# Transportation Impact Study for the Tesla Service Center Project


Prepared for the City of Santa Rosa

Submitted by
**W-Trans**

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# Executive Summary

As proposed, the project would include the repurposing of an existing 30,496 square foot building located at 3286 Airway Drive in the City of Santa Rosa from a furniture store to a Tesla Service Center. The site would be accessible via three existing driveways, including one off Airway Drive and two off Airway Court. Additionally, the proposed project includes the construction of a parking lot for storing vehicles awaiting sale at 3304 Industrial Drive, west of the project site. Based on application of standard trip generation rates, the project would be expected to generate an average of 61 net-new trips during the morning peak hour and 79 during the evening peak hour.

The study area included the intersections of Industrial Drive/Airway Drive, Airway Court/Airway Drive, Piner Road/Airway Drive, Piner Road/Range Avenue, and Bicentennial Way/Range Avenue. Three of these intersections experienced collisions at rates greater than the statewide averages for similar facilities. The City may wish to enhance enforcement in this part of the City or conduct a DUI outreach campaign in an attempt to reduce the number of crashes at the Piner Road/Range Avenue and Bicentennial Way/Range Avenue intersections.

A review of existing facilities for pedestrians, bicyclists and transit users indicates that the project site is adequately served by existing bicycle and transit infrastructure. To improve pedestrian facilities and connectivity to the surrounding sidewalk network, a sidewalk should be installed adjacent to the project frontage on Airway Court. It is also recommended that five long-term bicycle storage spaces be provided on-site to satisfy the City's Code requirements for bicycle storage.

The project is expected to have a less-than-significant impact on VMT as it is located in an area identified by the City of Santa Rosa that is generating at least 15 percent below the countywide average.

Sight distances along Airway Court are adequate for entering and exiting movements from the site. To provide adequate sight distance along Airway Drive, 40 feet of curb should be painted red to prohibit parking and the vegetation south of the project driveway should be maintained such that trees and hanging branches are trimmed to a minimum height of seven feet.

The existing stacking space in turn pockets at the study intersections is adequate to accommodate the queues anticipated for all scenarios evaluated. Turn lanes are not warranted at any of the project access points.

The project would have a less-than-significant impact on emergency response times. Site access and on-site circulation would adequately accommodate emergency response vehicles.

Under Existing and Baseline (Existing plus Approved Projects) conditions, all study intersections operate or are expected to operate at an acceptable Level of Service (LOS) of C or better during both the a.m. and p.m. peak hours. With the addition of project-related traffic, the study intersections are expected to continue operating acceptably, generally at the same service levels as without project traffic.

The proposed parking supply of 96 on-site parking spaces would satisfy the City's Code requirements for parking. The project would also include 127 off-site parking spaces at 3304 Industrial Drive, approximately 600 feet west of the project site, for use holding vehicles prior to sale.

# Introduction

This report presents an analysis of the potential traffic impacts and adverse operational effects that would be associated with repurposing of an existing 30,496 square foot building from a furniture store to a Tesla Service Center. The project site is located at 3286 Airway Drive in the City of Santa Rosa. The traffic study was completed in accordance with the criteria established by the City and is consistent with standard traffic engineering techniques.

## Prelude

The purpose of a traffic impact study is to provide City staff and policy makers with data that they can use to make an informed decision regarding the potential transportation impacts of a proposed project, and any associated improvements that would be required to mitigate these impacts to an acceptable level under CEQA, the City's General Plan, or other policies. This report provides an analysis of those items that are identified as areas of environmental concern under the California Environmental Quality Act (CEQA) and that, if significant, require an EIR. Impacts associated with access for pedestrians, bicyclists, and to transit; the vehicle miles traveled (VMT) generated by the project; potential safety concerns such as increased queuing in dedicated turn lanes, adequacy of sight distance, need for turn lanes, and need for additional right-of-way controls; and emergency access are addressed in the context of the CEQA criteria. While no longer a part of the CEQA review process, vehicular traffic service levels at key intersections were evaluated for consistency with General Plan policies by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on anticipated travel patterns specific to the proposed project, then analyzing the effect the new traffic would be expected to have on the study intersections and need for improvements to maintain acceptable operation. Adequacy of parking is also addressed as a policy issue.

## Applied Standards and Criteria

The report is organized to provide background data that supports the various aspects of the analysis, followed by the assessment of CEQA issues and then evaluation of policy-related issues. The CEQA criteria evaluated are as follows.

Would the project:

a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?
b. Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
d. Result in inadequate emergency access?

The project was also evaluated against the City's policies, which provide guidance relative to traffic impacts for CEQA issues as well as the effects caused by traffic associated with new development. The following policies set forth by the City in Section 5.8, Transportation Goals & Policy, of the *City of Santa Rosa General Plan*, were used to assess the project.

*T-D-2* *Monitor level of service at intersections to assure that improvements or alterations to improve corridor level of service do not cause severe impacts at any single intersection.*

General interpretation of Policy T-D-2. The impact to an intersection is considered adverse if the project related and/or future trips result in:

1. The level of service (LOS) at an intersection degrading from LOS D or better to LOS E or F, OR
2. An increase in average vehicle delay of greater than 5 seconds at a signalized intersection where the current LOS is either LOS E or F.
3. Queuing impacts based on a comparative analysis between the design queue length and the available queue storage capacity. Impacts include, but are not limited to, spillback queues at project access locations (both ingress and egress), turn lanes at intersections, lane drops, spill back that impacts upstream intersections or interchange ramps.
4. Exceptions may be granted under the following conditions:
   a. Within downtown,
   b. Where attainment would result in significant degradation,
   c. Where topography or impacts makes the improvement impossible; or
   d. Where attainment would ensure loss of an area's unique character.

*T-H-3* *Require new development to provide transit improvements, where a rough proportionality to demand from the project is established. Transit improvements may include:*

- *Direct and paved pedestrian access to transit stops*
- *Bus turnouts and shelters*
- *Lane width to accommodate buses.*

General interpretation of Policy T-H-3. An impact is considered adverse if the project has the potential to disrupt existing transit operations or establishes transit facilities and equipment such that it creates a sight distance deficiency or vehicle conflict point.

*T-J* *Provide attractive and safe streets for pedestrian and bicyclists.*

General interpretation of Policy T-J. An impact is considered adverse if the project generates 20 pedestrians in any single hour at an unsignalized intersection, mid-block crossing or where no crossing has been established.

An impact is further considered significant if the project interrupts existing or proposed pedestrian, bicycle and transit facilities, path or travel, direct access resulting in excessive rerouting or creates a vehicle conflict condition which affects the safety of other roadway users.

## Project Profile

The proposed project, to be located at 3286 Airway Drive, includes the conversion of space previously used to house a furniture store to instead be a Tesla auto sales and service center. The showroom gallery would have two vehicles with energy products on display. A fleet of up to six vehicles available for test drives would be located onsite. New vehicles would be held at an offsite parking lot at 3304 Industrial Drive, approximately 600 feet west of the project site. Standard service-work is anticipated to be performed on-site in one of the 16 repair bays or the dedicated wash bay. The location of the project site is shown in Figure 1.


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**Figure 1 – Study Area and Existing Lane Configurations**

# Transportation Setting

## Study Area and Periods

The study area varies depending on the topic. For pedestrian trips it consists of all streets within a half-mile of the project site that would lie along primary routes of pedestrian travel, or those leading to nearby generators. For bicycle trips it consists of all streets within one mile of the project site that would lie along primary routes of bicycle travel. For the safety and operational analyses, it consists of the project frontage and the following intersections:

1. Industrial Drive/Airway Drive
2. Airway Court/Airway Drive
3. Piner Road/Airway Drive
4. Piner Road/Range Avenue
5. Bicentennial Way/Range Avenue

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute. Counts were obtained for the study intersections on Wednesday, February 15, 2023, while local schools were in session.

### Study Intersections

**Industrial Drive/Airway Drive** is a four-legged intersection with stop controls on all approaches.

**Airway Court/Airway Drive** is a tee intersection with stop controls on the terminating Airway Court approach. Airway Drive flows freely at the intersection.

**Piner Road/Airway Drive** is a four-legged signalized intersection with Airway Drive terminating at the intersection. A driveway to a commercial shopping center makes up the south leg of the intersection. The northbound driveway approach and southbound Airway Drive approach have split phasing. Protected left-turn phasing exists for the eastbound and westbound approaches.

**Piner Road/Range Avenue** is a signalized tee intersection with Range Avenue terminating at the intersection. The westbound Piner Road approach has protected left-turn phasing.

**Bicentennial Way/Range Avenue** is a signalized tee intersection with Bicentennial Way terminating at the intersection. The southbound Range Avenue approach has protected left-turn phasing.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

### Study Roadways

**Airway Drive** is a two-lane road that runs north-south with a posted speed limit of 35 miles per hour (mph), from Piner Road and terminating approximately 900 feet north of Hopper Avenue. Airway Drive borders the project site to the west and is defined as a Regional/Arterial Street by the City's General Plan.

**Airway Court** is a two-lane local road that runs east-west along the northern project frontage with a *prima facie* speed limit of 25 mph.

## Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is September 1, 2016, through August 31, 2021.

As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2016 Collision Data on California State Highways*, California Department of Transportation (Caltrans). These average rates statewide are for intersections in the same urban environment, with the same number of approaches (three or four), and the same controls (all-way stop, two-way stop, or traffic signal). The collision rate calculations are provided in Appendix A. While two of the study intersections had collisions rates equal to or less than the statewide averages, three exceeded the average so further review was performed.

**Table 1 – Collision Rates for the Study Intersections**

| Study Intersection | Number of Collisions (2017-2021) | Calculated Collision Rate (c/mve) | Statewide Average Collision Rate (c/mve) |
|---|---|---|---|
| 1. Industrial Dr/Airway Dr | 3 | 0.17 | 0.17 |
| 2. Airway Ct/Airway Dr | 0 | 0.00 | 0.09 |
| 3. Piner Rd/Airway Dr | 11 | **0.25** | 0.24 |
| 4. Piner Rd/Range Ave | 15 | **0.34** | 0.20 |
| 5. Bicentennial Wy/Range Ave | 10 | **0.21** | 0.20 |

Note: c/mve = collisions per million vehicles entering; **bold** text = rate is higher than statewide average

Of the 11 crashes at Piner Road/Airway Drive, four each were broadside and hit object types, two were sideswipes, and one was a rear-end. No clear trends could be identified, and the collision rate is only marginally above the statewide average, so no remedial action is suggested.

At Piner Road/Range Avenue, six collisions were hit object, four were rear-end, two each were broadside and vehicle-pedestrian collisions, and one was a sideswipe collision. Three of the hit object collisions were due to driving under the influence and two were due to improper turning. All four rear-end collisions were due to unsafe speeds. As the injury rate of 40.0 percent at this location was lower than the statewide average of 46.8 percent, the above-average collision rate does not appear to translate to a safety concern, so no remedial action is suggested.

Four out of the ten collisions at Bicentennial Way/Range Avenue were hit object and rear-end collisions and the remaining two were head-on and vehicle-pedestrian collisions. Three out of four hit object collisions were due to driving under the influence and three out of four rear-end collisions were due to unsafe speeds. While the collision rate was only marginally above the average, 60.0 percent of crashes resulted in injuries compared to 46.8 percent for similar intersections statewide, indicating a potential safety concern.

For both Piner Road/Range Avenue and Bicentennial Way/Range Avenue unsafe speeds and driving under the influence were contributing factors for the rear-end and hit object collisions. The City may wish to enhance enforcement in this part of the City or conduct a DUI outreach campaign in an attempt to reduce the number of crashes.

# Project Data

The project consists of the re-use of an existing building that previously housed a furniture store to accommodate a Tesla Service Center. The proposed project site plan is shown in Figure 2.

## Trip Generation

The anticipated trip generations for most recent site use as well as the proposed project were estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11th Edition, 2021, for Furniture Store (LU #890), and Automobile Care Center (LU #942) as the descriptions for these land uses most closely match the prior use and proposed project. Based on application of these rates, the proposed project is expected to generate an average of 69 a.m. peak hour trips and 95 trips during the p.m. peak hour. Compared to the furniture store that previously occupied the space, this is an increase of 61 a.m. peak hour trips and 79 p.m. peak hour trips. These results are summarized in Table 2.

**Table 2 – Trip Generation Summary**

| Land Use | Units | Daily | | AM Peak Hour | | | | PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rate | Trips | Rate | Trips | In | Out | Rate | Trips | In | Out |
| **Prior Use** | | | | | | | | | | | |
| Furniture Store | 30.496 ksf | 6.32 | 192 | 0.26 | 8 | 6 | 2 | 0.52 | 16 | 7 | 9 |
| **Proposed** | | | | | | | | | | | |
| Auto Service Center | 30.496 ksf | n/a | n/a | 2.25 | 69 | 45 | 24 | 3.11 | 95 | 46 | 49 |
| **Total** | | | | | **61** | **39** | **22** | | **79** | **39** | **40** |

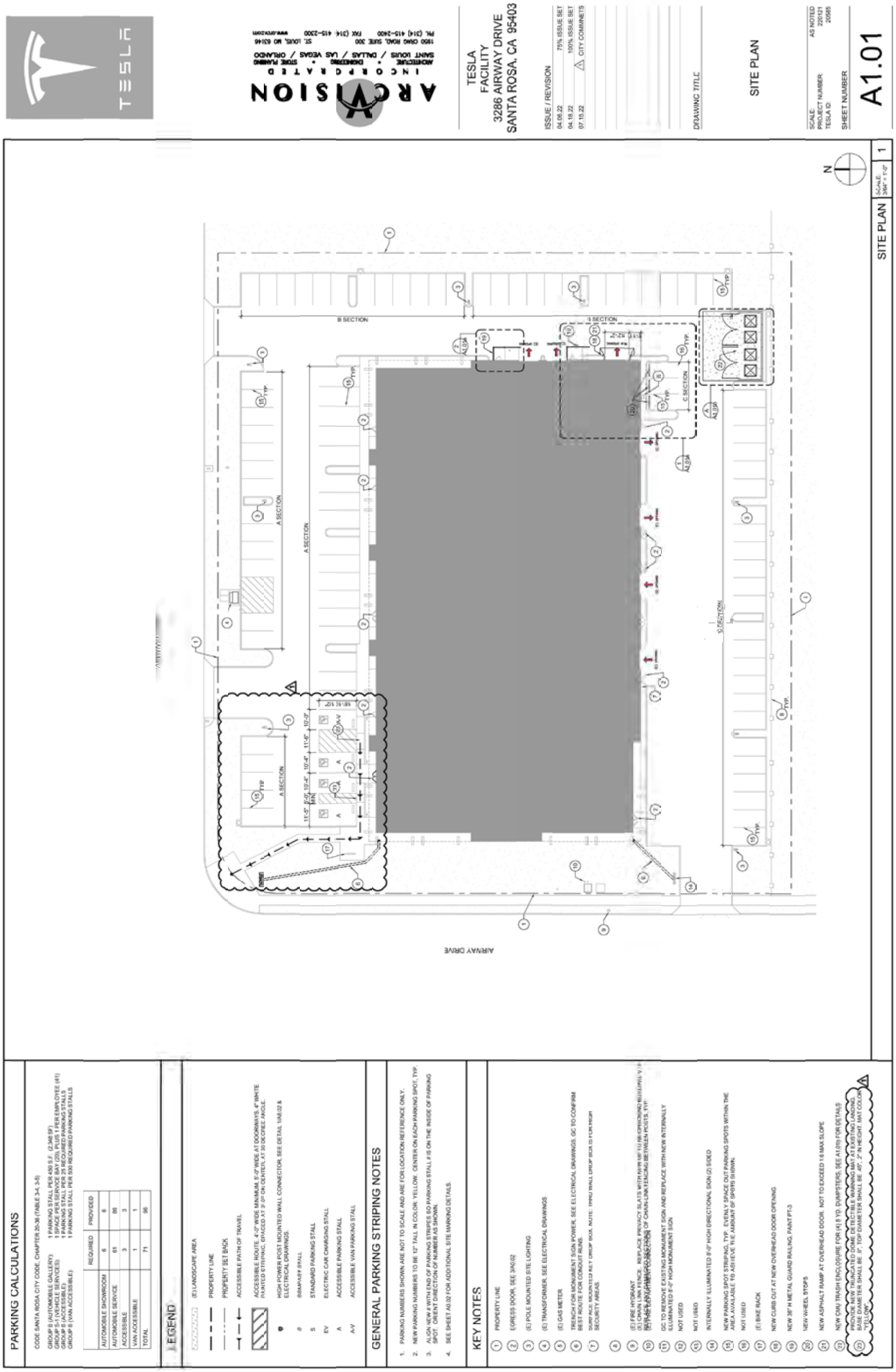
Note: ksf = 1,000 square feet

## Trip Distribution

The pattern used to allocate new project trips to the street network was determined by reviewing existing turning movements at the study intersections as well as knowledge of the local road system. The assumptions shown in Table 3 were applied.

**Table 3 – Trip Distribution Assumptions**

| Route | Percent |
|---|---|
| US 101 South of Mendocino OC | 50% |
| US 101 North of Hopper Ave | 15% |
| Hopper Ave West of Airway Dr | 5% |
| Piner Rd West of Airway Dr | 15% |
| Mendocino OC East of US 101 | 15% |
| **TOTAL** | **100%** |




Source: ArcVision Incorperated 3/28

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**Transportation Impact Study for the Tesla Service Center Project**

# Figure 2 – Site Plan

# Circulation System

This section addresses the first transportation bullet point on the CEQA checklist, which relates to the potential for a project to conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

## Pedestrian Facilities

### Existing and Planned Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians in the vicinity of the proposed project site. Sidewalks exist along the major nearby streets, but gaps exist along Airway Court near the proposed project entrance. These existing gaps impact convenient and continuous access for pedestrians and present safety concerns in those locations where appropriate pedestrian infrastructure would address potential conflict points.

- **Airway Drive** – Sidewalks are provided on both sides of Airway Drive within the vicinity of the proposed project site. Curb ramps and crosswalks at side street approaches are generally provided, though no crosswalk is striped across Airway Court at Airway Drive. Lighting is provided by overhead streetlights located on both sides of the street.
- **Airway Court** – Sidewalks are provided on the north side of Airway Court, terminating approximately 175 feet east of Airway Drive. Sidewalks are not provided along the south side of the street, including along the project frontage.
- **Piner Road** – Continuous sidewalks are provided on both sides of Piner Road with curb ramps and crosswalks provided at side street approaches. There are streetlights along both sides of the street.
- **Hopper Avenue** – Continuous sidewalks are provided on both sides of Hopper Avenue. Curb ramps and crosswalks are provided at side street approaches. Lighting is provided by overhead streetlights.
- **Class I Multi-Use paths** – The Piner Creek Trial and Russel Creek Trail are planned future facilities in the project vicinity according to the *City of Santa Rosa Bicycle and Pedestrian Master Plan, Update 2018*.

### Pedestrian Safety

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue for pedestrians. Collision records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports were reviewed for the most current five-year period available previously stated. During the five-year study period there were three reported collisions involving pedestrians at the study intersections. Two occurred at Piner Road/Range Avenue and one occurred at Bicentennial Way/Range Avenue. All three collisions were reported as being the fault of the pedestrian. Therefore, no remedial actions are suggested.

### Project Impacts on Pedestrian Facilities

Given the proximity of commercial and residential uses near the site as well as the planned use of off-site parking to store vehicles, it is reasonable to assume that some project patrons and employees will want to walk, bicycle, and/or use transit to reach the site. An existing sidewalk connection is provided from the northwest corner of the project building to the existing sidewalk at the southeast corner of Airway Court/ Airway Drive.

**Project Site** – Sidewalks exist along the surrounding streets but not along the project frontage on Airway Court.

**Finding** – Pedestrian facilities serving the project site are inadequate as a gap would remain along the project's Airway Court frontage.

**Recommendation** – Sidewalk should be installed along the project site's Airway Court frontage to provide a full and connected network.

# Bicycle Facilities

## Existing and Planned Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2020, classifies bikeways into four categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

In the project area, Class II bike lanes exist on Piner Road, Range Avenue, and Bicentennial Way and extensions are proposed along Piner Road and Range Avenue. Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area. Table 4 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *City of Santa Rosa Bicycle & Pedestrian Master Plan,* 2019.

**Table 4 – Bicycle Facility Summary**

| Status<br>Facility | Class | Length (miles) | Begin Point | End Point |
|---|---|---|---|---|
| **Existing** | | | | |
| Piner Rd | II | 2.10 | Fulton Rd | Range Rd |
| Range Ave | II | 0.69 | Russell Ave | Guerneville Rd |
| Bicentennial Wy | II | 0.50 | Range Ave | Mendocino Ave |
| Hopper Ave | II | 0.63 | Coffey Ln | US-101 SB Ramps |
| **Planned** | | | | |
| Piner Creek Trail | I | 1.56 | Marlow Rd | Hopper Rd |
| Russel Creek Trail | I | 0.64 | Piner Creek Trail | Range Ave |
| Piner Rd | II | 0.09 | Range Ave | Cleveland Ave |
| Range Ave | II | 0.20 | Piner Rd | Russell Ave |

Source: *City of Santa Rosa Bicycle & Pedestrian Master Plan,* City of Santa Rosa, 2018

## Bicyclist Safety

Collision records for the study area were reviewed to determine if there have been any bicyclist-involved crashes. During the five-year study period previously stated, there was one reported collision involving a bicyclist at Piner Road/Airway Drive. This collision was due to driving at unsafe speeds. Since there was only one crash involving a bicyclist and there are bike lanes on Piner Road, no remedial action is suggested.

**Finding** – Existing bicycle facilities, together with shared use of minor streets provide adequate access for bicyclists.

## Bicycle Storage

Based on Section 20-36.040 of Santa Rosa's Municipal Code, a minimum of one bicycle space for every 9,000 square feet of covered building area is required for Auto and Vehicle Sales and Rental land uses, and one bicycle space is required per every 10 full time employees for Vehicle Services – Minor and Major Repair/Body Work. Therefore, six total bicycle storage spaces would be required, one for the 2,348 square foot building used for Auto and Vehicle Sales and Rental and five for the 41 anticipated number of employees for Vehicle Services. Section 20-36.090 of the Code states "when part or all of the bicycle parking spaces required for a nonresidential land use is based on the number of employees, that portion shall be provided in long-term bicycle parking facilities." Therefore, the five bicycle spaces that are required for Vehicle Services must be long-term spaces.

The proposed project makes use of an existing bicycle rack at the northwest corner of the site. The bicycle rack provides space for six bicycles in an outdoor area adjacent to the building. This bicycle rack would satisfy the requirements for short-term bicycle parking on-site. However, no long-term bicycle parking is provided for employees. According to Section 20-36.090 of the City's Municipal Code, long-term bicycle parking facilities would protect the entire bicycle from vandalism, theft and weather and could be in the form of bicycle lockers or restricted-access bicycle enclosures. It is recommended that at least five long-term bicycle storage spaces be provided at the site.

**Finding** – A minimum of five long-term bicycle parking spaces and one short-term space must be provided on-site. The existing bicycle rack would satisfy the short-term bicycle parking requirement.

**Recommendation** – To satisfy the Santa Rosa Municipal Code, it is recommended that five long-term bicycle storage spaces be provided on-site.

# Transit Facilities

## Existing Transit Facilities

The Santa Rosa CityBus provides fixed route bus service in Santa Rosa. CityBus Route 10 provides loop service to destinations throughout the City and stops on Piner Road and Airway Drive, approximately 0.2 miles from the project site.

The Golden Gate Bridge Highway & Transportation District provide a regional and commute bus route to San Francisco as well as a local route in Santa Rosa. These routes stop near Piner Road and Industrial Drive, approximately 0.3 miles from the project site.

Existing transit routes and their operation are summarized in Table 5.

| Table 5 – Transit Routes | | | | | |
|---|---|---|---|---|---|
| **Transit Agency Route** | **Distance to Stop (mi)**[1] | **Service** | | | **Connection** |
| | | **Days of Operation** | **Time** | **Frequency** | |
| **Santa Rosa CityBus** | | | | | |
| Route #10 | 0.2 | Mon – Fri<br>Sat<br>Sun | 7:10 a.m. – 8:10 p.m.<br>8:16 a.m. – 5:16 p.m.<br>10:16 a.m. – 4:16 p.m. | 1 hour<br>1 hour<br>1 hour | Piner/Industrial to Coddingtown Mall & Santa Rosa Plaza/ Downtown |
| **Golden Gate Transit** | | | | | |
| Route #101 | 0.3 | Mon – Fri<br>Sat – Sun | 3:52 a.m. – 9:56 p.m.<br>3:47 a.m. – 9:53 p.m. | 1 hour | Santa Rosa to San Francisco |
| Route #172 | 0.3 | Mon – Fri | 4:12 a.m. – 7:12 p.m. | 20 min – 1 hour | Santa Rosa to San Francisco |

Note: [1] Defined as the shortest walking distance between the project site and the nearest bus stop
Source: www.srcity.org, www.goldengate.org

Bicycles can be carried on all Santa Rosa CityBus routes. Bike rack space is on a first-come, first-served basis with a limit of two bicycles per bus at any time. Bicyclists must be able to load and unload their own bicycle and use the racks at their own risk. Additional bicycles are allowed inside if there is room in the wheelchair area.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. The City of Santa Rosa Paratransit is designed to serve the needs of individuals with disabilities within Santa Rosa. This service is provided within three-quarters of a mile from existing CityBus routes.

