  | 24.1    | C   |



## **Appendix F**

### HCS Software Worksheets

### Vista GPU Conditions



# HCS Basic Freeway Report

## Project Information

|                     |                                                |               |                |
|---------------------|------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                  | Date          | 3/12/2025      |
| Agency              | CR Associates                                  | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                  | Time Analyzed | Future AM      |
| Project Description | AM SR-78 EB College Boulevard to Emerald Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 3691 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1018  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.42  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.6 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 14.6 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                  |               |                |
|---------------------|--------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                    | Date          | 3/7/2025       |
| Agency              | CR Associates                                    | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                    | Time Analyzed | Future AM      |
| Project Description | AM SR-78 EB Western City Limits to Emerald Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCav) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 3777 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1042  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.43  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.6 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 15.0 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                |               |                |
|---------------------|------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                  | Date          | 3/12/2025      |
| Agency              | CR Associates                                  | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                  | Time Analyzed | Future PM      |
| Project Description | PM SR-78 EB College Boulevard to Emerald Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4065 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1121  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.47  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.6 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 16.1 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                  |               |                |
|---------------------|--------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                    | Date          | 3/7/2025       |
| Agency              | CR Associates                                    | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                    | Time Analyzed | Future PM      |
| Project Description | PM SR-78 EB Western City Limits to Emerald Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCav) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 3876 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1069  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.45  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.6 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 15.4 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                |               |                |
|---------------------|------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                  | Date          | 3/12/2025      |
| Agency              | CR Associates                                  | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                  | Time Analyzed | Future AM      |
| Project Description | AM SR-78 WB College Boulevard to Emerald Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5417 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1494  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.62  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 68.7 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 21.7 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                  |               |                |
|---------------------|--------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                    | Date          | 3/7/2025       |
| Agency              | CR Associates                                    | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                    | Time Analyzed | Future AM      |
| Project Description | AM SR-78 WB Western City Limits to Emerald Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5165 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1425  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.59  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.1 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 20.6 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                |               |                |
|---------------------|------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                  | Date          | 3/12/2025      |
| Agency              | CR Associates                                  | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                  | Time Analyzed | Future PM      |
| Project Description | PM SR-78 WB College Boulevard to Emerald Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5081 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1402  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.58  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.2 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 20.3 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                  |               |                |
|---------------------|--------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                    | Date          | 3/7/2025       |
| Agency              | CR Associates                                    | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                    | Time Analyzed | Future PM      |
| Project Description | PM SR-78 WB Western City Limits to Emerald Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4844 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1336  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.56  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.4 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 19.3 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                            |               |                |
|---------------------|--------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                              | Date          | 3/7/2025       |
| Agency              | CR Associates                              | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                              | Time Analyzed | Future AM      |
| Project Description | AM SR-78 EB Emerald Drive to Melrose Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 3961 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1093  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.46  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.6 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 15.7 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                            |               |                |
|---------------------|--------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                              | Date          | 3/7/2025       |
| Agency              | CR Associates                              | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                              | Time Analyzed | Future PM      |
| Project Description | PM SR-78 EB Emerald Drive to Melrose Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCav) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4065 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1121  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.47  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.6 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 16.1 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                            |               |                |
|---------------------|--------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                              | Date          | 3/7/2025       |
| Agency              | CR Associates                              | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                              | Time Analyzed | Future AM      |
| Project Description | AM SR-78 WB Emerald Drive to Melrose Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCav) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5417 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1494  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.62  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 68.7 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 21.7 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                            |               |                |
|---------------------|--------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                              | Date          | 3/7/2025       |
| Agency              | CR Associates                              | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                              | Time Analyzed | Future PM      |
| Project Description | PM SR-78 WB Emerald Drive to Melrose Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5081 | Heavy Vehicle Adjustment Factor (fhv)     | 0.954 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1402  |
| Total Trucks, %               | 4.77 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.58  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.2 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 20.3 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                  |               |                |
|---------------------|--------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                    | Date          | 3/7/2025       |
| Agency              | CR Associates                                    | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                    | Time Analyzed | Future AM      |
| Project Description | AM SR-78 EB Melrose Drive to Vista Village Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4023 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1113  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.47  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.2 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 16.1 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                  |               |                |
|---------------------|--------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                    | Date          | 3/7/2025       |
| Agency              | CR Associates                                    | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                    | Time Analyzed | Future PM      |
| Project Description | PM SR-78 EB Melrose Drive to Vista Village Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4128 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1142  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.48  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.2 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 16.5 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                  |               |                |
|---------------------|--------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                    | Date          | 3/7/2025       |
| Agency              | CR Associates                                    | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                    | Time Analyzed | Future AM      |
| Project Description | AM SR-78 WB Melrose Drive to Vista Village Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCav) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5501 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1522  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.64  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 68.2 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 22.3 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                  |               |                |
|---------------------|--------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                    | Date          | 3/7/2025       |
| Agency              | CR Associates                                    | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                    | Time Analyzed | Future PM      |
| Project Description | PM SR-78 WB Melrose Drive to Vista Village Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5159 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1428  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.60  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 68.7 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 20.8 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                       |               |                |
|---------------------|-------------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                         | Date          | 3/7/2025       |
| Agency              | CR Associates                                         | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                         | Time Analyzed | Future AM      |
| Project Description | AM SR-78 EB Vista Village Drive to Civic Center Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5010 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1386  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.58  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.3 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 20.0 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                       |               |                |
|---------------------|-------------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                         | Date          | 3/7/2025       |
| Agency              | CR Associates                                         | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                         | Time Analyzed | Future PM      |