## Impact on Transit Facilities

Transit demand would be spread out across several routes and headways, so the proposed project would be expected to have an imperceptible impact on local transit service. Existing transit routes are adequate to accommodate project-generated transit trips. The CityBus stop and Golden Gate Transit stops are within an acceptable walking distance of the site.

**Finding** – Transit facilities serving the project site are adequate.

**Significance Finding** – The proposed project would be expected to have a less-than-significant impact on access for alternative mode users except that pedestrian access is incomplete.

**Mitigation** – To comply with City policies and plans, a sidewalk should be provided on the project site's Airway Court frontage. This would reduce the impact to less-than-significant.

# Vehicle Miles Traveled (VMT)

The potential for the project to conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b) was evaluated based the project's anticipated Vehicle Miles Traveled (VMT).

The City of Santa Rosa issued guidelines for vehicle-miles-travelled (VMT) analysis, as outlined in *Vehicle Miles Traveled (VMT) Guidelines Final Draft*, dated June 5, 2020. Many of the VMT significance criteria in these guidelines are consistent with guidance provided by the California Governor's Office of Planning and Research (OPR) in the publication *Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory*, 2018. Under these guidelines a commercial project generating vehicle travel that is 15 percent or more below the existing countywide VMT per employee may be considered to have a less-than-significant impact on VMT. The City's guidance includes a screening map that shows the project site to be within a screened area. It is therefore reasonable to conclude that the project would be presumed to have a less-than-significant VMT impact.

**Significance Finding** – The proposed project is within an area generating VMT that is at least 15 percent below the countywide average and can therefore be presumed to have a less-than-significant impact.

# Safety Issues

The potential for the project to impact safety was evaluated in terms of the adequacy of sight distance and need for turn lanes at the project accesses as well as the adequacy of stacking space in dedicated turn lanes at the study intersections to accommodate additional queuing due to adding project-generated trips and need for additional right-of-way controls. This section addresses the third transportation bullet on the CEQA checklist which is whether or not the project would substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

## Site Access

The project site would be accessible via three existing driveways: one on Airway Drive approximately 240 feet south of Airway Court and two on Airway Court approximately 100 feet and 300 feet east of Airway Drive, respectively. Along the project frontage, both Airway Drive and Airway Court have one lane per direction.

### Sight Distance

Sight distance along Airway Drive and Airway Court at the project driveways was evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distances for minor street approaches that are a driveway are based on stopping sight distance, with the approach travel speed used as the basis for determining the recommended sight distance. Additionally, the stopping sight distance needed for a following driver to stop if there is a vehicle waiting to turn into a side street or driveway is evaluated based on stopping sight distance criterion and the approach speed on the major street.

Field measurements were obtained at the proposed driveways on Airway Court and Airway Drive. Based on a posted speed limit of 35 mph on Airway Drive, the minimum stopping sight distance needed is 250 feet. According to field measurements, sight distances to and from the project driveway on Airway Drive exceed 300 feet for southbound approaches and 150 feet for northbound approaches. Sights lines south of the project driveway are blocked by trees and parked vehicles south of the project site. To improve sight distance, parking should be prohibited within 40 feet south of the project driveway via a painted red curb. It is also recommended that the vegetation south of the driveway be trimmed per guidance provided by the Federal Highway Administration in its guide on *Vegetation Control for Safety*, 2007, which recommends that bushes and shrubs be kept under three feet in height, and that trees and hanging branches be trimmed to a minimum height of seven feet.

Based on the *prima facie* speed limit of 25 mph on Airway Court, the minimum sight distance needed is 150 feet. Both project driveways on Airway Court have sight distances over 200 feet in both directions, satisfying the minimum sight distance requirement.

**Finding** – Stopping sight distances at the project driveways on Airway Court are adequate to meet the applied criteria for entering and exiting movements. Stopping sight distance at the project driveway on Airway Drive is not adequate for northbound approaches due to trees and parked vehicles blocking sight lines.

**Recommendation –** South of the project driveway on Airway Drive, 40 feet of curb should be painted red to prohibit parking. The vegetation south of the same project driveway should be maintained such that trees and hanging branches are trimmed to a minimum height of seven feet.

### Access Analysis

*Left-Turn Lane Warrants*

The need for a left-turn lane on Airway Drive at Airway Court and at the approaches to the three project driveways was evaluated based on criteria contained in the *Intersection Channelization Design Guide*, National Cooperative

Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as an update of the methodology developed by the Washington State Department of Transportation and published in the *Method For Prioritizing Intersection Improvements*, January 1997. The NCHRP report references a methodology developed by M. D. Harmelink that includes equations that can be applied to expected or actual traffic volumes to determine the need for a left-turn pocket based on safety issues.

Under Baseline plus Project volumes, which represent worst-case conditions, a left-turn lane is not warranted on Airway Drive at Airway Court or any of the project driveways during either of the peak periods evaluated. Copies of the turn lane warrant spreadsheets are provided in Appendix B.

## Queuing

The City prescribes thresholds of significance regarding queue lengths as part of the general interpretation of Policy T-D-2. Queuing impacts are to be evaluated based on a comparative analysis between the design queue length and the available queue storage capacity. Impacts include, but are not limited to, spillback queue at project access locations (both ingress and egress), turn lanes at intersections, lane drops, and spillback that impacts upstream intersections or interchange ramps.

Under each scenario, the projected maximum queues in left-turn pockets at the signalized study intersections were determined using Synchro queueing reports. Summarized in Table 6 are the predicted 95$^{th}$ percentile queue lengths for all dedicated turn lanes at the three signalized intersections. It is noted that only those locations where queuing can extend beyond the available storage capacity were evaluated. Where left-turn pockets transition into two-way left-turn lanes the storage capacity extends substantially beyond the turn pocket, so this condition was not evaluated. Similarly, on eastbound Piner Road approaching Range Avenue the right lane becomes a right-turn lane, so queuing was not checked. Copies of the Synchro queuing reports are contained in Appendix C.

**Table 6 – Maximum Left-Turn Queues in Dedicated Turn Lanes**

| Study Intersection Approach | Pocket Length (feet) | Maximum Queues | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | AM Peak Hour | | | | PM Peak Hour | | | |
| | | E | E+P | B | B+P | E | E+P | B | B+P |
| 3. Piner Rd/Airway Dr | | | | | | | | | |
| Southbound Right Turn | 160 | 22 | 24 | 23 | 25 | 53 | 53 | 52 | 54 |
| 4. Piner Rd/Range Ave | | | | | | | | | |
| Northbound Right Turn | 150 | 29 | 29 | 29 | 29 | 12 | 12 | 12 | 12 |
| 5. Bicentennial Wy/Range Ave | | | | | | | | | |
| Northbound Right Turn | 80 | **152** | **152** | **152** | **152** | 74 | 77 | 75 | 77 |

Notes: E = existing conditions; E+P = existing plus project conditions; B = baseline conditions; B+P = baseline plus project conditions; **Bold** text = queue length exceeds available storage

Turn storage is expected to exceed the existing capacity of 80 feet for northbound right turns at Bicentennial Way/Range Ave during the a.m. peak hour for all scenarios; however, the queues already exceed available storage without project trips so the proposed project would not *cause* the condition. Further, there is no change to the projected queue length, indicating that the project would have no measurable effect on this queue.

**Finding** – The project does not cause any queues to exceed available storage, so the impact is considered less-than-significant.

**Significance Finding** – The proposed project would be expected to have a less-than-significant impact as it would not introduce any new hazards.

# Emergency Access

The final transportation bullet on the CEQA checklist requires an evaluation as to whether the project would result in inadequate emergency access or not.

## Adequacy of Site Access

The project site would be accessible via two driveways on Airway Court and one driveway on Airway Drive.

According to the City of Santa Rosa's Municipal Code, Section 20-36.080, the minimum width of driveways is 12 feet for one-way traffic and 20 feet for two-way traffic. The Santa Rosa Fire Prevention Bureau Standards specify minimum roadway turning radii of 20 feet for the inside turn radius and 40 feet for the outside turn radius. Interior drive aisles and parking stalls appear to be in accordance with City design standards. Site access and circulation is therefore expected to function acceptably for emergency response vehicles.

It should also be noted that the project site has three vehicular access points. Therefore, should one access point be compromised during an emergency, responders would be able to access the site using one of the other two access points.

## Off-Site Impacts

While the project would be expected to result in slight increases in delay for traffic at the various study intersections as detailed in the Capacity Analysis section of this report, emergency response vehicles can claim the right-of-way by using their lights and sirens; therefore, the project would be expected to have a nominal effect on emergency response times.

**Significance Finding** – The project would have a less-than-significant impact on emergency response as site access and on-site circulation would be adequate for fire trucks and the project would not be expected to impact emergency response times.

# Capacity Analysis

## Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 6th Edition. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the intersection of Airway Drive/Airway Court, which has side street stop controls, were analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The study intersection at Airway Drive/Industrial Drive has stop signs on all approaches so was analyzed using the "All-Way Stop-Controlled" intersection methodology from the HCM. This methodology evaluates delay for each approach based on turning movements, opposing and conflicting traffic volumes, and the number of lanes. Average vehicle delay is computed for the intersection as a whole and is then related to a Level of Service.

The remaining study intersections are controlled by a traffic signal and were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using signal timing obtained from the City of Santa Rosa.

The ranges of delay associated with the various levels of service are indicated in Table 7.

| Table 7 – Intersection Level of Service Criteria | | | |
|---|---|---|---|
| **LOS** | **Two-Way Stop-Controlled** | **All-Way Stop-Controlled** | **Signalized** |
| A | Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street. | Delay of 0 to 10 seconds. Upon stopping, drivers are immediately able to proceed. | Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all. |
| B | Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street. | Delay of 10 to 15 seconds. Drivers may wait for one or two vehicles to clear the intersection before proceeding from a stop. | Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop. |
| C | Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street. | Delay of 15 to 25 seconds. Drivers will enter a queue of one or two vehicles on the same approach, and wait for vehicle to clear from one or more approaches prior to entering the intersection. | Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping. |
| D | Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street. | Delay of 25 to 35 seconds. Queues of more than two vehicles are encountered on one or more approaches. | Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop. |
| E | Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street. | Delay of 35 to 50 seconds. Longer queues are encountered on more than one approach to the intersection. | Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive. |
| F | Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues. | Delay of more than 50 seconds. Drivers enter long queues on all approaches. | Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection. |

Reference: *Highway Capacity Manual,* Transportation Research Board, 2016

## Traffic Operation Standards

Section 5.8 Transportation Goals & Policy of the City of Santa Rosa General Plan provides the following policies relative to traffic operation.

*T-D-1* *Maintain a Level of Service (LOS) D or better along all major corridors. Exceptions to meeting the standard include:*

- *Within downtown;*
- *Where attainment would result in significant degradation;*
- *Where topography or impacts makes the improvement impossible; or*
- *Where attainment would ensure loss of an area's unique character.*

*The LOS is to be calculated using the average traffic demand over the highest 60-minute period.*

*T-D-2* *Monitor level of service at intersections to assure that improvements or alterations to improve corridor level of service do not cause severe impacts at any single intersection.*

General interpretation of Policy T-D-2. The impact to an intersection is considered adverse if the project related and/or future trips result in:

1. The level of service (LOS) at an intersection degrading from LOS D or better to LOS E or F; OR
2. An increase in average vehicle delay of greater than 5 seconds at a signalized intersection where the current LOS is either LOS E or F.
3. Queuing impacts based on a comparative analysis between the design queue length and the available queue storage capacity. Impacts include, but are not limited to, spillback queue at project access locations (both ingress and egress), turn lanes at intersections, lane drops, spill back that impacts upstream intersections or interchange ramps.
4. Exceptions may be granted under the following conditions:
    a. Within downtown;
    b. Where attainment would result in significant degradation;
    c. Where topography or impacts makes the improvement impossible; or
    d. Where attainment would ensure loss of an area's unique character.

## Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected on Wednesday, February 15, 2023, while local schools were in session. Under existing volumes, all intersections operate acceptably at LOS C or better. A summary of the intersection Level of Service calculations is contained in Table 8. The existing traffic volumes are shown in Figure 3, and copies of the calculations are provided in Appendix D.

**Table 8 – Existing Peak Hour Intersection Levels of Service**

| Study Intersection | AM Peak | | PM Peak | |
|---|---|---|---|---|
| ***Approach*** | **Delay** | **LOS** | **Delay** | **LOS** |
| 1. Industrial Dr/Airway Dr | 9.6 | A | 12.1 | B |
| 2. Airway Ct/Airway Dr | 0.7 | A | 3.0 | A |
| *Westbound (Airway Dr) Approach* | *10.5* | *B* | *14.6* | *B* |
| 3. Piner Rd/Airway Dr | 7.9 | A | 11.0 | B |
| 4. Piner Rd/Range Ave | 21.6 | C | 23.7 | C |
| 5. Bicentennial Wy/Range Ave | 12.8 | B | 13.8 | B |

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

## Baseline Conditions

The Baseline Conditions scenario provides an evaluation of traffic operation in the short-term, considering traffic generated from nearby projects that are already approved or pending approval by the City but not yet constructed. Short-term operating conditions were determined with traffic from the following projects in the study area added to existing volumes.

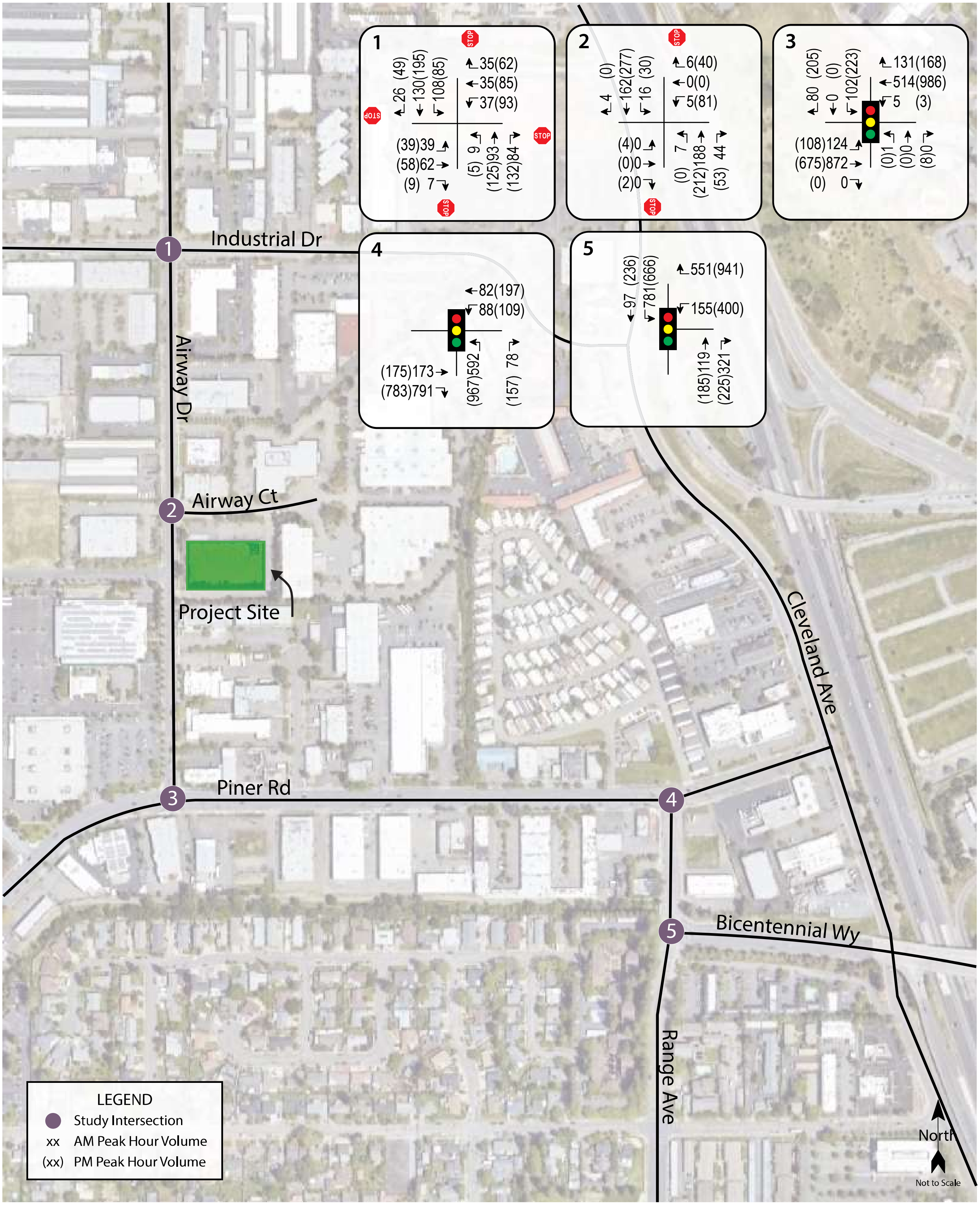


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**Figure 3 – Existing Traffic Volumes**

W-Trans

- **LMC Santa Rosa** and 3575 Mendocino Avenue are proposed multi-family housing developments that would consist of 260 units of multi-family market-rate dwellings and 162 affordable senior dwelling units. According to the "Addendum to the 3575 Mendocino Avenue Traffic Impact Analysis", W-Trans, April 26, 2022, these projects would be expected to generate 1,705 daily trips, with 128 of these during the a.m. peak hour and 142 during the p.m. peak hour. After removing the trips generated from the previous land use as shown in the *3575 Mendocino Avenue Traffic Impact Analysis*, W-Trans, September 22, 2020, the project would be expected to generate 1,109 daily trips, with 96 of these during the a.m. peak hour and 100 during the p.m. peak hour. The trip distribution assumptions applied in the traffic study were applied in this analysis.
- **Fountaingrove Inn Multi-Family Rental Housing Project** at 3586 Mendocino Avenue is a proposed multi-family housing project that would consist of 239 multi-family dwelling units. Based on the "Updated Focused Traffic Study for the Fountaingrove Inn Redevelopment Project", W-Trans, March 8, 2021, it would have the potential to generate 78 trips per day, including 27 during the morning peak hour and 11 during the evening peak hour. The trip distribution assumptions applied from the traffic study were applied in this analysis.
- **3737 Airway Drive** is a 90-unit senior care facility. Based on application of *Trip Generation Manual*, 11th Edition rates for Continuing Care Retirement Community (LU #255), the project would have an expected trip generation of 222 daily trips, with 14 trips during the a.m. peak hour and 17 trips during the p.m. peak hour. The trip distribution assumptions for the Tesla Service Center were applied for this project analysis.
- **Residence Inn by Marriot** is a 114-room hotel to be located at Round Barn Circle in the City of Santa Rosa. According to the *Residence Inn Traffic Impact Study Final Report*, W-Trans, August 9, 2018, it would be expected to generate an average of 931 net new trips per day, including 58 p.m. peak hour trips. The a.m. peak hour trips were not included in the traffic study, so application of rates for Hotel (LU #310) were applied. According to these rates, the project would be expected to generate 52 a.m. peak hour trips. The trip distribution assumptions applied in the traffic study were applied in this analysis.

Under Baseline Conditions that include trips from these four projects, all study intersections would be expected to operate acceptably at LOS C or better. These results are summarized in Table 9, and Baseline volumes are shown in Figure 4.

**Table 9 – Baseline Peak Hour Intersection Levels of Service**

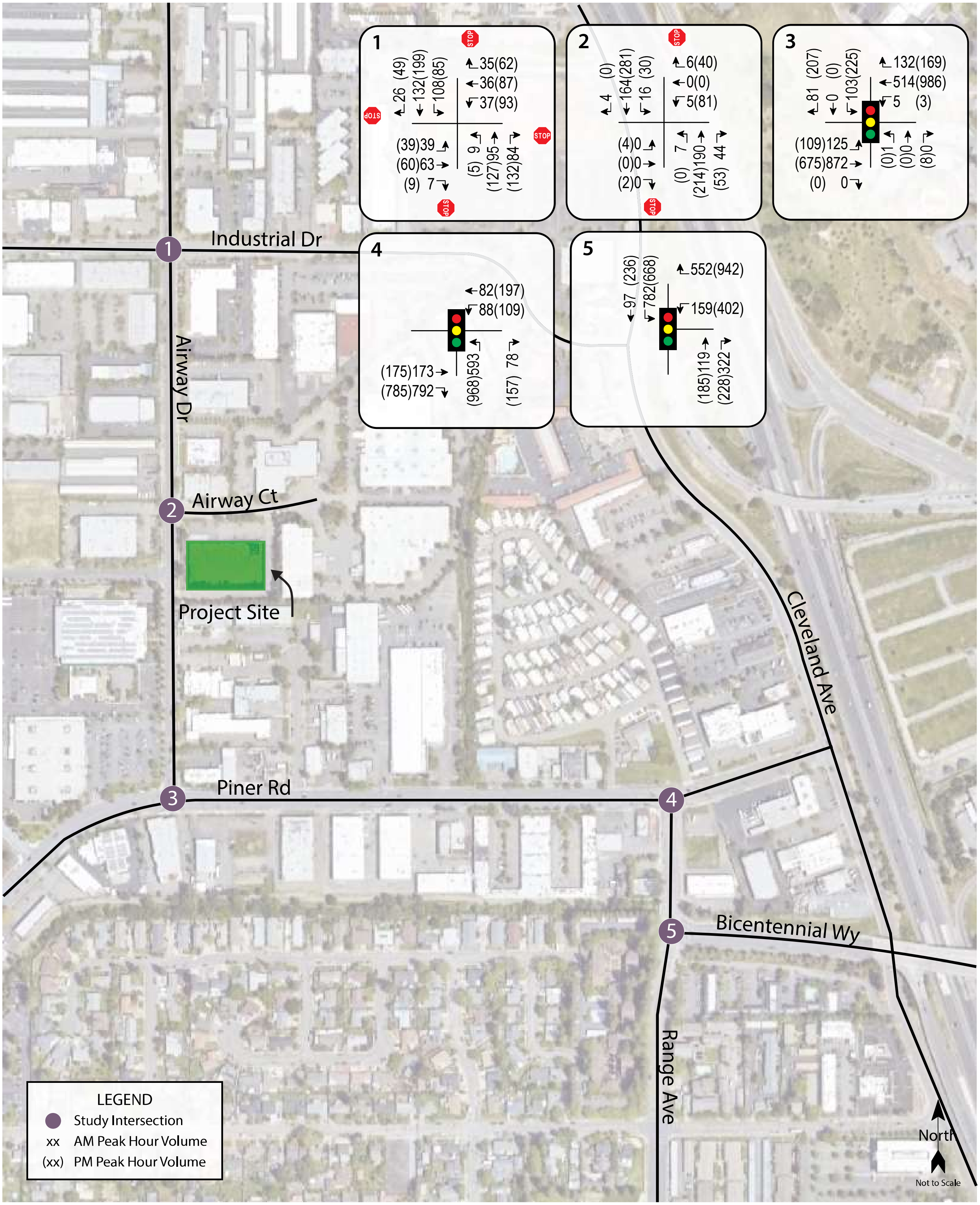
| **Study Intersection** | **AM Peak** | | **PM Peak** | |
|---|---|---|---|---|
| ***Approach*** | **Delay** | **LOS** | **Delay** | **LOS** |
| 1. Industrial Dr/Airway Dr | 9.7 | A | 12.2 | B |
| 2. Airway Ct/Airway Dr | 0.7 | A | 3.0 | A |
| *Westbound (Airway Dr) Approach* | *10.6* | *B* | *14.7* | *B* |
| 3. Piner Rd/Airway Dr | 7.9 | A | 11.1 | B |
| 4. Piner Rd/Range Ave | 21.6 | C | 23.7 | C |
| 5. Bicentennial Wy/Range Ave | 12.8 | B | 13.9 | B |

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

# Project Conditions

## Existing plus Project Conditions

Upon the addition of project-related traffic to the existing volumes, the study intersections are expected to operate acceptably and, with only one exception, at the same Levels of Service as without project trips. Project traffic volumes are shown in Figure 5 and Existing plus Project volumes in Figure 6. These results are summarized in Table 10.

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# Figure 4 – Baseline Traffic Volumes

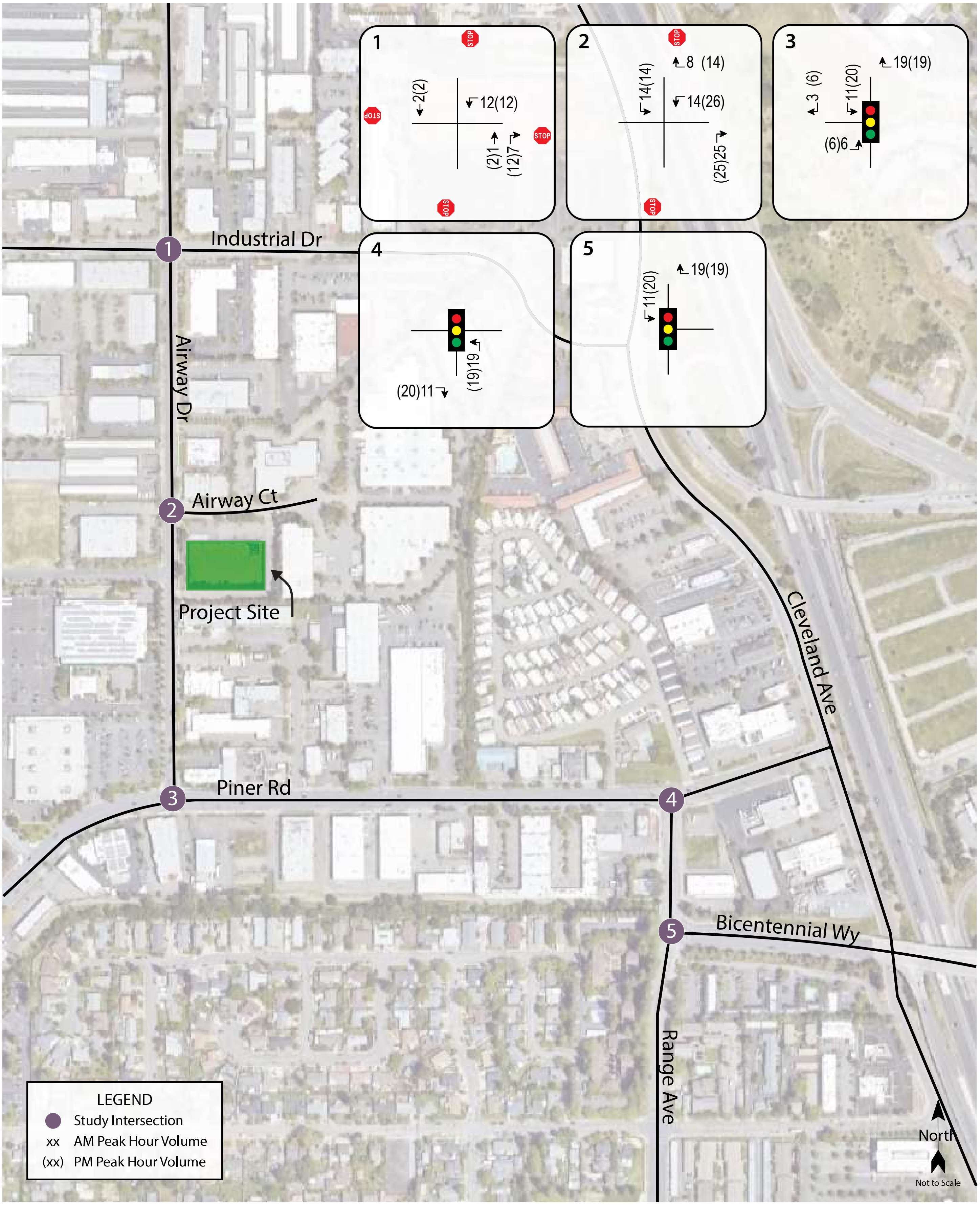


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**Figure 5 – Project Traffic Volumes**

W-Trans

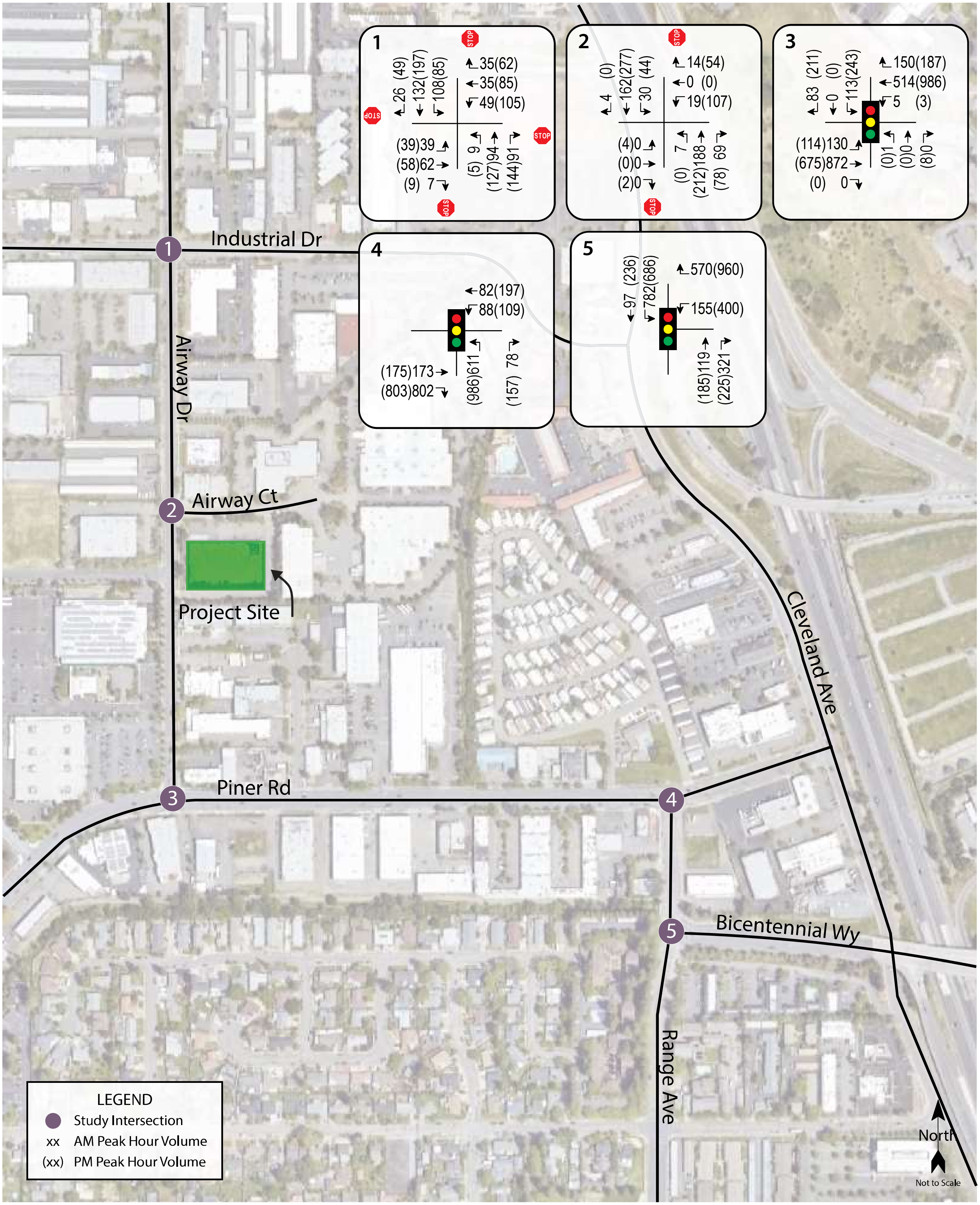


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**Figure 6 – Existing plus Project Traffic Volumes**

| Table 10 – Existing and Existing plus Project Peak Hour Intersection Levels of Service | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Study Intersection** | **Existing Conditions** | | | | **Existing plus Project** | | | |
| ***Approach*** | **AM Peak** | | **PM Peak** | | **AM Peak** | | **PM Peak** | |
| | **Delay** | **LOS** | **Delay** | **LOS** | **Delay** | **LOS** | **Delay** | **LOS** |
| 1. Industrial Dr/Airway Dr | 9.6 | A | 12.1 | B | 9.8 | A | 12.5 | B |
| 2. Airway Ct/Airway Dr | 0.7 | A | 3.0 | A | 1.3 | A | 4.0 | A |
| *Westbound (Airway Dr) Approach* | *10.5* | *B* | *14.6* | *B* | *11.4* | *B* | *16.7* | *C* |
| 3. Piner Rd/Airway Dr | 7.9 | A | 11.0 | B | 8.1 | A | 11.6 | B |
| 4. Piner Rd/Range Ave | 21.6 | C | 23.7 | C | 21.6 | C | 23.6 | C |
| 5. Bicentennial Wy/Range Ave | 12.8 | B | 13.8 | B | 12.7 | B | 13.8 | B |

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

It should be noted that with the addition of project-related traffic volumes, average delay at Piner Road/ Range Avenue decreases during the p.m. peak hour and average delay at Bicentennial Way/Range Avenue decreases during the a.m. peak hour. While this is counter-intuitive, this condition occurs when a project adds trips to movements that are currently underutilized or have delays that are below the intersection average, resulting in a better balance between approaches and lower overall average delay. At Piner Road/ Range Avenue, the project adds traffic predominantly to the eastbound right-turn movements and at Bicentennial Way/Range Avenue, the project adds traffic predominantly to the southbound left-turn and westbound right-turn movements. These movements have average delays lower than the average for the intersections as a whole, which results in a slight reduction in the overall average delays.

The conclusion could incorrectly be drawn that the project actually improves operation based on this data alone; however, it is more appropriate to conclude that the project trips are expected to make use of excess capacity, so drivers will experience little, if any, change in conditions as a result of the project.

**Finding** – The study intersections are expected to continue operating acceptably at the same overall levels of service upon the addition of project-generated traffic.

## Baseline plus Project Conditions

With project-related traffic added to baseline volumes the study intersections are expected to operate acceptably at the same Levels of Service as without the project, with the same one exception. Baseline plus Project volumes are shown in Figure 7, and these results are summarized in Table 11.

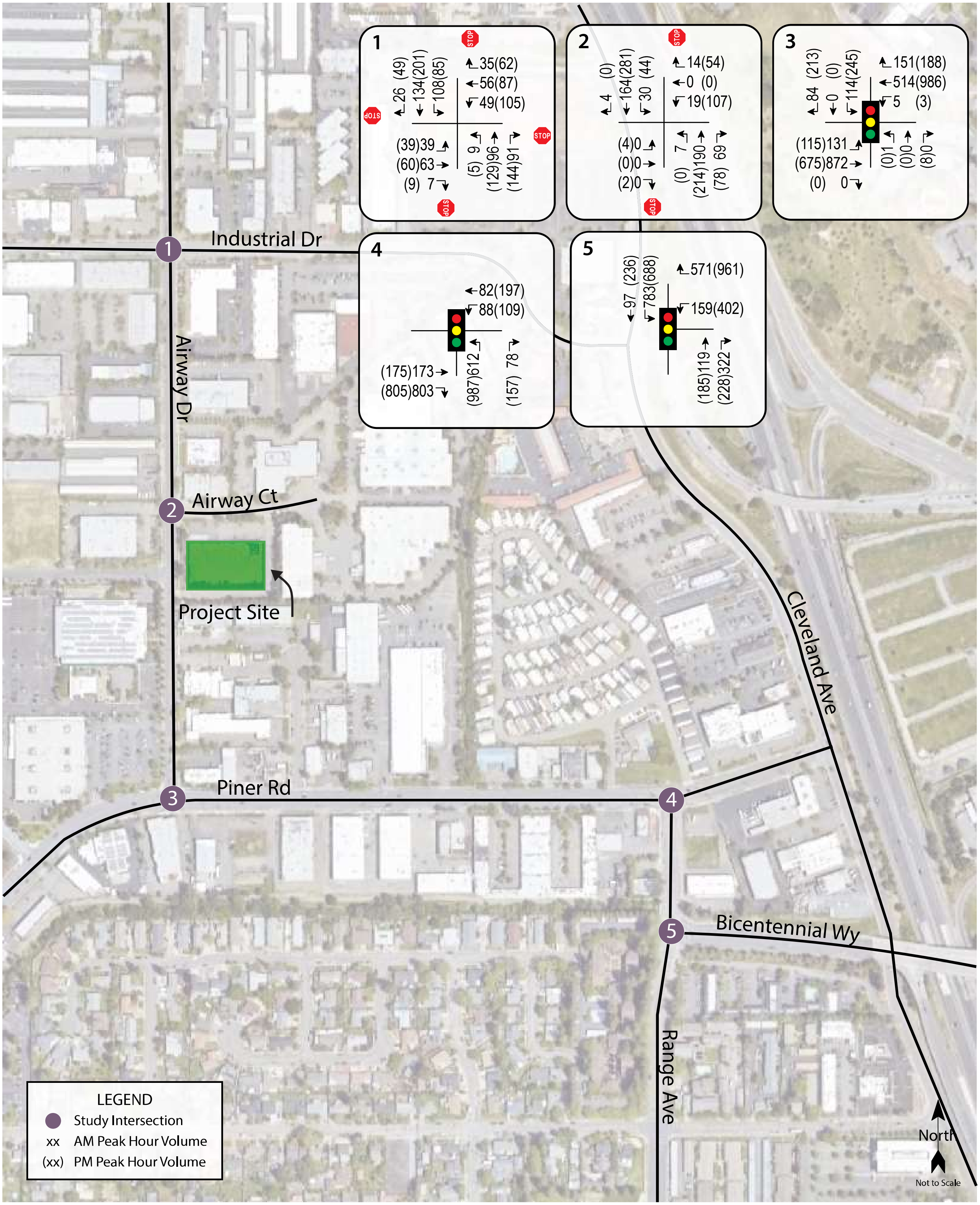


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**Figure 7 – Baseline plus Project Traffic Volumes**

| Table 11 – Baseline and Baseline plus Project Peak Hour Intersection Levels of Service | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Study Intersection** | **Baseline Conditions** | | | | **Baseline plus Project** | | | |
| ***Approach*** | **AM Peak** | | **PM Peak** | | **AM Peak** | | **PM Peak** | |
| | **Delay** | **LOS** | **Delay** | **LOS** | **Delay** | **LOS** | **Delay** | **LOS** |
| 1. Industrial Dr/Airway Dr | 9.7 | A | 12.2 | B | 9.8 | A | 12.6 | B |
| 2. Airway Ct/Airway Dr | 0.7 | A | 3.0 | A | 1.3 | A | 4.0 | A |
| *Westbound (Airway Dr) Approach* | *10.6* | *B* | *14.7* | *B* | *11.5* | *B* | *16.8* | *C* |
| 3. Piner Rd/Airway Dr | 7.9 | A | 11.1 | B | 8.1 | A | 11.7 | B |
| 4. Piner Rd/Range Ave | 21.6 | C | 23.7 | C | 21.6 | C | 23.6 | C |
| 5. Bicentennial Wy/Range Ave | 12.8 | B | 13.9 | B | 12.8 | B | 13.8 | B |

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Similar to the Existing Plus Project scenario and for the same reasons, with the addition of project-related traffic volumes, average delay at the intersections of Piner Road/Range Avenue and Bicentennial Way/Range Avenue decrease during the p.m. peak hour.

**Finding** – The study intersections are expected to continue operating acceptably at the same overall Levels of Service upon the addition of project-generated traffic.

# Parking

The project was analyzed to determine whether the proposed parking supply would be sufficient for the anticipated parking demand. The project site as proposed would provide a total of 96 standard parking spaces.

Section 20-36.040 of the Santa Rosa City Code requires vehicle parking at a rate of one space for every 450 square feet of floor area for auto and vehicle sales and rental uses, which will be applied to the 2,348 square foot automobile gallery. For the remainder of the project, rates for the vehicle services land use are applied, which require one space for each service bay and one space per employee. Additionally, 1 disabled parking space is required for every 25 required parking spaces and a minimum of one must be van accessible.

The site plan shows that out of the 96 spaces proposed, three would be disabled/accessible parking spaces and one would be van accessible. The City of Santa Rosa Municipal Code, Chapter 20-36.060; Parking requirements for the disabled, requires that disabled/accessible parking spaces must be located on the shortest accessible route of travel from adjacent parking to an accessible entrance. The proposed parking supply of 96 total parking spaces, including four disabled/accessible parking spaces, would meet the vehicle parking requirements contained in the City Municipal Code.

The proposed parking supply and City requirements are shown in Table 12.

**Table 12 – Parking Analysis Summary**

| Land Use | Units | Supply (spaces) | City Requirements | |
|---|---|---|---|---|
| | | | Rate | Spaces Required |
| Auto and Vehicle Sales and Rental | 2,348 sf | 6 | 1 per 450 sf | 6 |
| Vehicle Services – Minor and Major Repair/Body Work | 20 Service Bays<br>41 Employees | 86 | 1 per Service Bay<br>1 per Employee | 20<br>41 |
| **Parking Stalls (Non-disabled)** | | **92** | | **67** |
| *Disabled/Accessible Parking* | | 4 | 1 per 25 Spaces | 4 |
| **Total (On-site)** | | **96** | | **71** |

Note: sf = square feet

In addition to the on-site parking spaces provided, the proposed project would include 127 off-site parking spaces at 3304 Industrial Drive, west of the project site. This area would be used for storage of vehicles to be sold. These 127 spaces would be in addition to the parking provided on-site.

**Finding** – The proposed parking supply of 96 on-site parking spaces would satisfy the City's Code requirements. To hold vehicles prior to sale, the project would also include 127 off-site parking spaces at 3304 Industrial Drive, approximately 600 feet west of the project site.

# Conclusions and Recommendations

## Conclusions

- The proposed project is expected to generate an average of 61 a.m. peak hour trips and 79 p.m. peak hour trips.
- Pedestrian, bicycle, and transit facilities serving the project site are generally adequate, though sidewalk is lacking along the site's Airway Court frontage.
- The project would be expected to have a less-than-significant transportation impact on vehicle miles traveled.
- The proposed site access and on-site circulation are expected to function acceptably for emergency response vehicles, and the proposed project would have a less-than-significant impact on emergency response.
- Sight lines at the project driveways on Airway Court are adequate. However, stopping sight distance at the project driveway on Airway Drive is not adequate for northbound approaches due to trees and parked vehicles.
- Left-turn lanes would not be warranted on Airway Drive at Airway Court or at any of the project driveways.
- The proposed project would have a less-than-significant impact on queuing since the addition of project-generated volumes would not cause any queues to exceed available turn lane storage that would not already be exceeded without the project.
- The project would have a less-than-significant impact on emergency access and response times.
- The study intersections are expected to operate acceptably at LOS C or better under Existing and Baseline Conditions with or without the addition of project-generated trips; therefore, the project's effect on operating conditions would be considered acceptable.
- The proposed parking supply of 96 on-site parking spaces would satisfy the City's Code requirement for vehicular parking.

## Recommendations

- Sidewalk should be installed along the project frontage on Airway Court to connect to the surrounding sidewalk network and comply with City policies and plans.
- Five long-term bicycle storage spaces should be provided on-site to satisfy the Santa Rosa Municipal Code requirement for bicycle parking.
- South of the project driveway on Airway Drive, the curb should be painted red for a distance of 40 feet to eliminate parking and provide adequate visibility.
- Vegetation south of the project driveway on Airway Drive should be maintained such that trees and vegetation are trimmed to a minimum height of seven feet.

# Study Participants and References

## Study Participants

| | |
|---|---|
| **Principal in Charge** | Dalene J. Whitlock, PE, PTOE |
| **Associate Engineer** | Nick Brunetto, PE |
| **Assistant Engineer** | Valerie Haines, EIT, William Andrews, EIT |
| **Graphics** | Cameron Wong |
| **Editing/Formatting** | Jessica Bender |
| **Quality Control** | Dalene J. Whitlock, PE, PTOE |

## References


*2019 Collision Data on California State Highways*, California Department of Transportation, 2021
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*Updated Focused Traffic Study for the Fountaingrove Inn Redevelopment Project*, W-Trans, 2021
*Vehicle Miles Traveled (VMT) Guidelines Final Draft*, City of Santa Rosa, 2020


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# Appendix A

## Collision Rate Calculations

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## Intersection Collision Rate Worksheet

**TIS for the Tesla Service Center Project**

**Intersection # 1:** Industrial Dr & Airway Dr

**Date of Count:** Wednesday, February 15, 2023

**Number of Collisions:** 3
**Number of Injuries:** 2
**Number of Fatalities:** 0
**Average Daily Traffic (ADT):** 9400
**Start Date:** September 1, 2016
**End Date:** August 31, 2021
**Number of Years:** 5

**Intersection Type:** Four-Legged
**Control Type:** 4 Way Stop
**Area:** Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{3 \quad x \quad 1{,}000{,}000}{9{,}400 \quad x \quad 365 \quad x \quad 5}$$

| | Collision Rate | Fatality Rate | Injury Rate |
|---|---|---|---|
| **Study Intersection** | **0.17 c/mve** | **0.0%** | **66.7%** |
| **Statewide Average*** | **0.17 c/mve** | **0.4%** | **26.8%** |

**Notes**
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

**Intersection # 2:** Airway Dr & Airway Ct

**Date of Count:** Wednesday, February 15, 2023

**Number of Collisions:** 0
**Number of Injuries:** 0
**Number of Fatalities:** 0
**Average Daily Traffic (ADT):** 7000
**Start Date:** September 1, 2016
**End Date:** August 31, 2021
**Number of Years:** 5

**Intersection Type:** Tee
**Control Type:** Stop & Yield Controls
**Area:** Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \quad x \quad 1{,}000{,}000}{7{,}000 \quad x \quad 365 \quad x \quad 5}$$

| | Collision Rate | Fatality Rate | Injury Rate |
|---|---|---|---|
| **Study Intersection** | **0.00 c/mve** | **0.0%** | **0.0%** |
| **Statewide Average*** | **0.09 c/mve** | **1.2%** | **46.9%** |

**Notes**
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

## Intersection Collision Rate Worksheet

**TIS for the Tesla Service Center Project**

**Intersection # 3:** Piner Rd & Airway Dr
**Date of Count:** Wednesday, February 15, 2023

**Number of Collisions:** 11
**Number of Injuries:** 6
**Number of Fatalities:** 0
**Average Daily Traffic (ADT):** 23800
**Start Date:** September 1, 2016
**End Date:** August 31, 2021
**Number of Years:** 5

**Intersection Type:** Four-Legged
**Control Type:** Signals
**Area:** Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{11 \quad \text{x} \quad 1{,}000{,}000}{23{,}800 \quad \text{x} \quad 365 \quad \text{x} \quad 5}$$

| | Collision Rate | Fatality Rate | Injury Rate |
|---|---|---|---|
| **Study Intersection** | **0.25 c/mve** | **0.0%** | **54.5%** |
| **Statewide Average*** | **0.24 c/mve** | **0.5%** | **46.9%** |

**Notes**
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

**Intersection # 4:** Piner Rd & Range Ave
**Date of Count:** Wednesday, February 15, 2023

**Number of Collisions:** 15
**Number of Injuries:** 6
**Number of Fatalities:** 0
**Average Daily Traffic (ADT):** 23900
**Start Date:** September 1, 2016
**End Date:** August 31, 2021
**Number of Years:** 5

**Intersection Type:** Tee
**Control Type:** Signals
**Area:** Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{15 \quad \text{x} \quad 1{,}000{,}000}{23{,}900 \quad \text{x} \quad 365 \quad \text{x} \quad 5}$$

| | Collision Rate | Fatality Rate | Injury Rate |
|---|---|---|---|
| **Study Intersection** | **0.34 c/mve** | **0.0%** | **40.0%** |
| **Statewide Average*** | **0.20 c/mve** | **0.5%** | **46.8%** |

**Notes**
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

## Intersection Collision Rate Worksheet

**TIS for the Tesla Service Center Project**

**Intersection # 5:** Bicentennial Way & Range Ave
**Date of Count:** Wednesday, February 15, 2023

**Number of Collisions:** 10
**Number of Injuries:** 6
**Number of Fatalities:** 0
**Average Daily Traffic (ADT):** 26500
**Start Date:** September 1, 2016
**End Date:** August 31, 2021
**Number of Years:** 5

**Intersection Type:** Tee
**Control Type:** Signals
**Area:** Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{10 \quad x \quad 1,000,000}{26,500 \quad x \quad 365 \quad x \quad 5}$$

| | Collision Rate | Fatality Rate | Injury Rate |
|---|---|---|---|
| **Study Intersection** | **0.21 c/mve** | **0.0%** | **60.0%** |
| **Statewide Average*** | **0.20 c/mve** | **0.5%** | **46.8%** |

**Notes**
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2019 Collision Data on California State Highways, Caltrans

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# Appendix B

## Turn Lane Warrant Spreadsheets

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# Turn Lane Warrant Analysis - 4 Legged Intersections

Study Intersection: Airway Drive/Airway Court
Study Scenario: Baseline plus Project AM

Direction of Analysis Street: North/South

Airway Court

**Airway Drive**
Northbound Volumes (veh/hr)
Left Turn Volume = 7
Through Volume = 190
Right Turn Volume = 69

**Airway Drive**
Southbound Volumes (veh/hr)
4 = Right Turn Volume
164 = Through Volume
30 = Left Turn Volume

Northbound Speed Limit: 35 mph
Northbound Configuration: 2 Lanes Undivided

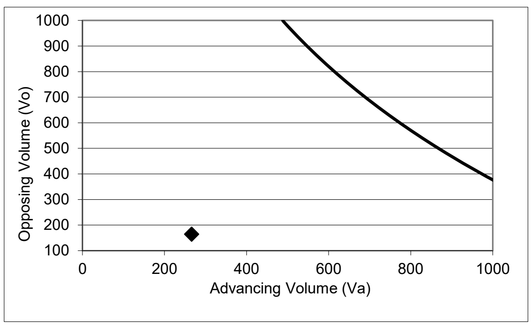
Airway Court

Southbound Speed Limit: 35 mph
Southbound Configuration: 2 Lanes Undivided

---

**Northbound Left Turn Lane Warrants**

Percentage Left Turns %lt 2.6 %
Advancing Volume Threshold AV 1277 veh/hr
If AV<Va then warrant is met

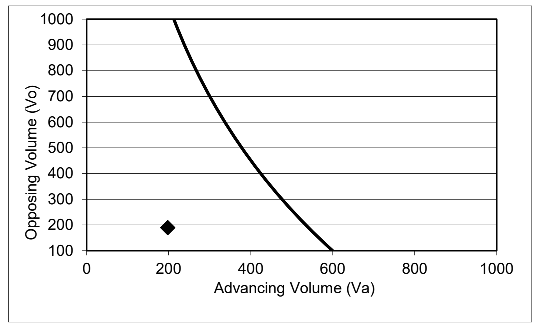



◆ Study Intersection
—— Two lane roadway warrant threshold for: 35 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