| Project Description | PM SR-78 EB Vista Village Drive to Civic Center Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 3912 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1082  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.45  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.6 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 15.5 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                       |               |                |
|---------------------|-------------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                         | Date          | 3/7/2025       |
| Agency              | CR Associates                                         | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                         | Time Analyzed | Future AM      |
| Project Description | AM SR-78 WB Vista Village Drive to Civic Center Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 1.83  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 70.1  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4705 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1302  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2400  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2400  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2400  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.54  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 70.0 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 18.6 |
| Total Ramp Density Adjustment            | 5.4  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 70.1 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                       |               |                |
|---------------------|-------------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                         | Date          | 3/7/2025       |
| Agency              | CR Associates                                         | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                         | Time Analyzed | Future PM      |
| Project Description | PM SR-78 WB Vista Village Drive to Civic Center Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 1.83  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 70.1  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5122 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1417  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2400  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2400  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2400  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.59  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.5 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 20.4 |
| Total Ramp Density Adjustment            | 5.4  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 70.1 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                   |               |                |
|---------------------|---------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                     | Date          | 3/7/2025       |
| Agency              | CR Associates                                     | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                     | Time Analyzed | Future AM      |
| Project Description | AM SR-78 EB Civic Center Drive to Mar Vista Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 1.67  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 70.4  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5288 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1463  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2400  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2400  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2400  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.61  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.5 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 21.1 |
| Total Ramp Density Adjustment            | 5.0  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 70.4 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                   |               |                |
|---------------------|---------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                     | Date          | 3/7/2025       |
| Agency              | CR Associates                                     | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                     | Time Analyzed | Future PM      |
| Project Description | PM SR-78 EB Civic Center Drive to Mar Vista Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 1.67  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 70.4  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4129 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1142  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2400  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2400  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2400  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.48  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 70.4 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 16.2 |
| Total Ramp Density Adjustment            | 5.0  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 70.4 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                   |               |                |
|---------------------|---------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                     | Date          | 3/7/2025       |
| Agency              | CR Associates                                     | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                     | Time Analyzed | Future AM      |
| Project Description | AM SR-78 WB Civic Center Drive to Mar Vista Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 1.67  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 70.4  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCav) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4966 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1374  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2400  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2400  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2400  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.57  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 70.0 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 19.6 |
| Total Ramp Density Adjustment            | 5.0  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 70.4 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                   |               |                |
|---------------------|---------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                     | Date          | 3/7/2025       |
| Agency              | CR Associates                                     | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                     | Time Analyzed | Future PM      |
| Project Description | PM SR-78 WB Civic Center Drive to Mar Vista Drive | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 1.67  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 70.4  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5407 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1496  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2400  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2400  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2400  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.62  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.3 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 21.6 |
| Total Ramp Density Adjustment            | 5.0  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 70.4 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                |               |                |
|---------------------|------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                  | Date          | 3/7/2025       |
| Agency              | CR Associates                                  | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                  | Time Analyzed | Future AM      |
| Project Description | AM SR-78 EB Mar Vista Drive to Sycamore Avenue | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCav) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5169 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1430  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.60  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 68.7 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 20.8 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                |               |                |
|---------------------|------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                  | Date          | 3/7/2025       |
| Agency              | CR Associates                                  | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                  | Time Analyzed | Future PM      |
| Project Description | PM SR-78 EB Mar Vista Drive to Sycamore Avenue | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4036 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1117  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.47  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.2 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 16.1 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                |               |                |
|---------------------|------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                  | Date          | 3/7/2025       |
| Agency              | CR Associates                                  | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                  | Time Analyzed | Future AM      |
| Project Description | AM SR-78 WB Mar Vista Drive to Sycamore Avenue | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4854 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1343  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.56  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 69.1 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 19.4 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                |               |                |
|---------------------|------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                  | Date          | 3/7/2025       |
| Agency              | CR Associates                                  | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                  | Time Analyzed | Future PM      |
| Project Description | PM SR-78 WB Mar Vista Drive to Sycamore Avenue | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5285 | Heavy Vehicle Adjustment Factor (fhv)     | 0.951 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1462  |
| Total Trucks, %               | 5.17 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (ET) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.61  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (flw)              | 0.0  | Average Speed (S), mi/h | 68.6 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 21.3 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                       |               |                |
|---------------------|-------------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                         | Date          | 3/12/2025      |
| Agency              | CR Associates                                         | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                         | Time Analyzed | Future AM      |
| Project Description | AM SR-78 EB Sycamore Avenue to N Rancho Santa Fe Road | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5765 | Heavy Vehicle Adjustment Factor (fhv)     | 0.956 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1587  |
| Total Trucks, %               | 4.63 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.66  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 68.0 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 23.3 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                       |               |                |
|---------------------|-------------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                         | Date          | 3/12/2025      |
| Agency              | CR Associates                                         | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                         | Time Analyzed | Future PM      |
| Project Description | PM SR-78 WB Sycamore Avenue to N Rancho Santa Fe Road | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.00  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.6  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 4502 | Heavy Vehicle Adjustment Factor (fhv)     | 0.956 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1239  |
| Total Trucks, %               | 4.63 | Capacity (c), pc/h/ln                     | 2396  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2396  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2396  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.52  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 69.6 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 17.8 |
| Total Ramp Density Adjustment            | 5.8  | Level of Service (LOS)  | B    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.6 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                       |               |                |
|---------------------|-------------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                         | Date          | 3/12/2025      |
| Agency              | CR Associates                                         | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                         | Time Analyzed | Future AM      |
| Project Description | AM SR-78 WB Sycamore Avenue to N Rancho Santa Fe Road | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5414 | Heavy Vehicle Adjustment Factor (fhv)     | 0.956 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1490  |
| Total Trucks, %               | 4.63 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.62  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 68.4 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 21.8 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |

# HCS Basic Freeway Report

## Project Information

|                     |                                                       |               |                |
|---------------------|-------------------------------------------------------|---------------|----------------|
| Analyst             | CR Associates                                         | Date          | 3/12/2025      |
| Agency              | CR Associates                                         | Analysis Year | 2050           |
| Jurisdiction        | City of Vista                                         | Time Analyzed | Future PM      |
| Project Description | PM SR-78 WB Sycamore Avenue to N Rancho Santa Fe Road | Units         | U.S. Customary |

## Geometric Data

|                                   |      |                                    |       |
|-----------------------------------|------|------------------------------------|-------|
| Number of Lanes (N), ln           | 4    | Terrain Type                       | Level |
| Segment Length (L), ft            | -    | Percent Grade, %                   | -     |
| Measured or Base Free-Flow Speed  | Base | Grade Length, mi                   | -     |
| Base Free-Flow Speed (BFFS), mi/h | 75.4 | Total Ramp Density (TRD), ramps/mi | 2.17  |
| Lane Width, ft                    | 12.0 | Free-Flow Speed (FFS), mi/h        | 69.2  |
| Right-Side Lateral Clearance, ft  | 10   |                                    |       |

## Adjustment Factors

|                                      |                    |                                        |       |
|--------------------------------------|--------------------|----------------------------------------|-------|
| Driver Population                    | All Familiar       | Final Speed Adjustment Factor (SAF)    | 1.000 |
| Weather Type                         | Non-Severe Weather | Demand Adjustment Factor (DAF)         | 1.000 |
| Incident Type                        | No Incident        | Final Capacity Adjustment Factor (CAF) | 1.000 |
| Proportion of CAVs in Traffic Stream | 0                  | Capacity Adj. Factor for CAVs (CAFCAV) | 1.000 |

## Demand and Capacity

|                               |      |                                           |       |
|-------------------------------|------|-------------------------------------------|-------|
| Demand Volume (V), veh/h      | 5895 | Heavy Vehicle Adjustment Factor (fHV)     | 0.956 |
| Peak Hour Factor (PHF)        | 0.95 | Flow Rate (vp), pc/h/ln                   | 1623  |
| Total Trucks, %               | 4.63 | Capacity (c), pc/h/ln                     | 2392  |
| Single-Unit Trucks (SUT), %   | -    | Initial Adjusted Capacity (cadj), pc/h/ln | 2392  |
| Tractor-Trailers (TT), %      | -    | Final Adjusted Capacity (cadj), pc/h/ln   | 2392  |
| Passenger Car Equivalent (Et) | 2.00 | Volume-to-Capacity Ratio (v/c)            | 0.68  |

## Speed and Density

|                                          |      |                         |      |
|------------------------------------------|------|-------------------------|------|
| Lane Width Adjustment (fLW)              | 0.0  | Average Speed (S), mi/h | 67.4 |
| Right-Side Lateral Clearance Adj. (fRLC) | 0.0  | Density (D), pc/mi/ln   | 24.1 |
| Total Ramp Density Adjustment            | 6.2  | Level of Service (LOS)  | C    |
| Adjusted Free-Flow Speed (FFSadj), mi/h  | 69.2 |                         |      |