**Southbound Left Turn Lane Warrants**

Percentage Left Turns %lt 15.2 %
Advancing Volume Threshold AV 541 veh/hr
If AV<Va then warrant is met




◆ Study Intersection
—— Two lane roadway warrant threshold for: 35 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

_Note:_ *If one direction has a left turn lane warranted, a left turn lane should be installed on the other side as well*

---

**Northbound Right Turn Lane Warrants**

1. Check for right turn volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold: AV = 793.8
Advancing Volume Va = 266
If AV<Va then warrant is met No

Right Turn Lane Warranted: NO

**Southbound Right Turn Lane Warrants**

1. Check for right turn volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold: AV = 1020.1
Advancing Volume Va = 198
If AV<Va then warrant is met No

Right Turn Lane Warranted: NO

**Northbound Right Turn Taper Warrants**
**(evaluate if right turn lane is unwarranted)**

1. Check taper volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -966.7
Advancing Volume Va = 266
If AV<Va then warrant is met Yes

Right Turn Taper Warranted: YES

**Southbound Right Turn Taper Warrants**
**(evaluate if right turn lane is unwarranted)**

1. Check taper volume criteria

**NOT WARRANTED - Less than 20 vehicles**

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -
Advancing Volume Va = 198
If AV<Va then warrant is met -

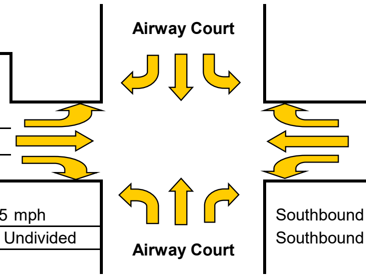
Right Turn Taper Warranted: NO

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, Jan. 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981. The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

# Turn Lane Warrant Analysis - 4 Legged Intersections

Study Intersection: Airway Drive/Airway Court
Study Scenario: Baseline plus Project PM

Direction of Analysis Street: North/South

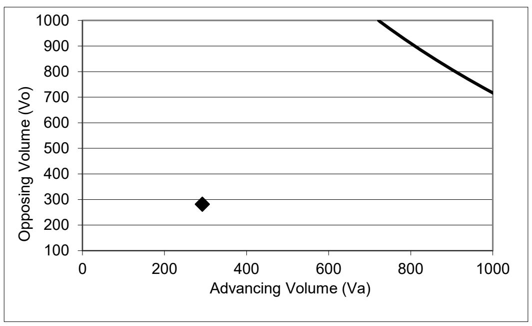



| Airway Drive Northbound Volumes (veh/hr) | | Airway Drive Southbound Volumes (veh/hr) | |
|---|---|---|---|
| Left Turn Volume = | 0 | 0 | = Right Turn Volume |
| Through Volume = | 214 | 281 | = Through Volume |
| Right Turn Volume = | 78 | 44 | = Left Turn Volume |

| | | | |
|---|---|---|---|
| Northbound Speed Limit: | 35 mph | Southbound Speed Limit: | 35 mph |
| Northbound Configuration: | 2 Lanes Undivided | Southbound Configuration: | 2 Lanes Undivided |

**Northbound Left Turn Lane Warrants**

Percentage Left Turns %lt 0.0 %
Advancing Volume Threshold AV 1651 veh/hr
If AV<Va then warrant is met

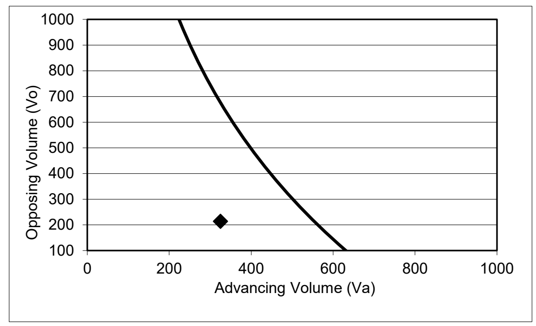



◆ Study Intersection
——— Two lane roadway warrant threshold for: 35 mph
Turn lane warranted if point falls to right of warrant threshold line

**Left Turn Lane Warranted: NO**

**Southbound Left Turn Lane Warrants**

Percentage Left Turns %lt 13.5 %
Advancing Volume Threshold AV 554 veh/hr
If AV<Va then warrant is met




◆ Study Intersection
——— Two lane roadway warrant threshold for: 35 mph
Turn lane warranted if point falls to right of warrant threshold line

**Left Turn Lane Warranted: NO**

Note: *If one direction has a left turn lane warranted, a left turn lane should be installed on the other side as well*

**Northbound Right Turn Lane Warrants**

1. Check for right turn volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold: AV = 667.8
Advancing Volume Va = 292
If AV<Va then warrant is met No

**Right Turn Lane Warranted: NO**

**Southbound Right Turn Lane Warrants**

1. Check for right turn volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold: AV = 1050.1
Advancing Volume Va = 325
If AV<Va then warrant is met No

**Right Turn Lane Warranted: NO**

**Northbound Right Turn Taper Warrants**

**(evaluate if right turn lane is unwarranted)**

1. Check taper volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -1267
Advancing Volume Va = 292
If AV<Va then warrant is met Yes

**Right Turn Taper Warranted: YES**

**Southbound Right Turn Taper Warrants**

**(evaluate if right turn lane is unwarranted)**

1. Check taper volume criteria

**NOT WARRANTED - Less than 20 vehicles**

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -
Advancing Volume Va = 325
If AV<Va then warrant is met -

**Right Turn Taper Warranted: NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, Jan. 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981. The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

# Appendix C

## Queuing Calculations

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# Queues
## 3: Piner Rd & Airway Dr
03/28/2023

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 124 | 872 | 5 | 645 | 1 | 102 | 80 |
| v/c Ratio | 0.35 | 0.38 | 0.02 | 0.40 | 0.00 | 0.27 | 0.20 |
| Control Delay | 21.9 | 7.7 | 25.6 | 13.2 | 26.0 | 18.7 | 5.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 21.9 | 7.7 | 25.6 | 13.2 | 26.0 | 18.7 | 5.0 |
| Queue Length 50th (ft) | 22 | 34 | 1 | 51 | 0 | 18 | 0 |
| Queue Length 95th (ft) | 100 | 218 | 12 | 180 | 5 | 74 | 22 |
| Internal Link Dist (ft) | | 483 | | 1520 | 155 | 860 | |
| Turn Bay Length (ft) | 100 | | 150 | | | | |
| Base Capacity (vph) | 787 | 3265 | 324 | 2948 | 787 | 1009 | 930 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.16 | 0.27 | 0.02 | 0.22 | 0.00 | 0.10 | 0.09 |

Intersection Summary



# Queues
## 4: Range Ave & Piner Rd
03/28/2023

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 173 | 791 | 88 | 82 | 592 | 78 |
| v/c Ratio | 0.18 | 0.58 | 0.43 | 0.04 | 0.69 | 0.12 |
| Control Delay | 12.6 | 2.5 | 38.6 | 5.4 | 34.8 | 7.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 12.6 | 2.5 | 38.6 | 5.4 | 34.8 | 7.3 |
| Queue Length 50th (ft) | 46 | 11 | 42 | 6 | 142 | 7 |
| Queue Length 95th (ft) | 92 | 42 | 82 | 14 | 192 | 29 |
| Internal Link Dist (ft) | 1520 | | | 361 | 356 | |
| Turn Bay Length (ft) | | | 140 | | 170 | |
| Base Capacity (vph) | 984 | 1383 | 376 | 2337 | 961 | 777 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.18 | 0.57 | 0.23 | 0.04 | 0.62 | 0.10 |

Intersection Summary

## Queues
### 5: Range Ave & Bicentennial Way
03/28/2023

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 155 | 551 | 119 | 321 | 781 | 97 |
| v/c Ratio | 0.27 | 0.24 | 0.24 | 0.70 | 0.40 | 0.07 |
| Control Delay | 30.4 | 0.8 | 30.2 | 29.5 | 13.5 | 4.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.4 | 0.8 | 30.2 | 29.5 | 13.5 | 4.4 |
| Queue Length 50th (ft) | 35 | 0 | 29 | 126 | 117 | 16 |
| Queue Length 95th (ft) | 62 | 18 | 42 | 152 | 213 | m24 |
| Internal Link Dist (ft) | 783 | | 501 | | | 356 |
| Turn Bay Length (ft) | 440 | | | 100 | 130 | |
| Base Capacity (vph) | 1017 | 2344 | 1021 | 660 | 1966 | 1363 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.15 | 0.24 | 0.12 | 0.49 | 0.40 | 0.07 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



## Queues
### 3: Piner Rd & Airway Dr
03/28/2023

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 108 | 675 | 3 | 1154 | 8 | 223 | 205 |
| v/c Ratio | 0.43 | 0.30 | 0.02 | 0.67 | 0.02 | 0.58 | 0.41 |
| Control Delay | 34.7 | 7.2 | 36.0 | 16.5 | 0.1 | 31.7 | 7.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 34.7 | 7.2 | 36.0 | 16.5 | 0.1 | 31.7 | 7.1 |
| Queue Length 50th (ft) | 38 | 42 | 1 | 158 | 0 | 77 | 0 |
| Queue Length 95th (ft) | 106 | 157 | 10 | 376 | 0 | 180 | 53 |
| Internal Link Dist (ft) | | 483 | | 1520 | 155 | 860 | |
| Turn Bay Length (ft) | 100 | | 150 | | | | |
| Base Capacity (vph) | 521 | 2703 | 214 | 2181 | 667 | 668 | 725 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.21 | 0.25 | 0.01 | 0.53 | 0.01 | 0.33 | 0.28 |

Intersection Summary

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 175 | 783 | 109 | 197 | 967 | 157 |
| v/c Ratio | 0.25 | 0.61 | 0.55 | 0.11 | 0.73 | 0.18 |
| Control Delay | 21.3 | 4.0 | 46.1 | 11.3 | 24.2 | 1.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 |
| Total Delay | 21.3 | 4.0 | 46.1 | 11.3 | 24.4 | 1.3 |
| Queue Length 50th (ft) | 65 | 49 | 55 | 26 | 235 | 0 |
| Queue Length 95th (ft) | 123 | 89 | 107 | 49 | 275 | 12 |
| Internal Link Dist (ft) | 1520 | | | 361 | 356 | |
| Turn Bay Length (ft) | | | 140 | | 170 | |
| Base Capacity (vph) | 709 | 1365 | 218 | 1871 | 1550 | 884 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 119 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.25 | 0.57 | 0.50 | 0.11 | 0.68 | 0.18 |

Intersection Summary





| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 400 | 941 | 185 | 225 | 666 | 236 |
| v/c Ratio | 0.64 | 0.43 | 0.37 | 0.41 | 0.36 | 0.18 |
| Control Delay | 36.8 | 1.5 | 33.7 | 13.5 | 13.7 | 3.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 36.8 | 1.5 | 33.7 | 13.5 | 13.7 | 3.9 |
| Queue Length 50th (ft) | 103 | 7 | 49 | 58 | 88 | 28 |
| Queue Length 95th (ft) | 139 | 40 | 66 | 74 | 183 | 59 |
| Internal Link Dist (ft) | 783 | | 501 | | | 356 |
| Turn Bay Length (ft) | 440 | | | 100 | 130 | |
| Base Capacity (vph) | 876 | 2214 | 961 | 663 | 1831 | 1344 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.46 | 0.43 | 0.19 | 0.34 | 0.36 | 0.18 |

Intersection Summary

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 125 | 872 | 5 | 646 | 1 | 103 | 81 |
| v/c Ratio | 0.35 | 0.37 | 0.02 | 0.40 | 0.00 | 0.28 | 0.20 |
| Control Delay | 21.9 | 7.7 | 25.6 | 13.1 | 27.0 | 18.8 | 5.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 21.9 | 7.7 | 25.6 | 13.1 | 27.0 | 18.8 | 5.0 |
| Queue Length 50th (ft) | 22 | 34 | 1 | 51 | 0 | 18 | 0 |
| Queue Length 95th (ft) | 102 | 218 | 12 | 181 | 5 | 75 | 23 |
| Internal Link Dist (ft) | | 483 | | 1520 | 155 | 860 | |
| Turn Bay Length (ft) | 100 | | 150 | | | | |
| Base Capacity (vph) | 786 | 3264 | 324 | 2943 | 786 | 1008 | 928 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.16 | 0.27 | 0.02 | 0.22 | 0.00 | 0.10 | 0.09 |

Intersection Summary





| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 173 | 792 | 88 | 82 | 593 | 78 |
| v/c Ratio | 0.18 | 0.58 | 0.43 | 0.04 | 0.69 | 0.12 |
| Control Delay | 12.6 | 2.5 | 38.6 | 5.4 | 34.8 | 7.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 12.6 | 2.5 | 38.6 | 5.4 | 34.8 | 7.3 |
| Queue Length 50th (ft) | 46 | 11 | 42 | 6 | 142 | 7 |
| Queue Length 95th (ft) | 92 | 42 | 82 | 14 | 193 | 29 |
| Internal Link Dist (ft) | 1520 | | | 361 | 356 | |
| Turn Bay Length (ft) | | | 140 | | 170 | |
| Base Capacity (vph) | 984 | 1383 | 376 | 2337 | 961 | 777 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.18 | 0.57 | 0.23 | 0.04 | 0.62 | 0.10 |

Intersection Summary

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 159 | 552 | 119 | 322 | 782 | 97 |
| v/c Ratio | 0.28 | 0.24 | 0.24 | 0.70 | 0.40 | 0.07 |
| Control Delay | 30.4 | 0.8 | 30.2 | 29.4 | 13.5 | 4.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.4 | 0.8 | 30.2 | 29.4 | 13.5 | 4.4 |
| Queue Length 50th (ft) | 36 | 0 | 29 | 126 | 118 | 16 |
| Queue Length 95th (ft) | 63 | 18 | 42 | 152 | 213 | m24 |
| Internal Link Dist (ft) | 783 | | 501 | | | 356 |
| Turn Bay Length (ft) | 440 | | | 100 | 130 | |
| Base Capacity (vph) | 1017 | 2344 | 1021 | 660 | 1963 | 1362 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.16 | 0.24 | 0.12 | 0.49 | 0.40 | 0.07 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.





| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 109 | 675 | 3 | 1155 | 8 | 225 | 207 |
| v/c Ratio | 0.43 | 0.30 | 0.02 | 0.67 | 0.02 | 0.59 | 0.41 |
| Control Delay | 34.7 | 7.2 | 36.3 | 16.6 | 0.1 | 31.9 | 7.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 34.7 | 7.2 | 36.3 | 16.6 | 0.1 | 31.9 | 7.1 |
| Queue Length 50th (ft) | 39 | 42 | 1 | 159 | 0 | 78 | 0 |
| Queue Length 95th (ft) | 107 | 157 | 10 | 377 | 0 | 182 | 52 |
| Internal Link Dist (ft) | | 483 | | 1520 | 155 | 860 | |
| Turn Bay Length (ft) | 100 | | 150 | | | | |
| Base Capacity (vph) | 519 | 2697 | 213 | 2172 | 665 | 665 | 724 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.21 | 0.25 | 0.01 | 0.53 | 0.01 | 0.34 | 0.29 |

Intersection Summary

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 175 | 785 | 109 | 197 | 968 | 157 |
| v/c Ratio | 0.25 | 0.61 | 0.55 | 0.11 | 0.73 | 0.18 |
| Control Delay | 21.3 | 4.0 | 46.1 | 11.3 | 24.2 | 1.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 |
| Total Delay | 21.3 | 4.0 | 46.1 | 11.3 | 24.4 | 1.3 |
| Queue Length 50th (ft) | 65 | 50 | 55 | 26 | 235 | 0 |
| Queue Length 95th (ft) | 123 | 90 | 107 | 49 | 275 | 12 |
| Internal Link Dist (ft) | 1520 | | | 361 | 356 | |
| Turn Bay Length (ft) | | | 140 | | 170 | |
| Base Capacity (vph) | 709 | 1365 | 218 | 1870 | 1550 | 885 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 120 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.25 | 0.58 | 0.50 | 0.11 | 0.68 | 0.18 |

Intersection Summary





| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 402 | 942 | 185 | 228 | 668 | 236 |
| v/c Ratio | 0.64 | 0.43 | 0.37 | 0.41 | 0.37 | 0.18 |
| Control Delay | 36.7 | 1.5 | 33.7 | 13.6 | 13.8 | 3.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 36.7 | 1.5 | 33.7 | 13.6 | 13.8 | 3.9 |
| Queue Length 50th (ft) | 104 | 7 | 49 | 59 | 89 | 28 |
| Queue Length 95th (ft) | 140 | 40 | 66 | 75 | 185 | 59 |
| Internal Link Dist (ft) | 783 | | 501 | | | 356 |
| Turn Bay Length (ft) | 440 | | | 100 | 130 | |
| Base Capacity (vph) | 876 | 2214 | 961 | 663 | 1829 | 1343 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.46 | 0.43 | 0.19 | 0.34 | 0.37 | 0.18 |

Intersection Summary

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 130 | 872 | 5 | 664 | 1 | 113 | 83 |
| v/c Ratio | 0.36 | 0.37 | 0.02 | 0.41 | 0.00 | 0.30 | 0.20 |
| Control Delay | 22.3 | 7.6 | 26.2 | 13.3 | 27.0 | 19.4 | 5.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 22.3 | 7.6 | 26.2 | 13.3 | 27.0 | 19.4 | 5.3 |
| Queue Length 50th (ft) | 24 | 35 | 1 | 54 | 0 | 21 | 0 |
| Queue Length 95th (ft) | 105 | 218 | 12 | 186 | 5 | 83 | 24 |
| Internal Link Dist (ft) | | 483 | | 1520 | 155 | 860 | |
| Turn Bay Length (ft) | 100 | | 150 | | | | |
| Base Capacity (vph) | 771 | 3258 | 317 | 2888 | 771 | 989 | 913 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.17 | 0.27 | 0.02 | 0.23 | 0.00 | 0.11 | 0.09 |

Intersection Summary





| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 173 | 802 | 88 | 82 | 611 | 78 |
| v/c Ratio | 0.18 | 0.59 | 0.43 | 0.04 | 0.70 | 0.12 |
| Control Delay | 12.8 | 2.6 | 38.6 | 5.5 | 34.4 | 7.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 12.8 | 2.6 | 38.6 | 5.5 | 34.4 | 7.2 |
| Queue Length 50th (ft) | 48 | 12 | 42 | 7 | 145 | 7 |
| Queue Length 95th (ft) | 92 | 44 | 82 | 14 | 199 | 29 |
| Internal Link Dist (ft) | 1520 | | | 361 | 356 | |
| Turn Bay Length (ft) | | | 140 | | 170 | |
| Base Capacity (vph) | 972 | 1378 | 376 | 2314 | 961 | 787 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.18 | 0.58 | 0.23 | 0.04 | 0.64 | 0.10 |

Intersection Summary

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 155 | 570 | 119 | 321 | 792 | 97 |
| v/c Ratio | 0.27 | 0.24 | 0.24 | 0.70 | 0.40 | 0.07 |
| Control Delay | 30.4 | 0.8 | 30.2 | 29.5 | 13.5 | 4.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.4 | 0.8 | 30.2 | 29.5 | 13.5 | 4.4 |
| Queue Length 50th (ft) | 35 | 0 | 29 | 126 | 119 | 16 |
| Queue Length 95th (ft) | 62 | 18 | 42 | 152 | 216 | m23 |
| Internal Link Dist (ft) | 783 | | 501 | | | 356 |
| Turn Bay Length (ft) | 440 | | | 100 | 130 | |
| Base Capacity (vph) | 1017 | 2348 | 1021 | 660 | 1964 | 1362 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.15 | 0.24 | 0.12 | 0.49 | 0.40 | 0.07 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.





| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 114 | 675 | 3 | 1173 | 8 | 243 | 211 |
| v/c Ratio | 0.45 | 0.30 | 0.02 | 0.68 | 0.02 | 0.62 | 0.41 |
| Control Delay | 35.9 | 7.3 | 36.7 | 17.2 | 0.1 | 33.5 | 7.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 35.9 | 7.3 | 36.7 | 17.2 | 0.1 | 33.5 | 7.0 |
| Queue Length 50th (ft) | 43 | 44 | 1 | 169 | 0 | 89 | 0 |
| Queue Length 95th (ft) | 111 | 157 | 10 | 388 | 0 | 197 | 53 |
| Internal Link Dist (ft) | | 483 | | 1520 | 155 | 860 | |
| Turn Bay Length (ft) | 100 | | 150 | | | | |
| Base Capacity (vph) | 499 | 2634 | 205 | 2087 | 644 | 640 | 707 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.23 | 0.26 | 0.01 | 0.56 | 0.01 | 0.38 | 0.30 |

Intersection Summary

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 175 | 805 | 109 | 197 | 987 | 157 |
| v/c Ratio | 0.25 | 0.63 | 0.56 | 0.11 | 0.73 | 0.18 |
| Control Delay | 21.5 | 4.2 | 47.1 | 11.5 | 23.9 | 1.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 |
| Total Delay | 21.5 | 4.2 | 47.1 | 11.5 | 24.2 | 1.2 |
| Queue Length 50th (ft) | 65 | 53 | 55 | 26 | 239 | 0 |
| Queue Length 95th (ft) | 123 | 98 | 107 | 49 | 284 | 12 |
| Internal Link Dist (ft) | 1520 | | | 361 | 356 | |
| Turn Bay Length (ft) | | | 140 | | 170 | |
| Base Capacity (vph) | 701 | 1359 | 214 | 1847 | 1550 | 890 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 120 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.25 | 0.59 | 0.51 | 0.11 | 0.69 | 0.18 |

Intersection Summary





| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 402 | 961 | 185 | 228 | 688 | 236 |
| v/c Ratio | 0.64 | 0.43 | 0.37 | 0.42 | 0.38 | 0.18 |
| Control Delay | 36.7 | 1.5 | 33.7 | 14.2 | 14.0 | 3.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 36.7 | 1.5 | 33.7 | 14.2 | 14.0 | 3.9 |
| Queue Length 50th (ft) | 104 | 8 | 49 | 62 | 94 | 29 |
| Queue Length 95th (ft) | 140 | 43 | 66 | 77 | 194 | 59 |
| Internal Link Dist (ft) | 783 | | 501 | | | 356 |
| Turn Bay Length (ft) | 440 | | | 100 | 130 | |
| Base Capacity (vph) | 876 | 2214 | 961 | 660 | 1829 | 1343 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.46 | 0.43 | 0.19 | 0.35 | 0.38 | 0.18 |

Intersection Summary

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 131 | 872 | 5 | 665 | 1 | 114 | 84 |
| v/c Ratio | 0.36 | 0.37 | 0.02 | 0.42 | 0.00 | 0.30 | 0.21 |
| Control Delay | 22.4 | 7.6 | 26.2 | 13.3 | 27.0 | 19.5 | 5.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 22.4 | 7.6 | 26.2 | 13.3 | 27.0 | 19.5 | 5.4 |
| Queue Length 50th (ft) | 24 | 35 | 1 | 54 | 0 | 21 | 0 |
| Queue Length 95th (ft) | 107 | 218 | 13 | 186 | 5 | 83 | 25 |
| Internal Link Dist (ft) | | 483 | | 1520 | 155 | 860 | |
| Turn Bay Length (ft) | 100 | | 150 | | | | |
| Base Capacity (vph) | 770 | 3257 | 317 | 2888 | 770 | 987 | 911 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.17 | 0.27 | 0.02 | 0.23 | 0.00 | 0.12 | 0.09 |

Intersection Summary





| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 173 | 803 | 88 | 82 | 612 | 78 |
| v/c Ratio | 0.18 | 0.59 | 0.43 | 0.04 | 0.70 | 0.12 |
| Control Delay | 12.8 | 2.6 | 38.6 | 5.6 | 34.4 | 7.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 12.8 | 2.6 | 38.6 | 5.6 | 34.4 | 7.2 |
| Queue Length 50th (ft) | 48 | 12 | 42 | 7 | 145 | 7 |
| Queue Length 95th (ft) | 92 | 44 | 82 | 14 | 199 | 29 |
| Internal Link Dist (ft) | 1520 | | | 361 | 356 | |
| Turn Bay Length (ft) | | | 140 | | 170 | |
| Base Capacity (vph) | 972 | 1377 | 376 | 2313 | 961 | 787 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.18 | 0.58 | 0.23 | 0.04 | 0.64 | 0.10 |

Intersection Summary

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 159 | 571 | 119 | 322 | 793 | 97 |
| v/c Ratio | 0.28 | 0.24 | 0.24 | 0.70 | 0.40 | 0.07 |
| Control Delay | 30.4 | 0.8 | 30.2 | 29.5 | 13.5 | 4.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.4 | 0.8 | 30.2 | 29.5 | 13.5 | 4.4 |
| Queue Length 50th (ft) | 35 | 0 | 29 | 126 | 119 | 16 |
| Queue Length 95th (ft) | 63 | 19 | 42 | 152 | 217 | m23 |
| Internal Link Dist (ft) | 783 | | 501 | | | 356 |
| Turn Bay Length (ft) | 440 | | | 100 | 130 | |
| Base Capacity (vph) | 1017 | 2348 | 1021 | 660 | 1962 | 1361 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.16 | 0.24 | 0.12 | 0.49 | 0.40 | 0.07 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.





| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT | SBR |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 115 | 675 | 3 | 1174 | 8 | 245 | 213 |
| v/c Ratio | 0.45 | 0.30 | 0.02 | 0.68 | 0.02 | 0.63 | 0.41 |
| Control Delay | 35.9 | 7.3 | 36.7 | 17.3 | 0.1 | 33.6 | 7.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 35.9 | 7.3 | 36.7 | 17.3 | 0.1 | 33.6 | 7.0 |
| Queue Length 50th (ft) | 43 | 45 | 1 | 171 | 0 | 90 | 0 |
| Queue Length 95th (ft) | 111 | 157 | 10 | 389 | 0 | 199 | 54 |
| Internal Link Dist (ft) | | 483 | | 1520 | 155 | 860 | |
| Turn Bay Length (ft) | 100 | | 150 | | | | |
| Base Capacity (vph) | 498 | 2628 | 205 | 2082 | 642 | 638 | 707 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.23 | 0.26 | 0.01 | 0.56 | 0.01 | 0.38 | 0.30 |

Intersection Summary

## 4: Range Ave & Piner Rd



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 175 | 805 | 109 | 197 | 987 | 157 |
| v/c Ratio | 0.25 | 0.63 | 0.56 | 0.11 | 0.73 | 0.18 |
| Control Delay | 21.5 | 4.2 | 47.1 | 11.5 | 23.9 | 1.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 |
| Total Delay | 21.5 | 4.2 | 47.1 | 11.5 | 24.2 | 1.2 |
| Queue Length 50th (ft) | 65 | 53 | 55 | 26 | 239 | 0 |
| Queue Length 95th (ft) | 123 | 98 | 107 | 49 | 284 | 12 |
| Internal Link Dist (ft) | 1520 | | | 361 | 356 | |
| Turn Bay Length (ft) | | | 140 | | 170 | |
| Base Capacity (vph) | 701 | 1359 | 214 | 1847 | 1550 | 890 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 120 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.25 | 0.59 | 0.51 | 0.11 | 0.69 | 0.18 |

Intersection Summary





## 5: Range Ave & Bicentennial Way



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 402 | 961 | 185 | 228 | 688 | 236 |
| v/c Ratio | 0.64 | 0.43 | 0.37 | 0.42 | 0.38 | 0.18 |
| Control Delay | 36.7 | 1.5 | 33.7 | 14.2 | 14.0 | 3.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 36.7 | 1.5 | 33.7 | 14.2 | 14.0 | 3.9 |
| Queue Length 50th (ft) | 104 | 8 | 49 | 62 | 94 | 29 |
| Queue Length 95th (ft) | 140 | 43 | 66 | 77 | 194 | 59 |
| Internal Link Dist (ft) | 783 | | 501 | | | 356 |
| Turn Bay Length (ft) | 440 | | | 100 | 130 | |
| Base Capacity (vph) | 876 | 2214 | 961 | 660 | 1829 | 1343 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.46 | 0.43 | 0.19 | 0.35 | 0.38 | 0.18 |

Intersection Summary

# Appendix D

## Intersection Level of Service Calculations

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| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.6 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 39 | 62 | 7 | 37 | 55 | 35 | 9 | 93 | 84 | 108 | 130 | 26 |
| Future Vol, veh/h | 39 | 62 | 7 | 37 | 55 | 35 | 9 | 93 | 84 | 108 | 130 | 26 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 62 | 7 | 37 | 55 | 35 | 9 | 93 | 84 | 108 | 130 | 26 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 9.2 | 9.2 | 9.1 | 10.4 |
| HCM LOS | A | A | A | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 5% | 36% | 29% | 41% |
| Vol Thru, % | 50% | 57% | 43% | 49% |
| Vol Right, % | 45% | 6% | 28% | 10% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 186 | 108 | 127 | 264 |
| LT Vol | 9 | 39 | 37 | 108 |
| Through Vol | 93 | 62 | 55 | 130 |
| RT Vol | 84 | 7 | 35 | 26 |
| Lane Flow Rate | 186 | 108 | 127 | 264 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.237 | 0.156 | 0.177 | 0.35 |
| Departure Headway (Hd) | 4.59 | 5.19 | 5.025 | 4.768 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 776 | 685 | 707 | 750 |
| Service Time | 2.656 | 3.268 | 3.102 | 2.829 |
| HCM Lane V/C Ratio | 0.24 | 0.158 | 0.18 | 0.352 |
| HCM Control Delay | 9.1 | 9.2 | 9.2 | 10.4 |
| HCM Lane LOS | A | A | A | B |
| HCM 95th-tile Q | 0.9 | 0.6 | 0.6 | 1.6 |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 5 | 0 | 6 | 7 | 188 | 44 | 16 | 162 | 4 |
| Future Vol, veh/h | 0 | 0 | 0 | 5 | 0 | 6 | 7 | 188 | 44 | 16 | 162 | 4 |
| Conflicting Peds, #/hr | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 0 | 0 | 5 | 0 | 6 | 7 | 188 | 44 | 16 | 162 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 425 | 444 | 166 | 422 | 424 | 212 | 167 | 0 | 0 | 233 | 0 | 0 |
| Stage 1 | 197 | 197 | - | 225 | 225 | - | - | - | - | - | - | - |
| Stage 2 | 228 | 247 | - | 197 | 199 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 540 | 508 | 878 | 542 | 522 | 828 | 1411 | - | - | 1335 | - | - |
| Stage 1 | 805 | 738 | - | 778 | 718 | - | - | - | - | - | - | - |
| Stage 2 | 775 | 702 | - | 805 | 736 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 528 | 497 | 876 | 533 | 511 | 826 | 1410 | - | - | 1334 | - | - |
| Mov Cap-2 Maneuver | 528 | 497 | - | 533 | 511 | - | - | - | - | - | - | - |
| Stage 1 | 799 | 728 | - | 773 | 713 | - | - | - | - | - | - | - |
| Stage 2 | 764 | 697 | - | 794 | 726 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0 | 10.5 | 0.2 | 0.7 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1410 | - | - | - | 661 | 1334 | - | - |
| HCM Lane V/C Ratio | 0.005 | - | - | - | 0.017 | 0.012 | - | - |
| HCM Control Delay (s) | 7.6 | 0 | - | 0 | 10.5 | 7.7 | 0 | - |
| HCM Lane LOS | A | A | - | A | B | A | A | - |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 | 0 | - | - |

HCM 6th Signalized Intersection Summary
3: Piner Rd & Airway Dr 03/28/2023

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 124 | 872 | 0 | 5 | 514 | 131 | 1 | 0 | 0 | 102 | 0 | 80 |
| Future Volume (veh/h) | 124 | 872 | 0 | 5 | 514 | 131 | 1 | 0 | 0 | 102 | 0 | 80 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 124 | 872 | 0 | 5 | 514 | 112 | 1 | 0 | 0 | 102 | 0 | 39 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 159 | 1490 | 0 | 10 | 973 | 211 | 7 | 0 | 0 | 190 | 0 | 167 |
| Arrive On Green | 0.09 | 0.42 | 0.00 | 0.01 | 0.34 | 0.34 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.11 |
| Sat Flow, veh/h | 1781 | 3647 | 0 | 1781 | 2901 | 629 | 1781 | 0 | 0 | 1781 | 0 | 1572 |
| Grp Volume(v), veh/h | 124 | 872 | 0 | 5 | 314 | 312 | 1 | 0 | 0 | 102 | 0 | 39 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 0 | 1781 | 1777 | 1754 | 1781 | 0 | 0 | 1781 | 0 | 1572 |
| Q Serve(g_s), s | 1.9 | 5.2 | 0.0 | 0.1 | 3.9 | 3.9 | 0.0 | 0.0 | 0.0 | 1.5 | 0.0 | 0.6 |
| Cycle Q Clear(g_c), s | 1.9 | 5.2 | 0.0 | 0.1 | 3.9 | 3.9 | 0.0 | 0.0 | 0.0 | 1.5 | 0.0 | 0.6 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 0.36 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 159 | 1490 | 0 | 10 | 596 | 588 | 7 | 0 | 0 | 190 | 0 | 167 |
| V/C Ratio(X) | 0.78 | 0.59 | 0.00 | 0.51 | 0.53 | 0.53 | 0.15 | 0.00 | 0.00 | 0.54 | 0.00 | 0.23 |
| Avail Cap(c_a), veh/h | 1108 | 4732 | 0 | 456 | 2366 | 2335 | 1108 | 0 | 0 | 1420 | 0 | 1254 |
| 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 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.2 | 6.1 | 0.0 | 13.6 | 7.3 | 7.3 | 13.6 | 0.0 | 0.0 | 11.6 | 0.0 | 11.2 |
| Incr Delay (d2), s/veh | 3.1 | 0.1 | 0.0 | 14.8 | 0.3 | 0.3 | 4.0 | 0.0 | 0.0 | 0.9 | 0.0 | 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 | 0.6 | 0.8 | 0.0 | 0.1 | 0.8 | 0.8 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.3 | 6.2 | 0.0 | 28.3 | 7.6 | 7.6 | 17.6 | 0.0 | 0.0 | 12.5 | 0.0 | 11.5 |
| LnGrp LOS | B | A | A | C | A | A | B | A | A | B | A | B |
| Approach Vol, veh/h | | 996 | | | 631 | | | 1 | | | 141 | |
| Approach Delay, s/veh | | 7.4 | | | 7.8 | | | 17.6 | | | 12.2 | |
| Approach LOS | | A | | | A | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | 4 | 5 | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 3.1 | 15.1 | 6.1 | 5.4 | 12.8 | 3.0 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | 3.2 | 3.0 | 3.6 | 3.0 |
| Max Green Setting (Gmax), s | 7.0 | 36.4 | 21.8 | 17.0 | 36.4 | 17.0 |
| Max Q Clear Time (g_c+I1), s | 2.1 | 7.2 | 3.5 | 3.9 | 5.9 | 2.0 |
| Green Ext Time (p_c), s | 0.0 | 4.3 | 0.3 | 0.1 | 2.5 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 7.9 |
| HCM 6th LOS | A |



HCM 6th Signalized Intersection Summary
4: Range Ave & Piner Rd 03/28/2023

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 173 | 791 | 88 | 82 | 592 | 78 |
| Future Volume (veh/h) | 173 | 791 | 88 | 82 | 592 | 78 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 173 | 739 | 88 | 82 | 592 | 66 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 987 | 1149 | 115 | 2239 | 720 | 433 |
| Arrive On Green | 0.53 | 0.53 | 0.06 | 0.63 | 0.21 | 0.21 |
| Sat Flow, veh/h | 1870 | 1551 | 1781 | 3647 | 3456 | 1585 |
| Grp Volume(v), veh/h | 173 | 739 | 88 | 82 | 592 | 66 |
| Grp Sat Flow(s),veh/h/ln | 1870 | 1551 | 1781 | 1777 | 1728 | 1585 |
| Q Serve(g_s), s | 3.8 | 19.2 | 3.9 | 0.7 | 13.1 | 2.5 |
| Cycle Q Clear(g_c), s | 3.8 | 19.2 | 3.9 | 0.7 | 13.1 | 2.5 |
| Prop In Lane | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 987 | 1149 | 115 | 2239 | 720 | 433 |
| V/C Ratio(X) | 0.18 | 0.64 | 0.76 | 0.04 | 0.82 | 0.15 |
| Avail Cap(c_a), veh/h | 987 | 1149 | 379 | 2239 | 968 | 546 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.93 | 0.93 | 1.00 | 1.00 | 0.98 | 0.98 |
| Uniform Delay (d), s/veh | 9.8 | 5.3 | 36.8 | 5.6 | 30.2 | 22.1 |
| Incr Delay (d2), s/veh | 0.4 | 2.6 | 10.0 | 0.0 | 10.0 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 11.6 | 2.0 | 0.2 | 6.3 | 1.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 10.2 | 7.9 | 46.9 | 5.6 | 40.3 | 22.8 |
| LnGrp LOS | B | A | D | A | D | C |
| Approach Vol, veh/h | 912 | | | 170 | 658 | |
| Approach Delay, s/veh | 8.3 | | | 27.0 | 38.5 | |
| Approach LOS | A | | | C | D | |

| Timer - Assigned Phs | 1 | 2 | 6 | 8 |
|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.2 | 45.8 | 54.0 | 20.3 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | 3.6 | 3.6 |
| Max Green Setting (Gmax), s | 17.0 | 30.4 | 50.4 | 22.4 |
| Max Q Clear Time (g_c+I1), s | 5.9 | 21.2 | 2.7 | 15.1 |
| Green Ext Time (p_c), s | 0.1 | 3.0 | 0.5 | 1.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 21.6 |
| HCM 6th LOS | C |

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

| Movement | WBL | WBR | NBT | NBR | SBL | SBT | | |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Traffic Volume (veh/h) | 155 | 551 | 119 | 321 | 781 | 97 | | |
| Future Volume (veh/h) | 155 | 551 | 119 | 321 | 781 | 97 | | |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 0.96 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | | |
| Adj Flow Rate, veh/h | 155 | 455 | 119 | 193 | 781 | 97 | | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Cap, veh/h | 386 | 1940 | 545 | 411 | 2017 | 1470 | | |
| Arrive On Green | 0.11 | 0.11 | 0.15 | 0.15 | 0.58 | 0.79 | | |
| Sat Flow, veh/h | 3456 | 2790 | 3647 | 1524 | 3456 | 1870 | | |
| Grp Volume(v), veh/h | 155 | 455 | 119 | 193 | 781 | 97 | | |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1395 | 1777 | 1524 | 1728 | 1870 | | |
| Q Serve(g_s), s | 3.3 | 4.7 | 2.3 | 8.5 | 9.7 | 0.9 | | |
| Cycle Q Clear(g_c), s | 3.3 | 4.7 | 2.3 | 8.5 | 9.7 | 0.9 | | |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 386 | 1940 | 545 | 411 | 2017 | 1470 | | |
| V/C Ratio(X) | 0.40 | 0.23 | 0.22 | 0.47 | 0.39 | 0.07 | | |
| Avail Cap(c_a), veh/h | 1024 | 2455 | 1026 | 617 | 2017 | 1470 | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 0.80 | 0.80 | | |
| Uniform Delay (d), s/veh | 33.0 | 4.4 | 29.7 | 24.7 | 9.0 | 1.9 | | |
| Incr Delay (d2), s/veh | 0.7 | 0.1 | 0.2 | 0.8 | 0.0 | 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 | 1.4 | 6.6 | 1.0 | 3.6 | 3.2 | 0.2 | | |
| Unsig. Movement Delay, s/veh | | | | | | | | |
| LnGrp Delay(d),s/veh | 33.7 | 4.5 | 29.9 | 25.6 | 9.0 | 2.0 | | |
| LnGrp LOS | C | A | C | C | A | A | | |
| Approach Vol, veh/h | 610 | | 312 | | | 878 | | |
| Approach Delay, s/veh | 11.9 | | 27.2 | | | 8.2 | | |
| Approach LOS | B | | C | | | A | | |
| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 |
| Phs Duration (G+Y+Rc), s | | | | 66.8 | | 13.2 | 50.6 | 16.2 |
| Change Period (Y+Rc), s | | | | 3.9 | | 4.3 | 3.9 | 3.9 |
| Max Green Setting (Gmax), s | | | | 48.1 | | 23.7 | 21.1 | 23.1 |
| Max Q Clear Time (g_c+I1), s | | | | 2.9 | | 6.7 | 11.7 | 10.5 |
| Green Ext Time (p_c), s | | | | 0.6 | | 2.2 | 1.3 | 1.1 |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 12.8 |
| HCM 6th LOS | | B |

Notes

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





| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12.1 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 39 | 58 | 9 | 93 | 85 | 62 | 5 | 125 | 132 | 85 | 195 | 49 |
| Future Vol, veh/h | 39 | 58 | 9 | 93 | 85 | 62 | 5 | 125 | 132 | 85 | 195 | 49 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 58 | 9 | 93 | 85 | 62 | 5 | 125 | 132 | 85 | 195 | 49 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| Approach | EB | | | WB | | | NB | | | SB | | |
| Opposing Approach | WB | | | EB | | | SB | | | NB | | |
| Opposing Lanes | 1 | | | 1 | | | 1 | | | 1 | | |
| Conflicting Approach Left | SB | | | NB | | | EB | | | WB | | |
| Conflicting Lanes Left | 1 | | | 1 | | | 1 | | | 1 | | |
| Conflicting Approach Right | NB | | | SB | | | WB | | | EB | | |
| Conflicting Lanes Right | 1 | | | 1 | | | 1 | | | 1 | | |
| HCM Control Delay | 10.3 | | | 12 | | | 11.3 | | | 13.3 | | |
| HCM LOS | B | | | B | | | B | | | B | | |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 2% | 37% | 39% | 26% |
| Vol Thru, % | 48% | 55% | 35% | 59% |
| Vol Right, % | 50% | 8% | 26% | 15% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 262 | 106 | 240 | 329 |
| LT Vol | 5 | 39 | 93 | 85 |
| Through Vol | 125 | 58 | 85 | 195 |
| RT Vol | 132 | 9 | 62 | 49 |
| Lane Flow Rate | 262 | 106 | 240 | 329 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.376 | 0.176 | 0.374 | 0.485 |
| Departure Headway (Hd) | 5.164 | 5.974 | 5.609 | 5.309 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 694 | 598 | 638 | 678 |
| Service Time | 3.215 | 4.037 | 3.661 | 3.356 |
| HCM Lane V/C Ratio | 0.378 | 0.177 | 0.376 | 0.485 |
| HCM Control Delay | 11.3 | 10.3 | 12 | 13.3 |
| HCM Lane LOS | B | B | B | B |
| HCM 95th-tile Q | 1.8 | 0.6 | 1.7 | 2.7 |

## HCM 6th TWSC
2: Airway Dr & Airway Ct

03/28/2023

| Intersection | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Int Delay, s/veh | 3 | | | | | | | | | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 4 | 0 | 2 | 81 | 0 | 40 | 0 | 212 | 53 | 30 | 277 | 0 |
| Future Vol, veh/h | 4 | 0 | 2 | 81 | 0 | 40 | 0 | 212 | 53 | 30 | 277 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 0 | 2 | 81 | 0 | 40 | 0 | 212 | 53 | 30 | 277 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 596 | 602 | 277 | 577 | 576 | 239 | 277 | 0 | 0 | 265 | 0 | 0 |
| Stage 1 | 337 | 337 | - | 239 | 239 | - | - | - | - | - | - | - |
| Stage 2 | 259 | 265 | - | 338 | 337 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 415 | 414 | 762 | 428 | 428 | 800 | 1286 | - | - | 1299 | - | - |
| Stage 1 | 677 | 641 | - | 764 | 708 | - | - | - | - | - | - | - |
| Stage 2 | 746 | 689 | - | 676 | 641 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 386 | 403 | 762 | 418 | 416 | 800 | 1286 | - | - | 1299 | - | - |
| Mov Cap-2 Maneuver | 386 | 403 | - | 418 | 416 | - | - | - | - | - | - | - |
| Stage 1 | 677 | 624 | - | 764 | 708 | - | - | - | - | - | - | - |
| Stage 2 | 709 | 689 | - | 656 | 624 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 12.9 | 14.6 | 0 | 0.8 |
| HCM LOS | B | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1286 | - | - | 462 | 496 | 1299 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.013 | 0.244 | 0.023 | - | - |
| HCM Control Delay (s) | 0 | - | - | 12.9 | 14.6 | 7.8 | 0 | - |
| HCM Lane LOS | A | - | - | B | B | A | A | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 0.9 | 0.1 | - | - |



## HCM 6th Signalized Intersection Summary
3: Piner Rd & Airway Dr

03/28/2023

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 108 | 675 | 0 | 3 | 986 | 168 | 0 | 0 | 8 | 223 | 0 | 205 |
| Future Volume (veh/h) | 108 | 675 | 0 | 3 | 986 | 168 | 0 | 0 | 8 | 223 | 0 | 205 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 108 | 675 | 0 | 3 | 986 | 149 | 0 | 0 | 3 | 223 | 0 | 145 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 140 | 1809 | 0 | 6 | 1339 | 202 | 0 | 0 | 4 | 327 | 0 | 291 |
| Arrive On Green | 0.08 | 0.51 | 0.00 | 0.00 | 0.43 | 0.43 | 0.00 | 0.00 | 0.00 | 0.18 | 0.00 | 0.18 |
| Sat Flow, veh/h | 1781 | 3647 | 0 | 1781 | 3085 | 466 | 0 | 0 | 1585 | 1781 | 0 | 1585 |
| Grp Volume(v), veh/h | 108 | 675 | 0 | 3 | 568 | 567 | 0 | 0 | 3 | 223 | 0 | 145 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 0 | 1781 | 1777 | 1774 | 0 | 0 | 1585 | 1781 | 0 | 1585 |
| Q Serve(g_s), s | 2.5 | 4.9 | 0.0 | 0.1 | 11.2 | 11.3 | 0.0 | 0.0 | 0.1 | 4.9 | 0.0 | 3.5 |
| Cycle Q Clear(g_c), s | 2.5 | 4.9 | 0.0 | 0.1 | 11.2 | 11.3 | 0.0 | 0.0 | 0.1 | 4.9 | 0.0 | 3.5 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 0.26 | 0.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 140 | 1809 | 0 | 6 | 771 | 770 | 0 | 0 | 4 | 327 | 0 | 291 |
| V/C Ratio(X) | 0.77 | 0.37 | 0.00 | 0.51 | 0.74 | 0.74 | 0.00 | 0.00 | 0.80 | 0.68 | 0.00 | 0.50 |
| Avail Cap(c_a), veh/h | 715 | 3055 | 0 | 295 | 1528 | 1525 | 0 | 0 | 636 | 917 | 0 | 816 |
| 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 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 19.1 | 6.3 | 0.0 | 21.1 | 10.0 | 10.0 | 0.0 | 0.0 | 21.1 | 16.1 | 0.0 | 15.5 |
| Incr Delay (d2), s/veh | 3.4 | 0.0 | 0.0 | 23.6 | 0.5 | 0.5 | 0.0 | 0.0 | 81.4 | 0.9 | 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 | 1.0 | 1.1 | 0.0 | 0.1 | 3.1 | 3.1 | 0.0 | 0.0 | 0.1 | 1.7 | 0.0 | 1.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 22.6 | 6.3 | 0.0 | 44.7 | 10.5 | 10.5 | 0.0 | 0.0 | 102.5 | 17.1 | 0.0 | 16.0 |
| LnGrp LOS | C | A | A | D | B | B | A | A | F | B | A | B |
| Approach Vol, veh/h | | 783 | | | 1138 | | | 3 | | | 368 | |
| Approach Delay, s/veh | | 8.6 | | | 10.6 | | | 102.5 | | | 16.7 | |
| Approach LOS | | A | | | B | | | F | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 3.1 | 25.2 | | 11.0 | 6.3 | 22.0 | | 3.1 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | 3.2 | 3.0 | 3.6 | | 3.0 |
| Max Green Setting (Gmax), s | 7.0 | 36.4 | | 21.8 | 17.0 | 36.4 | | 17.0 |
| Max Q Clear Time (g_c+I1), s | 2.1 | 6.9 | | 6.9 | 4.5 | 13.3 | | 2.1 |
| Green Ext Time (p_c), s | 0.0 | 3.1 | | 0.9 | 0.1 | 5.1 | | 0.0 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 11.0 |
| HCM 6th LOS | | | B |

## HCM 6th Signalized Intersection Summary
### 4: Range Ave & Piner Rd

03/28/2023

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 175 | 783 | 109 | 197 | 967 | 157 |
| Future Volume (veh/h) | 175 | 783 | 109 | 197 | 967 | 157 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 175 | 748 | 109 | 197 | 967 | 145 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 655 | 1067 | 139 | 1647 | 1142 | 648 |
| Arrive On Green | 0.35 | 0.35 | 0.08 | 0.46 | 0.33 | 0.33 |
| Sat Flow, veh/h | 1870 | 1550 | 1781 | 3647 | 3456 | 1585 |
| Grp Volume(v), veh/h | 175 | 748 | 109 | 197 | 967 | 145 |
| Grp Sat Flow(s),veh/h/ln | 1870 | 1550 | 1781 | 1777 | 1728 | 1585 |
| Q Serve(g_s), s | 5.7 | 25.3 | 5.1 | 2.7 | 22.1 | 5.1 |
| Cycle Q Clear(g_c), s | 5.7 | 25.3 | 5.1 | 2.7 | 22.1 | 5.1 |
| Prop In Lane | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 655 | 1067 | 139 | 1647 | 1142 | 648 |
| V/C Ratio(X) | 0.27 | 0.70 | 0.79 | 0.12 | 0.85 | 0.22 |
| Avail Cap(c_a), veh/h | 655 | 1067 | 210 | 1647 | 1561 | 840 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.96 | 0.96 | 1.00 | 1.00 | 0.91 | 0.91 |
| Uniform Delay (d), s/veh | 19.8 | 8.4 | 38.5 | 12.9 | 26.4 | 16.4 |
| Incr Delay (d2), s/veh | 1.0 | 3.7 | 10.6 | 0.1 | 7.2 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.6 | 16.6 | 2.6 | 1.1 | 9.8 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 20.7 | 12.1 | 49.1 | 13.1 | 33.6 | 17.1 |
| LnGrp LOS | C | B | D | B | C | B |
| Approach Vol, veh/h | 923 | | | 306 | 1112 | |
| Approach Delay, s/veh | 13.7 | | | 25.9 | 31.5 | |
| Approach LOS | B | | | C | C | |

| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.6 | 33.4 | | | | 43.0 | | 31.7 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | | | 3.6 | | 3.6 |
| Max Green Setting (Gmax), s | 10.0 | 26.4 | | | | 39.4 | | 38.4 |
| Max Q Clear Time (g_c+I1), s | 7.1 | 27.3 | | | | 4.7 | | 24.1 |
| Green Ext Time (p_c), s | 0.1 | 0.0 | | | | 1.3 | | 4.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 23.7 |
| HCM 6th LOS | C |

**Notes**

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



## HCM 6th Signalized Intersection Summary
### 5: Range Ave & Bicentennial Way

03/28/2023

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 400 | 941 | 185 | 225 | 666 | 236 |
| Future Volume (veh/h) | 400 | 941 | 185 | 225 | 666 | 236 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 0.97 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 400 | 826 | 185 | 122 | 666 | 236 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 613 | 2098 | 375 | 443 | 1986 | 1358 |
| Arrive On Green | 0.18 | 0.18 | 0.11 | 0.11 | 0.57 | 0.73 |
| Sat Flow, veh/h | 3456 | 2790 | 3647 | 1533 | 3456 | 1870 |
| Grp Volume(v), veh/h | 400 | 826 | 185 | 122 | 666 | 236 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1395 | 1777 | 1533 | 1728 | 1870 |
| Q Serve(g_s), s | 9.2 | 8.9 | 4.2 | 5.3 | 8.6 | 3.4 |
| Cycle Q Clear(g_c), s | 9.2 | 8.9 | 4.2 | 5.3 | 8.6 | 3.4 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 613 | 2098 | 375 | 443 | 1986 | 1358 |
| V/C Ratio(X) | 0.65 | 0.39 | 0.49 | 0.28 | 0.34 | 0.17 |
| Avail Cap(c_a), veh/h | 882 | 2316 | 966 | 698 | 1986 | 1358 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 0.77 | 0.77 |
| Uniform Delay (d), s/veh | 32.5 | 3.7 | 35.9 | 23.7 | 9.5 | 3.6 |
| Incr Delay (d2), s/veh | 1.2 | 0.1 | 1.0 | 0.3 | 0.0 | 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 | 8.7 | 12.2 | 1.8 | 2.5 | 3.0 | 1.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 33.7 | 3.8 | 36.9 | 24.1 | 9.5 | 3.9 |
| LnGrp LOS | C | A | D | C | A | A |
| Approach Vol, veh/h | 1226 | | 307 | | | 902 |
| Approach Delay, s/veh | 13.6 | | 31.8 | | | 8.1 |
| Approach LOS | B | | C | | | A |

| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | | | 65.6 | | 19.4 | 52.8 | 12.9 |
| Change Period (Y+Rc), s | | | | 3.9 | | 4.3 | 3.9 | 3.9 |
| Max Green Setting (Gmax), s | | | | 55.1 | | 21.7 | 28.1 | 23.1 |
| Max Q Clear Time (g_c+I1), s | | | | 5.4 | | 11.2 | 10.6 | 7.3 |
| Green Ext Time (p_c), s | | | | 1.5 | | 3.9 | 1.3 | 1.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 13.8 |
| HCM 6th LOS | B |

**Notes**

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

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.7 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 39 | 63 | 7 | 37 | 56 | 35 | 9 | 95 | 84 | 108 | 132 | 26 |
| Future Vol, veh/h | 39 | 63 | 7 | 37 | 56 | 35 | 9 | 95 | 84 | 108 | 132 | 26 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 63 | 7 | 37 | 56 | 35 | 9 | 95 | 84 | 108 | 132 | 26 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 9.3 | 9.2 | 9.1 | 10.5 |
| HCM LOS | A | A | A | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 5% | 36% | 29% | 41% |
| Vol Thru, % | 51% | 58% | 44% | 50% |
| Vol Right, % | 45% | 6% | 27% | 10% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 188 | 109 | 128 | 266 |
| LT Vol | 9 | 39 | 37 | 108 |
| Through Vol | 95 | 63 | 56 | 132 |
| RT Vol | 84 | 7 | 35 | 26 |
| Lane Flow Rate | 188 | 109 | 128 | 266 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.24 | 0.158 | 0.179 | 0.353 |
| Departure Headway (Hd) | 4.604 | 5.203 | 5.04 | 4.779 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 775 | 683 | 705 | 747 |
| Service Time | 2.67 | 3.282 | 3.116 | 2.84 |
| HCM Lane V/C Ratio | 0.243 | 0.16 | 0.182 | 0.356 |
| HCM Control Delay | 9.1 | 9.3 | 9.2 | 10.5 |
| HCM Lane LOS | A | A | A | B |
| HCM 95th-tile Q | 0.9 | 0.6 | 0.6 | 1.6 |





| Intersection | |
|---|---|
| Int Delay, s/veh | 0.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 5 | 0 | 6 | 7 | 190 | 44 | 16 | 164 | 4 |
| Future Vol, veh/h | 0 | 0 | 0 | 5 | 0 | 6 | 7 | 190 | 44 | 16 | 164 | 4 |
| Conflicting Peds, #/hr | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 0 | 0 | 5 | 0 | 6 | 7 | 190 | 44 | 16 | 164 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 429 | 448 | 168 | 426 | 428 | 214 | 169 | 0 | 0 | 235 | 0 | 0 |
| Stage 1 | 199 | 199 | - | 227 | 227 | - | - | - | - | - | - | - |
| Stage 2 | 230 | 249 | - | 199 | 201 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 536 | 506 | 876 | 539 | 519 | 826 | 1409 | - | - | 1332 | - | - |
| Stage 1 | 803 | 736 | - | 776 | 716 | - | - | - | - | - | - | - |
| Stage 2 | 773 | 701 | - | 803 | 735 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 524 | 495 | 874 | 530 | 508 | 824 | 1408 | - | - | 1331 | - | - |
| Mov Cap-2 Maneuver | 524 | 495 | - | 530 | 508 | - | - | - | - | - | - | - |
| Stage 1 | 797 | 726 | - | 771 | 711 | - | - | - | - | - | - | - |
| Stage 2 | 762 | 696 | - | 792 | 725 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0 | 10.6 | 0.2 | 0.7 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1408 | - | - | - | 658 | 1331 | - | - |
| HCM Lane V/C Ratio | 0.005 | - | - | - | 0.017 | 0.012 | - | - |
| HCM Control Delay (s) | 7.6 | 0 | - | 0 | 10.6 | 7.7 | 0 | - |
| HCM Lane LOS | A | A | - | A | B | A | A | - |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 | 0 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 125 | 872 | 0 | 5 | 514 | 132 | 1 | 0 | 0 | 103 | 0 | 81 |
| Future Volume (veh/h) | 125 | 872 | 0 | 5 | 514 | 132 | 1 | 0 | 0 | 103 | 0 | 81 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 125 | 872 | 0 | 5 | 514 | 113 | 1 | 0 | 0 | 103 | 0 | 40 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 160 | 1489 | 0 | 10 | 970 | 212 | 7 | 0 | 0 | 191 | 0 | 169 |
| Arrive On Green | 0.09 | 0.42 | 0.00 | 0.01 | 0.33 | 0.33 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.11 |
| Sat Flow, veh/h | 1781 | 3647 | 0 | 1781 | 2896 | 634 | 1781 | 0 | 0 | 1781 | 0 | 1572 |
| Grp Volume(v), veh/h | 125 | 872 | 0 | 5 | 314 | 313 | 1 | 0 | 0 | 103 | 0 | 40 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 0 | 1781 | 1777 | 1753 | 1781 | 0 | 0 | 1781 | 0 | 1572 |
| Q Serve(g_s), s | 1.9 | 5.2 | 0.0 | 0.1 | 3.9 | 4.0 | 0.0 | 0.0 | 0.0 | 1.5 | 0.0 | 0.6 |
| Cycle Q Clear(g_c), s | 1.9 | 5.2 | 0.0 | 0.1 | 3.9 | 4.0 | 0.0 | 0.0 | 0.0 | 1.5 | 0.0 | 0.6 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 0.36 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 160 | 1489 | 0 | 10 | 595 | 587 | 7 | 0 | 0 | 191 | 0 | 169 |
| V/C Ratio(X) | 0.78 | 0.59 | 0.00 | 0.51 | 0.53 | 0.53 | 0.15 | 0.00 | 0.00 | 0.54 | 0.00 | 0.24 |
| Avail Cap(c_a), veh/h | 1106 | 4726 | 0 | 456 | 2363 | 2331 | 1106 | 0 | 0 | 1419 | 0 | 1252 |
| 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 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.2 | 6.1 | 0.0 | 13.6 | 7.4 | 7.4 | 13.6 | 0.0 | 0.0 | 11.6 | 0.0 | 11.2 |
| Incr Delay (d2), s/veh | 3.2 | 0.1 | 0.0 | 14.8 | 0.3 | 0.3 | 4.0 | 0.0 | 0.0 | 0.9 | 0.0 | 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 | 0.7 | 0.8 | 0.0 | 0.1 | 0.8 | 0.8 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.4 | 6.3 | 0.0 | 28.4 | 7.6 | 7.7 | 17.6 | 0.0 | 0.0 | 12.5 | 0.0 | 11.5 |
| LnGrp LOS | B | A | A | C | A | A | B | A | A | B | A | B |
| Approach Vol, veh/h | | 997 | | | 632 | | | 1 | | | 143 | |
| Approach Delay, s/veh | | 7.4 | | | 7.8 | | | 17.6 | | | 12.2 | |
| Approach LOS | | A | | | A | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 3.1 | 15.1 | | 6.1 | 5.5 | 12.8 | | 3.0 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | 3.2 | 3.0 | 3.6 | | 3.0 |
| Max Green Setting (Gmax), s | 7.0 | 36.4 | | 21.8 | 17.0 | 36.4 | | 17.0 |
| Max Q Clear Time (g_c+I1), s | 2.1 | 7.2 | | 3.5 | 3.9 | 6.0 | | 2.0 |
| Green Ext Time (p_c), s | 0.0 | 4.3 | | 0.3 | 0.1 | 2.5 | | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 7.9 |
| HCM 6th LOS | A |





| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 173 | 792 | 88 | 82 | 593 | 78 |
| Future Volume (veh/h) | 173 | 792 | 88 | 82 | 593 | 78 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 173 | 740 | 88 | 82 | 593 | 66 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 987 | 1149 | 115 | 2239 | 721 | 433 |
| Arrive On Green | 0.53 | 0.53 | 0.06 | 0.63 | 0.21 | 0.21 |
| Sat Flow, veh/h | 1870 | 1551 | 1781 | 3647 | 3456 | 1585 |
| Grp Volume(v), veh/h | 173 | 740 | 88 | 82 | 593 | 66 |
| Grp Sat Flow(s),veh/h/ln | 1870 | 1551 | 1781 | 1777 | 1728 | 1585 |
| Q Serve(g_s), s | 3.8 | 19.2 | 3.9 | 0.7 | 13.1 | 2.5 |
| Cycle Q Clear(g_c), s | 3.8 | 19.2 | 3.9 | 0.7 | 13.1 | 2.5 |
| Prop In Lane | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 987 | 1149 | 115 | 2239 | 721 | 433 |
| V/C Ratio(X) | 0.18 | 0.64 | 0.76 | 0.04 | 0.82 | 0.15 |
| Avail Cap(c_a), veh/h | 987 | 1149 | 379 | 2239 | 968 | 546 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.93 | 0.93 | 1.00 | 1.00 | 0.98 | 0.98 |
| Uniform Delay (d), s/veh | 9.8 | 5.3 | 36.8 | 5.6 | 30.2 | 22.0 |
| Incr Delay (d2), s/veh | 0.4 | 2.6 | 10.0 | 0.0 | 10.0 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 11.6 | 2.0 | 0.2 | 6.3 | 1.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 10.2 | 7.9 | 46.9 | 5.6 | 40.3 | 22.8 |
| LnGrp LOS | B | A | D | A | D | C |
| Approach Vol, veh/h | 913 | | | 170 | 659 | |
| Approach Delay, s/veh | 8.3 | | | 27.0 | 38.5 | |
| Approach LOS | A | | | C | D | |

| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.2 | 45.8 | | | | 54.0 | | 20.3 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | | | 3.6 | | 3.6 |
| Max Green Setting (Gmax), s | 17.0 | 30.4 | | | | 50.4 | | 22.4 |
| Max Q Clear Time (g_c+I1), s | 5.9 | 21.2 | | | | 2.7 | | 15.1 |
| Green Ext Time (p_c), s | 0.1 | 3.0 | | | | 0.5 | | 1.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 21.6 |
| HCM 6th LOS | C |

Notes

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

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 159 | 552 | 119 | 322 | 782 | 97 |
| Future Volume (veh/h) | 159 | 552 | 119 | 322 | 782 | 97 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 0.96 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 159 | 456 | 119 | 194 | 782 | 97 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 388 | 1939 | 546 | 412 | 2014 | 1469 |
| Arrive On Green | 0.11 | 0.11 | 0.15 | 0.15 | 0.58 | 0.79 |
| Sat Flow, veh/h | 3456 | 2790 | 3647 | 1524 | 3456 | 1870 |
| Grp Volume(v), veh/h | 159 | 456 | 119 | 194 | 782 | 97 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1395 | 1777 | 1524 | 1728 | 1870 |
| Q Serve(g_s), s | 3.4 | 4.8 | 2.3 | 8.6 | 9.8 | 0.9 |
| Cycle Q Clear(g_c), s | 3.4 | 4.8 | 2.3 | 8.6 | 9.8 | 0.9 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 388 | 1939 | 546 | 412 | 2014 | 1469 |
| V/C Ratio(X) | 0.41 | 0.24 | 0.22 | 0.47 | 0.39 | 0.07 |
| Avail Cap(c_a), veh/h | 1024 | 2452 | 1026 | 618 | 2014 | 1469 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 0.80 | 0.80 |
| Uniform Delay (d), s/veh | 33.0 | 4.4 | 29.6 | 24.7 | 9.0 | 1.9 |
| Incr Delay (d2), s/veh | 0.7 | 0.1 | 0.2 | 0.8 | 0.0 | 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 | 1.4 | 6.6 | 1.0 | 3.6 | 3.2 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 33.7 | 4.5 | 29.8 | 25.5 | 9.0 | 2.0 |
| LnGrp LOS | C | A | C | C | A | A |
| Approach Vol, veh/h | 615 | | 313 | | | 879 |
| Approach Delay, s/veh | 12.1 | | 27.2 | | | 8.3 |
| Approach LOS | B | | C | | | A |

| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | | | 66.7 | | 13.3 | 50.5 | 16.2 |
| Change Period (Y+Rc), s | | | | 3.9 | | 4.3 | 3.9 | 3.9 |
| Max Green Setting (Gmax), s | | | | 48.1 | | 23.7 | 21.1 | 23.1 |
| Max Q Clear Time (g_c+I1), s | | | | 2.9 | | 6.8 | 11.8 | 10.6 |
| Green Ext Time (p_c), s | | | | 0.6 | | 2.2 | 1.3 | 1.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 12.8 |
| HCM 6th LOS | B |

Notes

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





| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12.2 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 39 | 60 | 9 | 93 | 87 | 62 | 5 | 127 | 132 | 85 | 199 | 49 |
| Future Vol, veh/h | 39 | 60 | 9 | 93 | 87 | 62 | 5 | 127 | 132 | 85 | 199 | 49 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 60 | 9 | 93 | 87 | 62 | 5 | 127 | 132 | 85 | 199 | 49 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 10.4 | 12.1 | 11.4 | 13.5 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 2% | 36% | 38% | 26% |
| Vol Thru, % | 48% | 56% | 36% | 60% |
| Vol Right, % | 50% | 8% | 26% | 15% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 264 | 108 | 242 | 333 |
| LT Vol | 5 | 39 | 93 | 85 |
| Through Vol | 127 | 60 | 87 | 199 |
| RT Vol | 132 | 9 | 62 | 49 |
| Lane Flow Rate | 264 | 108 | 242 | 333 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.381 | 0.18 | 0.379 | 0.493 |
| Departure Headway (Hd) | 5.194 | 6.002 | 5.635 | 5.332 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 689 | 595 | 636 | 673 |
| Service Time | 3.245 | 4.069 | 3.691 | 3.38 |
| HCM Lane V/C Ratio | 0.383 | 0.182 | 0.381 | 0.495 |
| HCM Control Delay | 11.4 | 10.4 | 12.1 | 13.5 |
| HCM Lane LOS | B | B | B | B |
| HCM 95th-tile Q | 1.8 | 0.7 | 1.8 | 2.7 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 4 | 0 | 2 | 81 | 0 | 40 | 0 | 214 | 53 | 30 | 281 | 0 |
| Future Vol, veh/h | 4 | 0 | 2 | 81 | 0 | 40 | 0 | 214 | 53 | 30 | 281 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 0 | 2 | 81 | 0 | 40 | 0 | 214 | 53 | 30 | 281 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 602 | 608 | 281 | 583 | 582 | 241 | 281 | 0 | 0 | 267 | 0 | 0 |
| Stage 1 | 341 | 341 | - | 241 | 241 | - | - | - | - | - | - | - |
| Stage 2 | 261 | 267 | - | 342 | 341 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 412 | 410 | 758 | 424 | 425 | 798 | 1282 | - | - | 1297 | - | - |
| Stage 1 | 674 | 639 | - | 762 | 706 | - | - | - | - | - | - | - |
| Stage 2 | 744 | 688 | - | 673 | 639 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 383 | 399 | 758 | 414 | 414 | 798 | 1282 | - | - | 1297 | - | - |
| Mov Cap-2 Maneuver | 383 | 399 | - | 414 | 414 | - | - | - | - | - | - | - |
| Stage 1 | 674 | 622 | - | 762 | 706 | - | - | - | - | - | - | - |
| Stage 2 | 707 | 688 | - | 653 | 622 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 12.9 | 14.7 | 0 | 0.8 |
| HCM LOS | B | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1282 | - | - | 459 | 492 | 1297 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.013 | 0.246 | 0.023 | - | - |
| HCM Control Delay (s) | 0 | - | - | 12.9 | 14.7 | 7.8 | 0 | - |
| HCM Lane LOS | A | - | - | B | B | A | A | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 1 | 0.1 | - | - |





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 109 | 675 | 0 | 3 | 986 | 169 | 0 | 0 | 8 | 225 | 0 | 207 |
| Future Volume (veh/h) | 109 | 675 | 0 | 3 | 986 | 169 | 0 | 0 | 8 | 225 | 0 | 207 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 109 | 675 | 0 | 3 | 986 | 150 | 0 | 0 | 3 | 225 | 0 | 147 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 141 | 1811 | 0 | 6 | 1336 | 203 | 0 | 0 | 4 | 328 | 0 | 292 |
| Arrive On Green | 0.08 | 0.51 | 0.00 | 0.00 | 0.43 | 0.43 | 0.00 | 0.00 | 0.00 | 0.18 | 0.00 | 0.18 |
| Sat Flow, veh/h | 1781 | 3647 | 0 | 1781 | 3081 | 468 | 0 | 0 | 1585 | 1781 | 0 | 1585 |
| Grp Volume(v), veh/h | 109 | 675 | 0 | 3 | 568 | 568 | 0 | 0 | 3 | 225 | 0 | 147 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 0 | 1781 | 1777 | 1773 | 0 | 0 | 1585 | 1781 | 0 | 1585 |
| Q Serve(g_s), s | 2.6 | 4.9 | 0.0 | 0.1 | 11.3 | 11.4 | 0.0 | 0.0 | 0.1 | 5.0 | 0.0 | 3.5 |
| Cycle Q Clear(g_c), s | 2.6 | 4.9 | 0.0 | 0.1 | 11.3 | 11.4 | 0.0 | 0.0 | 0.1 | 5.0 | 0.0 | 3.5 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 0.26 | 0.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 141 | 1811 | 0 | 6 | 771 | 769 | 0 | 0 | 4 | 328 | 0 | 292 |
| V/C Ratio(X) | 0.77 | 0.37 | 0.00 | 0.51 | 0.74 | 0.74 | 0.00 | 0.00 | 0.81 | 0.69 | 0.00 | 0.50 |
| Avail Cap(c_a), veh/h | 712 | 3040 | 0 | 293 | 1520 | 1516 | 0 | 0 | 633 | 912 | 0 | 812 |
| 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 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 19.2 | 6.3 | 0.0 | 21.2 | 10.0 | 10.0 | 0.0 | 0.0 | 21.2 | 16.2 | 0.0 | 15.6 |
| Incr Delay (d2), s/veh | 3.4 | 0.0 | 0.0 | 23.7 | 0.5 | 0.5 | 0.0 | 0.0 | 82.6 | 1.0 | 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 | 1.0 | 1.1 | 0.0 | 0.1 | 3.1 | 3.1 | 0.0 | 0.0 | 0.1 | 1.8 | 0.0 | 1.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 22.6 | 6.4 | 0.0 | 44.8 | 10.6 | 10.6 | 0.0 | 0.0 | 103.8 | 17.2 | 0.0 | 16.1 |
| LnGrp LOS | C | A | A | D | B | B | A | A | F | B | A | B |
| Approach Vol, veh/h | | 784 | | | 1139 | | | 3 | | | 372 | |
| Approach Delay, s/veh | | 8.6 | | | 10.7 | | | 103.8 | | | 16.7 | |
| Approach LOS | | A | | | B | | | F | | | B | |

| Timer - Assigned Phs | 1 | 2 | 4 | 5 | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 3.1 | 25.3 | 11.0 | 6.4 | 22.1 | 3.1 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | 3.2 | 3.0 | 3.6 | 3.0 |
| Max Green Setting (Gmax), s | 7.0 | 36.4 | 21.8 | 17.0 | 36.4 | 17.0 |
| Max Q Clear Time (g_c+I1), s | 2.1 | 6.9 | 7.0 | 4.6 | 13.4 | 2.1 |
| Green Ext Time (p_c), s | 0.0 | 3.1 | 0.9 | 0.1 | 5.1 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 11.1 |
| HCM 6th LOS | B |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 175 | 785 | 109 | 197 | 968 | 157 |
| Future Volume (veh/h) | 175 | 785 | 109 | 197 | 968 | 157 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 175 | 750 | 109 | 197 | 968 | 145 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 655 | 1067 | 139 | 1647 | 1143 | 648 |
| Arrive On Green | 0.35 | 0.35 | 0.08 | 0.46 | 0.33 | 0.33 |
| Sat Flow, veh/h | 1870 | 1550 | 1781 | 3647 | 3456 | 1585 |
| Grp Volume(v), veh/h | 175 | 750 | 109 | 197 | 968 | 145 |
| Grp Sat Flow(s),veh/h/ln | 1870 | 1550 | 1781 | 1777 | 1728 | 1585 |
| Q Serve(g_s), s | 5.7 | 25.4 | 5.1 | 2.7 | 22.1 | 5.1 |
| Cycle Q Clear(g_c), s | 5.7 | 25.4 | 5.1 | 2.7 | 22.1 | 5.1 |
| Prop In Lane | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 655 | 1067 | 139 | 1647 | 1143 | 648 |
| V/C Ratio(X) | 0.27 | 0.70 | 0.79 | 0.12 | 0.85 | 0.22 |
| Avail Cap(c_a), veh/h | 655 | 1067 | 210 | 1647 | 1561 | 840 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.96 | 0.96 | 1.00 | 1.00 | 0.91 | 0.91 |
| Uniform Delay (d), s/veh | 19.8 | 8.4 | 38.5 | 12.9 | 26.4 | 16.4 |
| Incr Delay (d2), s/veh | 1.0 | 3.7 | 10.6 | 0.1 | 7.2 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.6 | 16.6 | 2.6 | 1.1 | 9.8 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 20.7 | 12.1 | 49.1 | 13.1 | 33.6 | 17.1 |
| LnGrp LOS | C | B | D | B | C | B |
| Approach Vol, veh/h | 925 | | | 306 | 1113 | |
| Approach Delay, s/veh | 13.7 | | | 25.9 | 31.4 | |
| Approach LOS | B | | | C | C | |

| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.6 | 33.4 | | | | 43.0 | | 31.7 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | | | 3.6 | | 3.6 |
| Max Green Setting (Gmax), s | 10.0 | 26.4 | | | | 39.4 | | 38.4 |
| Max Q Clear Time (g_c+I1), s | 7.1 | 27.4 | | | | 4.7 | | 24.1 |
| Green Ext Time (p_c), s | 0.1 | 0.0 | | | | 1.3 | | 4.0 |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 23.7 |
| HCM 6th LOS | | C |

**Notes**

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





| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 402 | 942 | 185 | 228 | 668 | 236 |
| Future Volume (veh/h) | 402 | 942 | 185 | 228 | 668 | 236 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 0.97 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 402 | 827 | 185 | 125 | 668 | 236 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 614 | 2094 | 381 | 446 | 1979 | 1357 |
| Arrive On Green | 0.18 | 0.18 | 0.11 | 0.11 | 0.57 | 0.73 |
| Sat Flow, veh/h | 3456 | 2790 | 3647 | 1533 | 3456 | 1870 |
| Grp Volume(v), veh/h | 402 | 827 | 185 | 125 | 668 | 236 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1395 | 1777 | 1533 | 1728 | 1870 |
| Q Serve(g_s), s | 9.2 | 8.9 | 4.2 | 5.4 | 8.7 | 3.4 |
| Cycle Q Clear(g_c), s | 9.2 | 8.9 | 4.2 | 5.4 | 8.7 | 3.4 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 614 | 2094 | 381 | 446 | 1979 | 1357 |
| V/C Ratio(X) | 0.65 | 0.39 | 0.49 | 0.28 | 0.34 | 0.17 |
| Avail Cap(c_a), veh/h | 882 | 2310 | 966 | 699 | 1979 | 1357 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 0.76 | 0.76 |
| Uniform Delay (d), s/veh | 32.5 | 3.8 | 35.7 | 23.7 | 9.6 | 3.7 |
| Incr Delay (d2), s/veh | 1.2 | 0.1 | 1.0 | 0.3 | 0.0 | 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 | 3.8 | 12.2 | 1.8 | 2.5 | 3.0 | 1.1 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 33.7 | 3.9 | 36.7 | 24.0 | 9.6 | 3.9 |
| LnGrp LOS | C | A | D | C | A | A |
| Approach Vol, veh/h | 1229 | | 310 | | | 904 |
| Approach Delay, s/veh | 13.6 | | 31.6 | | | 8.1 |
| Approach LOS | B | | C | | | A |

| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | | | 65.6 | | 19.4 | 52.6 | 13.0 |
| Change Period (Y+Rc), s | | | | 3.9 | | 4.3 | 3.9 | 3.9 |
| Max Green Setting (Gmax), s | | | | 55.1 | | 21.7 | 28.1 | 23.1 |
| Max Q Clear Time (g_c+I1), s | | | | 5.4 | | 11.2 | 10.7 | 7.4 |
| Green Ext Time (p_c), s | | | | 1.5 | | 3.9 | 1.3 | 1.4 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 13.9 |
| HCM 6th LOS | | | B |

**Notes**

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

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.8 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 39 | 62 | 7 | 49 | 55 | 35 | 9 | 94 | 91 | 108 | 132 | 26 |
| Future Vol, veh/h | 39 | 62 | 7 | 49 | 55 | 35 | 9 | 94 | 91 | 108 | 132 | 26 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 62 | 7 | 49 | 55 | 35 | 9 | 94 | 91 | 108 | 132 | 26 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 9.3 | 9.4 | 9.2 | 10.6 |
| HCM LOS | A | A | A | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 5% | 36% | 35% | 41% |
| Vol Thru, % | 48% | 57% | 40% | 50% |
| Vol Right, % | 47% | 6% | 25% | 10% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 194 | 108 | 139 | 266 |
| LT Vol | 9 | 39 | 49 | 108 |
| Through Vol | 94 | 62 | 55 | 132 |
| RT Vol | 91 | 7 | 35 | 26 |
| Lane Flow Rate | 194 | 108 | 139 | 266 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.249 | 0.157 | 0.196 | 0.356 |
| Departure Headway (Hd) | 4.621 | 5.238 | 5.081 | 4.814 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 770 | 678 | 699 | 742 |
| Service Time | 2.692 | 3.324 | 3.163 | 2.881 |
| HCM Lane V/C Ratio | 0.252 | 0.159 | 0.199 | 0.358 |
| HCM Control Delay | 9.2 | 9.3 | 9.4 | 10.6 |
| HCM Lane LOS | A | A | A | B |
| HCM 95th-tile Q | 1 | 0.6 | 0.7 | 1.6 |





| Intersection | |
|---|---|
| Int Delay, s/veh | 1.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 19 | 0 | 14 | 7 | 188 | 69 | 30 | 162 | 4 |
| Future Vol, veh/h | 0 | 0 | 0 | 19 | 0 | 14 | 7 | 188 | 69 | 30 | 162 | 4 |
| Conflicting Peds, #/hr | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 0 | 0 | 19 | 0 | 14 | 7 | 188 | 69 | 30 | 162 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 470 | 497 | 166 | 463 | 465 | 225 | 167 | 0 | 0 | 258 | 0 | 0 |
| Stage 1 | 225 | 225 | - | 238 | 238 | - | - | - | - | - | - | - |
| Stage 2 | 245 | 272 | - | 225 | 227 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 504 | 475 | 878 | 509 | 495 | 814 | 1411 | - | - | 1307 | - | - |
| Stage 1 | 778 | 718 | - | 765 | 708 | - | - | - | - | - | - | - |
| Stage 2 | 759 | 685 | - | 778 | 716 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 483 | 459 | 876 | 496 | 479 | 812 | 1410 | - | - | 1306 | - | - |
| Mov Cap-2 Maneuver | 483 | 459 | - | 496 | 479 | - | - | - | - | - | - | - |
| Stage 1 | 773 | 699 | - | 760 | 703 | - | - | - | - | - | - | - |
| Stage 2 | 741 | 680 | - | 758 | 697 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0 | 11.4 | 0.2 | 1.2 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1410 | - | - | - | 594 | 1306 | - | - |
| HCM Lane V/C Ratio | 0.005 | - | - | - | 0.056 | 0.023 | - | - |
| HCM Control Delay (s) | 7.6 | 0 | - | 0 | 11.4 | 7.8 | 0 | - |
| HCM Lane LOS | A | A | - | A | B | A | A | - |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.2 | 0.1 | - | - |

## HCM 6th Signalized Intersection Summary
### 3: Piner Rd & Airway Dr

03/28/2023

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 130 | 872 | 0 | 5 | 514 | 150 | 1 | 0 | 0 | 113 | 0 | 83 |
| Future Volume (veh/h) | 130 | 872 | 0 | 5 | 514 | 150 | 1 | 0 | 0 | 113 | 0 | 83 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 130 | 872 | 0 | 5 | 514 | 131 | 1 | 0 | 0 | 113 | 0 | 42 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 167 | 1484 | 0 | 10 | 924 | 234 | 6 | 0 | 0 | 200 | 0 | 176 |
| Arrive On Green | 0.09 | 0.42 | 0.00 | 0.01 | 0.33 | 0.33 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.11 |
| Sat Flow, veh/h | 1781 | 3647 | 0 | 1781 | 2804 | 711 | 1781 | 0 | 0 | 1781 | 0 | 1572 |
| Grp Volume(v), veh/h | 130 | 872 | 0 | 5 | 325 | 320 | 1 | 0 | 0 | 113 | 0 | 42 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 0 | 1781 | 1777 | 1739 | 1781 | 0 | 0 | 1781 | 0 | 1572 |
| Q Serve(g_s), s | 2.0 | 5.2 | 0.0 | 0.1 | 4.1 | 4.2 | 0.0 | 0.0 | 0.0 | 1.7 | 0.0 | 0.7 |
| Cycle Q Clear(g_c), s | 2.0 | 5.2 | 0.0 | 0.1 | 4.1 | 4.2 | 0.0 | 0.0 | 0.0 | 1.7 | 0.0 | 0.7 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 0.41 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 167 | 1484 | 0 | 10 | 586 | 573 | 6 | 0 | 0 | 200 | 0 | 176 |
| V/C Ratio(X) | 0.78 | 0.59 | 0.00 | 0.51 | 0.55 | 0.56 | 0.15 | 0.00 | 0.00 | 0.57 | 0.00 | 0.24 |
| Avail Cap(c_a), veh/h | 1098 | 4691 | 0 | 452 | 2346 | 2295 | 1098 | 0 | 0 | 1408 | 0 | 1243 |
| 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 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.2 | 6.2 | 0.0 | 13.7 | 7.6 | 7.6 | 13.7 | 0.0 | 0.0 | 11.6 | 0.0 | 11.2 |
| Incr Delay (d2), s/veh | 3.0 | 0.1 | 0.0 | 14.8 | 0.3 | 0.3 | 4.1 | 0.0 | 0.0 | 0.9 | 0.0 | 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 | 0.7 | 0.8 | 0.0 | 0.1 | 0.9 | 0.8 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.2 | 6.3 | 0.0 | 28.5 | 7.9 | 7.9 | 17.8 | 0.0 | 0.0 | 12.5 | 0.0 | 11.4 |
| LnGrp LOS | B | A | A | C | A | A | B | A | A | B | A | B |
| Approach Vol, veh/h | | 1002 | | | 650 | | | 1 | | | 155 | |
| Approach Delay, s/veh | | 7.5 | | | 8.1 | | | 17.8 | | | 12.2 | |
| Approach LOS | | A | | | A | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 3.2 | 15.1 | | 6.3 | 5.6 | 12.7 | | 3.0 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | 3.2 | 3.0 | 3.6 | | 3.0 |
| Max Green Setting (Gmax), s | 7.0 | 36.4 | | 21.8 | 17.0 | 36.4 | | 17.0 |
| Max Q Clear Time (g_c+I1), s | 2.1 | 7.2 | | 3.7 | 4.0 | 6.2 | | 2.0 |
| Green Ext Time (p_c), s | 0.0 | 4.3 | | 0.4 | 0.1 | 2.6 | | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 8.1 |
| HCM 6th LOS | A |



## HCM 6th Signalized Intersection Summary
### 4: Range Ave & Piner Rd

03/28/2023

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 173 | 802 | 88 | 82 | 611 | 78 |
| Future Volume (veh/h) | 173 | 802 | 88 | 82 | 611 | 78 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 173 | 750 | 88 | 82 | 611 | 66 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 987 | 1157 | 115 | 2239 | 738 | 441 |
| Arrive On Green | 0.53 | 0.53 | 0.06 | 0.63 | 0.21 | 0.21 |
| Sat Flow, veh/h | 1870 | 1551 | 1781 | 3647 | 3456 | 1585 |
| Grp Volume(v), veh/h | 173 | 750 | 88 | 82 | 611 | 66 |
| Grp Sat Flow(s),veh/h/ln | 1870 | 1551 | 1781 | 1777 | 1728 | 1585 |
| Q Serve(g_s), s | 3.8 | 19.4 | 3.9 | 0.7 | 13.5 | 2.5 |
| Cycle Q Clear(g_c), s | 3.8 | 19.4 | 3.9 | 0.7 | 13.5 | 2.5 |
| Prop In Lane | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 987 | 1157 | 115 | 2239 | 738 | 441 |
| V/C Ratio(X) | 0.18 | 0.65 | 0.76 | 0.04 | 0.83 | 0.15 |
| Avail Cap(c_a), veh/h | 987 | 1157 | 379 | 2239 | 968 | 546 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.93 | 0.93 | 1.00 | 1.00 | 0.98 | 0.98 |
| Uniform Delay (d), s/veh | 9.8 | 5.2 | 36.8 | 5.6 | 30.0 | 21.7 |
| Incr Delay (d2), s/veh | 0.4 | 2.6 | 10.0 | 0.0 | 10.1 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 11.9 | 2.0 | 0.2 | 6.5 | 1.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 10.2 | 7.8 | 46.9 | 5.6 | 40.2 | 22.4 |
| LnGrp LOS | B | A | D | A | D | C |
| Approach Vol, veh/h | 923 | | | 170 | 677 | |
| Approach Delay, s/veh | 8.2 | | | 27.0 | 38.5 | |
| Approach LOS | A | | | C | D | |

| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.2 | 45.8 | | | | 54.0 | | 20.7 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | | | 3.6 | | 3.6 |
| Max Green Setting (Gmax), s | 17.0 | 30.4 | | | | 50.4 | | 22.4 |
| Max Q Clear Time (g_c+I1), s | 5.9 | 21.4 | | | | 2.7 | | 15.5 |
| Green Ext Time (p_c), s | 0.1 | 3.1 | | | | 0.5 | | 1.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 21.6 |
| HCM 6th LOS | C |

**Notes**

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

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 155 | 570 | 119 | 321 | 792 | 97 |
| Future Volume (veh/h) | 155 | 570 | 119 | 321 | 792 | 97 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 0.96 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 155 | 474 | 119 | 193 | 792 | 97 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 400 | 1941 | 543 | 416 | 2005 | 1462 |
| Arrive On Green | 0.12 | 0.12 | 0.15 | 0.15 | 0.58 | 0.78 |
| Sat Flow, veh/h | 3456 | 2790 | 3647 | 1524 | 3456 | 1870 |
| Grp Volume(v), veh/h | 155 | 474 | 119 | 193 | 792 | 97 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1395 | 1777 | 1524 | 1728 | 1870 |
| Q Serve(g_s), s | 3.3 | 5.0 | 2.3 | 8.5 | 10.0 | 1.0 |
| Cycle Q Clear(g_c), s | 3.3 | 5.0 | 2.3 | 8.5 | 10.0 | 1.0 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 400 | 1941 | 543 | 416 | 2005 | 1462 |
| V/C Ratio(X) | 0.39 | 0.24 | 0.22 | 0.46 | 0.39 | 0.07 |
| Avail Cap(c_a), veh/h | 1024 | 2445 | 1026 | 623 | 2005 | 1462 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 0.80 | 0.80 |
| Uniform Delay (d), s/veh | 32.8 | 4.5 | 29.7 | 24.5 | 9.1 | 2.0 |
| Incr Delay (d2), s/veh | 0.6 | 0.1 | 0.2 | 0.8 | 0.0 | 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 | 1.4 | 6.9 | 1.0 | 3.6 | 3.3 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 33.4 | 4.5 | 29.9 | 25.3 | 9.2 | 2.1 |
| LnGrp LOS | C | A | C | C | A | A |
| Approach Vol, veh/h | 629 | | 312 | | | 889 |
| Approach Delay, s/veh | 11.6 | | 27.1 | | | 8.4 |
| Approach LOS | B | | C | | | A |

| Timer - Assigned Phs | 4 | 6 | 7 | 8 |
|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 66.5 | 13.5 | 50.3 | 16.1 |
| Change Period (Y+Rc), s | 3.9 | 4.3 | 3.9 | 3.9 |
| Max Green Setting (Gmax), s | 48.1 | 23.7 | 21.1 | 23.1 |
| Max Q Clear Time (g_c+I1), s | 3.0 | 7.0 | 12.0 | 10.5 |
| Green Ext Time (p_c), s | 0.6 | 2.3 | 1.3 | 1.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 12.7 |
| HCM 6th LOS | B |

Notes

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





| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12.5 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 39 | 58 | 9 | 105 | 85 | 62 | 5 | 127 | 144 | 85 | 197 | 49 |
| Future Vol, veh/h | 39 | 58 | 9 | 105 | 85 | 62 | 5 | 127 | 144 | 85 | 197 | 49 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 58 | 9 | 105 | 85 | 62 | 5 | 127 | 144 | 85 | 197 | 49 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 10.5 | 12.5 | 11.7 | 13.7 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 2% | 37% | 42% | 26% |
| Vol Thru, % | 46% | 55% | 34% | 60% |
| Vol Right, % | 52% | 8% | 25% | 15% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 276 | 106 | 252 | 331 |
| LT Vol | 5 | 39 | 105 | 85 |
| Through Vol | 127 | 58 | 85 | 197 |
| RT Vol | 144 | 9 | 62 | 49 |
| Lane Flow Rate | 276 | 106 | 252 | 331 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.4 | 0.179 | 0.398 | 0.495 |
| Departure Headway (Hd) | 5.214 | 6.066 | 5.681 | 5.383 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 687 | 588 | 630 | 665 |
| Service Time | 3.273 | 4.138 | 3.74 | 3.439 |
| HCM Lane V/C Ratio | 0.402 | 0.18 | 0.4 | 0.498 |
| HCM Control Delay | 11.7 | 10.5 | 12.5 | 13.7 |
| HCM Lane LOS | B | B | B | B |
| HCM 95th-tile Q | 1.9 | 0.6 | 1.9 | 2.8 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 4 | 0 | 2 | 107 | 0 | 54 | 0 | 212 | 78 | 44 | 277 | 0 |
| Future Vol, veh/h | 4 | 0 | 2 | 107 | 0 | 54 | 0 | 212 | 78 | 44 | 277 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 0 | 2 | 107 | 0 | 54 | 0 | 212 | 78 | 44 | 277 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 643 | 655 | 277 | 617 | 616 | 251 | 277 | 0 | 0 | 290 | 0 | 0 |
| Stage 1 | 365 | 365 | - | 251 | 251 | - | - | - | - | - | - | - |
| Stage 2 | 278 | 290 | - | 366 | 365 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 386 | 386 | 762 | 402 | 406 | 788 | 1286 | - | - | 1272 | - | - |
| Stage 1 | 654 | 623 | - | 753 | 699 | - | - | - | - | - | - | - |
| Stage 2 | 728 | 672 | - | 653 | 623 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 348 | 370 | 762 | 388 | 389 | 788 | 1286 | - | - | 1272 | - | - |
| Mov Cap-2 Maneuver | 348 | 370 | - | 388 | 389 | - | - | - | - | - | - | - |
| Stage 1 | 654 | 597 | - | 753 | 699 | - | - | - | - | - | - | - |
| Stage 2 | 678 | 672 | - | 625 | 597 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 13.6 | 16.7 | 0 | 1.1 |
| HCM LOS | B | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1286 | - | - | 425 | 468 | 1272 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.014 | 0.344 | 0.035 | - | - |
| HCM Control Delay (s) | 0 | - | - | 13.6 | 16.7 | 7.9 | 0 | - |
| HCM Lane LOS | A | - | - | B | C | A | A | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 1.5 | 0.1 | - | - |





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 114 | 675 | 0 | 3 | 986 | 187 | 0 | 0 | 8 | 243 | 0 | 211 |
| Future Volume (veh/h) | 114 | 675 | 0 | 3 | 986 | 187 | 0 | 0 | 8 | 243 | 0 | 211 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 675 | 0 | 3 | 986 | 168 | 0 | 0 | 3 | 243 | 0 | 151 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 148 | 1828 | 0 | 6 | 1315 | 224 | 0 | 0 | 4 | 344 | 0 | 306 |
| Arrive On Green | 0.08 | 0.51 | 0.00 | 0.00 | 0.43 | 0.43 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.19 |
| Sat Flow, veh/h | 1781 | 3647 | 0 | 1781 | 3025 | 515 | 0 | 0 | 1585 | 1781 | 0 | 1585 |
| Grp Volume(v), veh/h | 114 | 675 | 0 | 3 | 579 | 575 | 0 | 0 | 3 | 243 | 0 | 151 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 0 | 1781 | 1777 | 1763 | 0 | 0 | 1585 | 1781 | 0 | 1585 |
| Q Serve(g_s), s | 2.8 | 5.1 | 0.0 | 0.1 | 12.2 | 12.2 | 0.0 | 0.0 | 0.1 | 5.7 | 0.0 | 3.8 |
| Cycle Q Clear(g_c), s | 2.8 | 5.1 | 0.0 | 0.1 | 12.2 | 12.2 | 0.0 | 0.0 | 0.1 | 5.7 | 0.0 | 3.8 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 0.29 | 0.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 148 | 1828 | 0 | 6 | 772 | 766 | 0 | 0 | 4 | 344 | 0 | 306 |
| V/C Ratio(X) | 0.77 | 0.37 | 0.00 | 0.51 | 0.75 | 0.75 | 0.00 | 0.00 | 0.84 | 0.71 | 0.00 | 0.49 |
| Avail Cap(c_a), veh/h | 680 | 2903 | 0 | 280 | 1452 | 1440 | 0 | 0 | 605 | 872 | 0 | 775 |
| 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 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.0 | 6.5 | 0.0 | 22.2 | 10.6 | 10.6 | 0.0 | 0.0 | 22.2 | 16.8 | 0.0 | 16.0 |
| Incr Delay (d2), s/veh | 3.2 | 0.0 | 0.0 | 23.7 | 0.6 | 0.6 | 0.0 | 0.0 | 93.8 | 1.0 | 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 | 1.1 | 1.2 | 0.0 | 0.1 | 3.4 | 3.4 | 0.0 | 0.0 | 0.1 | 2.0 | 0.0 | 1.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 23.2 | 6.5 | 0.0 | 45.9 | 11.1 | 11.1 | 0.0 | 0.0 | 116.0 | 17.8 | 0.0 | 16.5 |
| LnGrp LOS | C | A | A | D | B | B | A | A | F | B | A | B |
| Approach Vol, veh/h | | 789 | | | 1157 | | | 3 | | | 394 | |
| Approach Delay, s/veh | | 8.9 | | | 11.2 | | | 116.0 | | | 17.3 | |
| Approach LOS | | A | | | B | | | F | | | B | |

| Timer - Assigned Phs | 1 | 2 | 4 | 5 | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 3.1 | 26.5 | 11.8 | 6.7 | 23.0 | 3.1 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | 3.2 | 3.0 | 3.6 | 3.0 |
| Max Green Setting (Gmax), s | 7.0 | 36.4 | 21.8 | 17.0 | 36.4 | 17.0 |
| Max Q Clear Time (g_c+I1), s | 2.1 | 7.1 | 7.7 | 4.8 | 14.2 | 2.1 |
| Green Ext Time (p_c), s | 0.0 | 3.1 | 1.0 | 0.1 | 5.2 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 11.6 |
| HCM 6th LOS | B |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 175 | 805 | 109 | 197 | 987 | 157 |
| Future Volume (veh/h) | 175 | 805 | 109 | 197 | 987 | 157 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 175 | 770 | 109 | 197 | 987 | 145 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 655 | 1076 | 139 | 1647 | 1162 | 657 |
| Arrive On Green | 0.35 | 0.35 | 0.08 | 0.46 | 0.34 | 0.34 |
| Sat Flow, veh/h | 1870 | 1550 | 1781 | 3647 | 3456 | 1585 |
| Grp Volume(v), veh/h | 175 | 770 | 109 | 197 | 987 | 145 |
| Grp Sat Flow(s),veh/h/ln | 1870 | 1550 | 1781 | 1777 | 1728 | 1585 |
| Q Serve(g_s), s | 5.7 | 26.3 | 5.1 | 2.7 | 22.6 | 5.0 |
| Cycle Q Clear(g_c), s | 5.7 | 26.3 | 5.1 | 2.7 | 22.6 | 5.0 |
| Prop In Lane | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 655 | 1076 | 139 | 1647 | 1162 | 657 |
| V/C Ratio(X) | 0.27 | 0.72 | 0.79 | 0.12 | 0.85 | 0.22 |
| Avail Cap(c_a), veh/h | 655 | 1076 | 210 | 1647 | 1561 | 840 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.96 | 0.96 | 1.00 | 1.00 | 0.91 | 0.91 |
| Uniform Delay (d), s/veh | 19.8 | 8.3 | 38.5 | 12.9 | 26.2 | 16.1 |
| Incr Delay (d2), s/veh | 1.0 | 3.9 | 10.6 | 0.1 | 7.2 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.6 | 17.1 | 2.6 | 1.1 | 10.0 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 20.7 | 12.2 | 49.1 | 13.1 | 33.4 | 16.8 |
| LnGrp LOS | C | B | D | B | C | B |
| Approach Vol, veh/h | 945 | | | 306 | 1132 | |
| Approach Delay, s/veh | 13.8 | | | 25.9 | 31.3 | |
| Approach LOS | B | | | C | C | |

| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.6 | 33.4 | | | | 43.0 | | 32.2 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | | | 3.6 | | 3.6 |
| Max Green Setting (Gmax), s | 10.0 | 26.4 | | | | 39.4 | | 38.4 |
| Max Q Clear Time (g_c+I1), s | 7.1 | 28.3 | | | | 4.7 | | 24.6 |
| Green Ext Time (p_c), s | 0.1 | 0.0 | | | | 1.3 | | 4.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 23.6 |
| HCM 6th LOS | C |

Notes

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





| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 402 | 961 | 185 | 228 | 688 | 236 |
| Future Volume (veh/h) | 402 | 961 | 185 | 228 | 688 | 236 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 0.97 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 402 | 846 | 185 | 125 | 688 | 236 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 618 | 2094 | 380 | 448 | 1976 | 1355 |
| Arrive On Green | 0.18 | 0.18 | 0.11 | 0.11 | 0.57 | 0.72 |
| Sat Flow, veh/h | 3456 | 2790 | 3647 | 1533 | 3456 | 1870 |
| Grp Volume(v), veh/h | 402 | 846 | 185 | 125 | 688 | 236 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1395 | 1777 | 1533 | 1728 | 1870 |
| Q Serve(g_s), s | 9.2 | 9.2 | 4.2 | 5.4 | 9.0 | 3.4 |
| Cycle Q Clear(g_c), s | 9.2 | 9.2 | 4.2 | 5.4 | 9.0 | 3.4 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 618 | 2094 | 380 | 448 | 1976 | 1355 |
| V/C Ratio(X) | 0.65 | 0.40 | 0.49 | 0.28 | 0.35 | 0.17 |
| Avail Cap(c_a), veh/h | 882 | 2307 | 966 | 700 | 1976 | 1355 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 0.75 | 0.75 |
| Uniform Delay (d), s/veh | 32.4 | 3.8 | 35.8 | 23.6 | 9.7 | 3.7 |
| Incr Delay (d2), s/veh | 1.2 | 0.1 | 1.0 | 0.3 | 0.0 | 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 | 3.7 | 12.5 | 1.8 | 2.5 | 3.1 | 1.1 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 33.6 | 3.9 | 36.7 | 23.9 | 9.8 | 3.9 |
| LnGrp LOS | C | A | D | C | A | A |
| Approach Vol, veh/h | 1248 | | 310 | | | 924 |
| Approach Delay, s/veh | 13.5 | | 31.6 | | | 8.3 |
| Approach LOS | B | | C | | | A |

| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | | | 65.5 | | 19.5 | 52.5 | 13.0 |
| Change Period (Y+Rc), s | | | | 3.9 | | 4.3 | 3.9 | 3.9 |
| Max Green Setting (Gmax), s | | | | 55.1 | | 21.7 | 28.1 | 23.1 |
| Max Q Clear Time (g_c+I1), s | | | | 5.4 | | 11.2 | 11.0 | 7.4 |
| Green Ext Time (p_c), s | | | | 1.5 | | 4.0 | 1.3 | 1.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 13.8 |
| HCM 6th LOS | B |

Notes

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

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.8 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 39 | 63 | 7 | 49 | 56 | 35 | 9 | 96 | 91 | 108 | 134 | 26 |
| Future Vol, veh/h | 39 | 63 | 7 | 49 | 56 | 35 | 9 | 96 | 91 | 108 | 134 | 26 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 63 | 7 | 49 | 56 | 35 | 9 | 96 | 91 | 108 | 134 | 26 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 9.3 | 9.5 | 9.3 | 10.6 |
| HCM LOS | A | A | A | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 5% | 36% | 35% | 40% |
| Vol Thru, % | 49% | 58% | 40% | 50% |
| Vol Right, % | 46% | 6% | 25% | 10% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 196 | 109 | 140 | 268 |
| LT Vol | 9 | 39 | 49 | 108 |
| Through Vol | 96 | 63 | 56 | 134 |
| RT Vol | 91 | 7 | 35 | 26 |
| Lane Flow Rate | 196 | 109 | 140 | 268 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.252 | 0.159 | 0.198 | 0.359 |
| Departure Headway (Hd) | 4.634 | 5.249 | 5.093 | 4.825 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 768 | 676 | 697 | 740 |
| Service Time | 2.706 | 3.338 | 3.177 | 2.892 |
| HCM Lane V/C Ratio | 0.255 | 0.161 | 0.201 | 0.362 |
| HCM Control Delay | 9.3 | 9.3 | 9.5 | 10.6 |
| HCM Lane LOS | A | A | A | B |
| HCM 95th-tile Q | 1 | 0.6 | 0.7 | 1.6 |





| Intersection | |
|---|---|
| Int Delay, s/veh | 1.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 0 | 0 | 19 | 0 | 14 | 7 | 190 | 69 | 30 | 164 | 4 |
| Future Vol, veh/h | 0 | 0 | 0 | 19 | 0 | 14 | 7 | 190 | 69 | 30 | 164 | 4 |
| Conflicting Peds, #/hr | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 0 | 0 | 19 | 0 | 14 | 7 | 190 | 69 | 30 | 164 | 4 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 474 | 501 | 168 | 467 | 469 | 227 | 169 | 0 | 0 | 260 | 0 | 0 |
| Stage 1 | 227 | 227 | - | 240 | 240 | - | - | - | - | - | - | - |
| Stage 2 | 247 | 274 | - | 227 | 229 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 501 | 472 | 876 | 506 | 492 | 812 | 1409 | - | - | 1304 | - | - |
| Stage 1 | 776 | 716 | - | 763 | 707 | - | - | - | - | - | - | - |
| Stage 2 | 757 | 683 | - | 776 | 715 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 480 | 456 | 874 | 493 | 476 | 810 | 1408 | - | - | 1303 | - | - |
| Mov Cap-2 Maneuver | 480 | 456 | - | 493 | 476 | - | - | - | - | - | - | - |
| Stage 1 | 771 | 697 | - | 758 | 702 | - | - | - | - | - | - | - |
| Stage 2 | 739 | 678 | - | 756 | 696 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0 | 11.5 | 0.2 | 1.2 |
| HCM LOS | A | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1408 | - | - | - | 591 | 1303 | - | - |
| HCM Lane V/C Ratio | 0.005 | - | - | - | 0.056 | 0.023 | - | - |
| HCM Control Delay (s) | 7.6 | 0 | - | 0 | 11.5 | 7.8 | 0 | - |
| HCM Lane LOS | A | A | - | A | B | A | A | - |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.2 | 0.1 | - | - |

## HCM 6th Signalized Intersection Summary
### 3: Piner Rd & Airway Dr

03/28/2023

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 131 | 872 | 0 | 5 | 514 | 151 | 1 | 0 | 0 | 114 | 0 | 84 |
| Future Volume (veh/h) | 131 | 872 | 0 | 5 | 514 | 151 | 1 | 0 | 0 | 114 | 0 | 84 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 131 | 872 | 0 | 5 | 514 | 132 | 1 | 0 | 0 | 114 | 0 | 43 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 168 | 1483 | 0 | 10 | 919 | 235 | 6 | 0 | 0 | 202 | 0 | 178 |
| Arrive On Green | 0.09 | 0.42 | 0.00 | 0.01 | 0.33 | 0.33 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.11 |
| Sat Flow, veh/h | 1781 | 3647 | 0 | 1781 | 2799 | 715 | 1781 | 0 | 0 | 1781 | 0 | 1572 |
| Grp Volume(v), veh/h | 131 | 872 | 0 | 5 | 325 | 321 | 1 | 0 | 0 | 114 | 0 | 43 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 0 | 1781 | 1777 | 1738 | 1781 | 0 | 0 | 1781 | 0 | 1572 |
| Q Serve(g_s), s | 2.0 | 5.2 | 0.0 | 0.1 | 4.2 | 4.2 | 0.0 | 0.0 | 0.0 | 1.7 | 0.0 | 0.7 |
| Cycle Q Clear(g_c), s | 2.0 | 5.2 | 0.0 | 0.1 | 4.2 | 4.2 | 0.0 | 0.0 | 0.0 | 1.7 | 0.0 | 0.7 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 0.41 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 168 | 1483 | 0 | 10 | 584 | 571 | 6 | 0 | 0 | 202 | 0 | 178 |
| V/C Ratio(X) | 0.78 | 0.59 | 0.00 | 0.51 | 0.56 | 0.56 | 0.16 | 0.00 | 0.00 | 0.57 | 0.00 | 0.24 |
| Avail Cap(c_a), veh/h | 1096 | 4683 | 0 | 451 | 2341 | 2290 | 1096 | 0 | 0 | 1406 | 0 | 1241 |
| 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 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 12.2 | 6.2 | 0.0 | 13.7 | 7.6 | 7.6 | 13.8 | 0.0 | 0.0 | 11.6 | 0.0 | 11.2 |
| Incr Delay (d2), s/veh | 3.0 | 0.1 | 0.0 | 14.8 | 0.3 | 0.3 | 4.1 | 0.0 | 0.0 | 0.9 | 0.0 | 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 | 0.7 | 0.8 | 0.0 | 0.1 | 0.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.2 | 6.4 | 0.0 | 28.5 | 7.9 | 8.0 | 17.8 | 0.0 | 0.0 | 12.5 | 0.0 | 11.4 |
| LnGrp LOS | B | A | A | C | A | A | B | A | A | B | A | B |
| Approach Vol, veh/h | | 1003 | | | 651 | | | 1 | | | 157 | |
| Approach Delay, s/veh | | 7.5 | | | 8.1 | | | 17.8 | | | 12.2 | |
| Approach LOS | | A | | | A | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 3.2 | 15.1 | | 6.3 | 5.6 | 12.7 | | 3.0 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | 3.2 | 3.0 | 3.6 | | 3.0 |
| Max Green Setting (Gmax), s | 7.0 | 36.4 | | 21.8 | 17.0 | 36.4 | | 17.0 |
| Max Q Clear Time (g_c+I1), s | 2.1 | 7.2 | | 3.7 | 4.0 | 6.2 | | 2.0 |
| Green Ext Time (p_c), s | 0.0 | 4.3 | | 0.4 | 0.1 | 2.6 | | 0.0 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 8.1 |
| HCM 6th LOS | | | A |



## HCM 6th Signalized Intersection Summary
### 4: Range Ave & Piner Rd

03/28/2023

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 173 | 803 | 88 | 82 | 612 | 78 |
| Future Volume (veh/h) | 173 | 803 | 88 | 82 | 612 | 78 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 173 | 751 | 88 | 82 | 612 | 66 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 987 | 1158 | 115 | 2239 | 739 | 441 |
| Arrive On Green | 0.53 | 0.53 | 0.06 | 0.63 | 0.21 | 0.21 |
| Sat Flow, veh/h | 1870 | 1551 | 1781 | 3647 | 3456 | 1585 |
| Grp Volume(v), veh/h | 173 | 751 | 88 | 82 | 612 | 66 |
| Grp Sat Flow(s),veh/h/ln | 1870 | 1551 | 1781 | 1777 | 1728 | 1585 |
| Q Serve(g_s), s | 3.8 | 19.4 | 3.9 | 0.7 | 13.5 | 2.5 |
| Cycle Q Clear(g_c), s | 3.8 | 19.4 | 3.9 | 0.7 | 13.5 | 2.5 |
| Prop In Lane | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 987 | 1158 | 115 | 2239 | 739 | 441 |
| V/C Ratio(X) | 0.18 | 0.65 | 0.76 | 0.04 | 0.83 | 0.15 |
| Avail Cap(c_a), veh/h | 987 | 1158 | 379 | 2239 | 968 | 546 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.93 | 0.93 | 1.00 | 1.00 | 0.98 | 0.98 |
| Uniform Delay (d), s/veh | 9.8 | 5.2 | 36.8 | 5.6 | 30.0 | 21.7 |
| Incr Delay (d2), s/veh | 0.4 | 2.6 | 10.0 | 0.0 | 10.1 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 11.9 | 2.0 | 0.2 | 6.5 | 1.0 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 10.2 | 7.8 | 46.9 | 5.6 | 40.2 | 22.4 |
| LnGrp LOS | B | A | D | A | D | C |
| Approach Vol, veh/h | 924 | | | 170 | 678 | |
| Approach Delay, s/veh | 8.2 | | | 27.0 | 38.5 | |
| Approach LOS | A | | | C | D | |

| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.2 | 45.8 | | | | 54.0 | | 20.7 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | | | 3.6 | | 3.6 |
| Max Green Setting (Gmax), s | 17.0 | 30.4 | | | | 50.4 | | 22.4 |
| Max Q Clear Time (g_c+I1), s | 5.9 | 21.4 | | | | 2.7 | | 15.5 |
| Green Ext Time (p_c), s | 0.1 | 3.1 | | | | 0.5 | | 1.6 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 21.6 |
| HCM 6th LOS | | | C |

**Notes**

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

## HCM 6th Signalized Intersection Summary
### 5: Range Ave & Bicentennial Way



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 159 | 571 | 119 | 322 | 793 | 97 |
| Future Volume (veh/h) | 159 | 571 | 119 | 322 | 793 | 97 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 0.96 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 159 | 475 | 119 | 194 | 793 | 97 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 401 | 1940 | 545 | 418 | 2002 | 1462 |
| Arrive On Green | 0.12 | 0.12 | 0.15 | 0.15 | 0.58 | 0.78 |
| Sat Flow, veh/h | 3456 | 2790 | 3647 | 1524 | 3456 | 1870 |
| Grp Volume(v), veh/h | 159 | 475 | 119 | 194 | 793 | 97 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1395 | 1777 | 1524 | 1728 | 1870 |
| Q Serve(g_s), s | 3.4 | 5.0 | 2.3 | 8.5 | 10.0 | 1.0 |
| Cycle Q Clear(g_c), s | 3.4 | 5.0 | 2.3 | 8.5 | 10.0 | 1.0 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 401 | 1940 | 545 | 418 | 2002 | 1462 |
| V/C Ratio(X) | 0.40 | 0.24 | 0.22 | 0.46 | 0.40 | 0.07 |
| Avail Cap(c_a), veh/h | 1024 | 2443 | 1026 | 624 | 2002 | 1462 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 0.80 | 0.80 |
| Uniform Delay (d), s/veh | 32.8 | 4.5 | 29.7 | 24.5 | 9.2 | 2.0 |
| Incr Delay (d2), s/veh | 0.6 | 0.1 | 0.2 | 0.8 | 0.0 | 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 | 1.4 | 6.9 | 1.0 | 3.6 | 3.3 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 33.4 | 4.5 | 29.9 | 25.3 | 9.2 | 2.1 |
| LnGrp LOS | C | A | C | C | A | A |
| Approach Vol, veh/h | 634 | | 313 | | | 890 |
| Approach Delay, s/veh | 11.8 | | 27.0 | | | 8.4 |
| Approach LOS | B | | C | | | A |

| Timer - Assigned Phs | 4 | 6 | 7 | 8 |
|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 66.4 | 13.6 | 50.2 | 16.2 |
| Change Period (Y+Rc), s | 3.9 | 4.3 | 3.9 | 3.9 |
| Max Green Setting (Gmax), s | 48.1 | 23.7 | 21.1 | 23.1 |
| Max Q Clear Time (g_c+I1), s | 3.0 | 7.0 | 12.0 | 10.5 |
| Green Ext Time (p_c), s | 0.6 | 2.3 | 1.3 | 1.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 12.8 |
| HCM 6th LOS | B |

**Notes**

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



## HCM 6th AWSC
### 1: Airway Dr & Industrial Dr



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12.6 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 39 | 60 | 9 | 105 | 87 | 62 | 5 | 129 | 144 | 85 | 201 | 49 |
| Future Vol, veh/h | 39 | 60 | 9 | 105 | 87 | 62 | 5 | 129 | 144 | 85 | 201 | 49 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 60 | 9 | 105 | 87 | 62 | 5 | 129 | 144 | 85 | 201 | 49 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 10.5 | 12.6 | 11.9 | 13.9 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 2% | 36% | 41% | 25% |
| Vol Thru, % | 46% | 56% | 34% | 60% |
| Vol Right, % | 52% | 8% | 24% | 15% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 278 | 108 | 254 | 335 |
| LT Vol | 5 | 39 | 105 | 85 |
| Through Vol | 129 | 60 | 87 | 201 |
| RT Vol | 144 | 9 | 62 | 49 |
| Lane Flow Rate | 278 | 108 | 254 | 335 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.405 | 0.183 | 0.403 | 0.503 |
| Departure Headway (Hd) | 5.244 | 6.096 | 5.709 | 5.408 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 684 | 585 | 627 | 663 |
| Service Time | 3.303 | 4.17 | 3.769 | 3.464 |
| HCM Lane V/C Ratio | 0.406 | 0.185 | 0.405 | 0.505 |
| HCM Control Delay | 11.9 | 10.5 | 12.6 | 13.9 |
| HCM Lane LOS | B | B | B | B |
| HCM 95th-tile Q | 2 | 0.7 | 1.9 | 2.8 |

## HCM 6th TWSC
### 2: Airway Dr & Airway Ct
03/28/2023

| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 4 | 0 | 2 | 107 | 0 | 54 | 0 | 214 | 78 | 44 | 281 | 0 |
| Future Vol, veh/h | 4 | 0 | 2 | 107 | 0 | 54 | 0 | 214 | 78 | 44 | 281 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 0 | 2 | 107 | 0 | 54 | 0 | 214 | 78 | 44 | 281 | 0 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 649 | 661 | 281 | 623 | 622 | 253 | 281 | 0 | 0 | 292 | 0 | 0 |
| Stage 1 | 369 | 369 | - | 253 | 253 | - | - | - | - | - | - | - |
| Stage 2 | 280 | 292 | - | 370 | 369 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 383 | 383 | 758 | 398 | 403 | 786 | 1282 | - | - | 1270 | - | - |
| Stage 1 | 651 | 621 | - | 751 | 698 | - | - | - | - | - | - | - |
| Stage 2 | 727 | 671 | - | 650 | 621 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 345 | 367 | 758 | 384 | 386 | 786 | 1282 | - | - | 1270 | - | - |
| Mov Cap-2 Maneuver | 345 | 367 | - | 384 | 386 | - | - | - | - | - | - | - |
| Stage 1 | 651 | 596 | - | 751 | 698 | - | - | - | - | - | - | - |
| Stage 2 | 677 | 671 | - | 622 | 596 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 13.7 | 16.8 | 0 | 1.1 |
| HCM LOS | B | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1282 | - | - | 422 | 464 | 1270 | - | - |
| HCM Lane V/C Ratio | - | - | - | 0.014 | 0.347 | 0.035 | - | - |
| HCM Control Delay (s) | 0 | - | - | 13.7 | 16.8 | 7.9 | 0 | - |
| HCM Lane LOS | A | - | - | B | C | A | A | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0 | 1.5 | 0.1 | - | - |



## HCM 6th Signalized Intersection Summary
### 3: Piner Rd & Airway Dr
03/28/2023

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 115 | 675 | 0 | 3 | 986 | 188 | 0 | 0 | 8 | 245 | 0 | 213 |
| Future Volume (veh/h) | 115 | 675 | 0 | 3 | 986 | 188 | 0 | 0 | 8 | 245 | 0 | 213 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 115 | 675 | 0 | 3 | 986 | 169 | 0 | 0 | 3 | 245 | 0 | 153 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 149 | 1830 | 0 | 6 | 1313 | 225 | 0 | 0 | 4 | 346 | 0 | 308 |
| Arrive On Green | 0.08 | 0.51 | 0.00 | 0.00 | 0.43 | 0.43 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.19 |
| Sat Flow, veh/h | 1781 | 3647 | 0 | 1781 | 3022 | 517 | 0 | 0 | 1585 | 1781 | 0 | 1585 |
| Grp Volume(v), veh/h | 115 | 675 | 0 | 3 | 579 | 576 | 0 | 0 | 3 | 245 | 0 | 153 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1777 | 0 | 1781 | 1777 | 1763 | 0 | 0 | 1585 | 1781 | 0 | 1585 |
| Q Serve(g_s), s | 2.8 | 5.1 | 0.0 | 0.1 | 12.3 | 12.3 | 0.0 | 0.0 | 0.1 | 5.8 | 0.0 | 3.9 |
| Cycle Q Clear(g_c), s | 2.8 | 5.1 | 0.0 | 0.1 | 12.3 | 12.3 | 0.0 | 0.0 | 0.1 | 5.8 | 0.0 | 3.9 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 0.29 | 0.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 149 | 1830 | 0 | 6 | 772 | 766 | 0 | 0 | 4 | 346 | 0 | 308 |
| V/C Ratio(X) | 0.77 | 0.37 | 0.00 | 0.51 | 0.75 | 0.75 | 0.00 | 0.00 | 0.85 | 0.71 | 0.00 | 0.50 |
| Avail Cap(c_a), veh/h | 676 | 2888 | 0 | 278 | 1444 | 1433 | 0 | 0 | 602 | 867 | 0 | 771 |
| 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 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.1 | 6.5 | 0.0 | 22.3 | 10.6 | 10.6 | 0.0 | 0.0 | 22.3 | 16.9 | 0.0 | 16.1 |
| Incr Delay (d2), s/veh | 3.2 | 0.0 | 0.0 | 23.7 | 0.6 | 0.6 | 0.0 | 0.0 | 95.1 | 1.0 | 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 | 1.1 | 1.2 | 0.0 | 0.1 | 3.5 | 3.5 | 0.0 | 0.0 | 0.1 | 2.1 | 0.0 | 1.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 23.3 | 6.6 | 0.0 | 46.0 | 11.2 | 11.2 | 0.0 | 0.0 | 117.5 | 17.9 | 0.0 | 16.6 |
| LnGrp LOS | C | A | A | D | B | B | A | A | F | B | A | B |
| Approach Vol, veh/h | | 790 | | | 1158 | | | 3 | | | 398 | |
| Approach Delay, s/veh | | 9.0 | | | 11.3 | | | 117.5 | | | 17.4 | |
| Approach LOS | | A | | | B | | | F | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 3.1 | 26.7 | | 11.9 | 6.8 | 23.1 | | 3.1 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | 3.2 | 3.0 | 3.6 | | 3.0 |
| Max Green Setting (Gmax), s | 7.0 | 36.4 | | 21.8 | 17.0 | 36.4 | | 17.0 |
| Max Q Clear Time (g_c+I1), s | 2.1 | 7.1 | | 7.8 | 4.8 | 14.3 | | 2.1 |
| Green Ext Time (p_c), s | 0.0 | 3.1 | | 1.0 | 0.1 | 5.2 | | 0.0 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 11.7 |
| HCM 6th LOS | | | B |

## HCM 6th Signalized Intersection Summary
### 4: Range Ave & Piner Rd



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 175 | 805 | 109 | 197 | 987 | 157 |
| Future Volume (veh/h) | 175 | 805 | 109 | 197 | 987 | 157 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | 0.98 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 175 | 770 | 109 | 197 | 987 | 145 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 655 | 1076 | 139 | 1647 | 1162 | 657 |
| Arrive On Green | 0.35 | 0.35 | 0.08 | 0.46 | 0.34 | 0.34 |
| Sat Flow, veh/h | 1870 | 1550 | 1781 | 3647 | 3456 | 1585 |
| Grp Volume(v), veh/h | 175 | 770 | 109 | 197 | 987 | 145 |
| Grp Sat Flow(s),veh/h/ln | 1870 | 1550 | 1781 | 1777 | 1728 | 1585 |
| Q Serve(g_s), s | 5.7 | 26.3 | 5.1 | 2.7 | 22.6 | 5.0 |
| Cycle Q Clear(g_c), s | 5.7 | 26.3 | 5.1 | 2.7 | 22.6 | 5.0 |
| Prop In Lane | | 1.00 | 1.00 | | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 655 | 1076 | 139 | 1647 | 1162 | 657 |
| V/C Ratio(X) | 0.27 | 0.72 | 0.79 | 0.12 | 0.85 | 0.22 |
| Avail Cap(c_a), veh/h | 655 | 1076 | 210 | 1647 | 1561 | 840 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.96 | 0.96 | 1.00 | 1.00 | 0.91 | 0.91 |
| Uniform Delay (d), s/veh | 19.8 | 8.3 | 38.5 | 12.9 | 26.2 | 16.1 |
| Incr Delay (d2), s/veh | 1.0 | 3.9 | 10.6 | 0.1 | 7.2 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.6 | 17.1 | 2.6 | 1.1 | 10.0 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 20.7 | 12.2 | 49.1 | 13.1 | 33.4 | 16.8 |
| LnGrp LOS | C | B | D | B | C | B |
| Approach Vol, veh/h | 945 | | | 306 | 1132 | |
| Approach Delay, s/veh | 13.8 | | | 25.9 | 31.3 | |
| Approach LOS | B | | | C | C | |

| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.6 | 33.4 | | | | 43.0 | | 32.2 |
| Change Period (Y+Rc), s | 3.0 | 3.6 | | | | 3.6 | | 3.6 |
| Max Green Setting (Gmax), s | 10.0 | 26.4 | | | | 39.4 | | 38.4 |
| Max Q Clear Time (g_c+I1), s | 7.1 | 28.3 | | | | 4.7 | | 24.6 |
| Green Ext Time (p_c), s | 0.1 | 0.0 | | | | 1.3 | | 4.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 23.6 |
| HCM 6th LOS | C |

**Notes**

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



## HCM 6th Signalized Intersection Summary
### 5: Range Ave & Bicentennial Way



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 402 | 961 | 185 | 228 | 688 | 236 |
| Future Volume (veh/h) | 402 | 961 | 185 | 228 | 688 | 236 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 0.97 | 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 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 402 | 846 | 185 | 125 | 688 | 236 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 618 | 2094 | 380 | 448 | 1976 | 1355 |
| Arrive On Green | 0.18 | 0.18 | 0.11 | 0.11 | 0.57 | 0.72 |
| Sat Flow, veh/h | 3456 | 2790 | 3647 | 1533 | 3456 | 1870 |
| Grp Volume(v), veh/h | 402 | 846 | 185 | 125 | 688 | 236 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1395 | 1777 | 1533 | 1728 | 1870 |
| Q Serve(g_s), s | 9.2 | 9.2 | 4.2 | 5.4 | 9.0 | 3.4 |
| Cycle Q Clear(g_c), s | 9.2 | 9.2 | 4.2 | 5.4 | 9.0 | 3.4 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 618 | 2094 | 380 | 448 | 1976 | 1355 |
| V/C Ratio(X) | 0.65 | 0.40 | 0.49 | 0.28 | 0.35 | 0.17 |
| Avail Cap(c_a), veh/h | 882 | 2307 | 966 | 700 | 1976 | 1355 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 0.75 | 0.75 |
| Uniform Delay (d), s/veh | 32.4 | 3.8 | 35.8 | 23.6 | 9.7 | 3.7 |
| Incr Delay (d2), s/veh | 1.2 | 0.1 | 1.0 | 0.3 | 0.0 | 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 | 3.7 | 12.5 | 1.8 | 2.5 | 3.1 | 1.1 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 33.6 | 3.9 | 36.7 | 23.9 | 9.8 | 3.9 |
| LnGrp LOS | C | A | D | C | A | A |
| Approach Vol, veh/h | 1248 | | 310 | | | 924 |
| Approach Delay, s/veh | 13.5 | | 31.6 | | | 8.3 |
| Approach LOS | B | | C | | | A |

| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | | | 65.5 | | 19.5 | 52.5 | 13.0 |
| Change Period (Y+Rc), s | | | | 3.9 | | 4.3 | 3.9 | 3.9 |
| Max Green Setting (Gmax), s | | | | 55.1 | | 21.7 | 28.1 | 23.1 |
| Max Q Clear Time (g_c+I1), s | | | | 5.4 | | 11.2 | 11.0 | 7.4 |
| Green Ext Time (p_c), s | | | | 1.5 | | 4.0 | 1.3 | 1.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 13.8 |
| HCM 6th LOS | B |

**Notes**

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