Miscellaneous Capacity and Safety Improvement Evaluations

# SR 434 at McCulloch Road
# Median Closure Technical Memorandum

Seminole County, Florida

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# Section 1
# Introduction

# INTRODUCTION

Kittelson & Associates, Inc. was retained by Seminole County to conduct a traffic operations evaluation of the Private Roadway intersection with McCulloch Road approximately 330 feet west of SR 434. The primary purpose of this study is to evaluate operations and safety concerns with the eastbound approach of McCulloch Road at SR 434 where typical queues extend past the left turn storage and the private road intersection. Analysis includes the signalized intersection's interaction with the nearby private road intersection and evaluates impacts of closing the median.

The current geometry of the private road intersection is full access, allowing left turns for all approaches, in and out of the private roadways. However, the proximity of the signalized intersection on McCulloch Road at SR 434 and this unsignalized intersection creates challenges for peak hour traffic operations, driver expectancy, and intersection safety – often resulting in an eastbound queue on McCulloch Road that does not clear during the evening peak. The existing unsignalized median opening was evaluated for a median closure, restricting access for the driveways to only right turns in and out.

## PROJECT DESCRIPTION

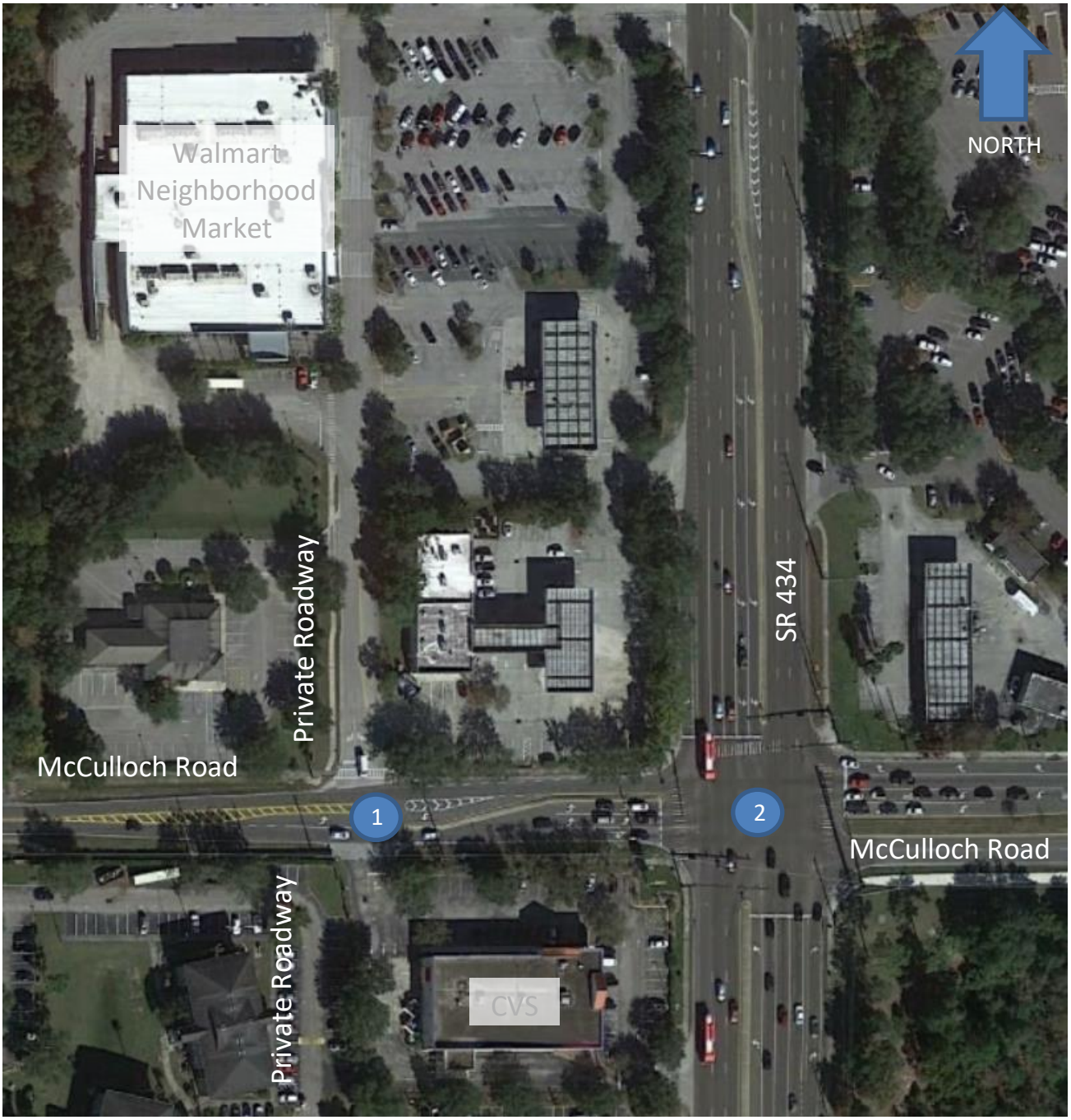
The intersection of McCulloch Road at SR 434 is located in Seminole County, Florida near the University of Central Florida. McCulloch Road lies along the county line of Orange and Seminole counties. McCulloch Road is classified as an urban collector and SR 434 is classified as an urban principal arterial. This signalized intersection operates using adaptive signal control. Driveways to CVS and a Walmart Neighborhood Market lie just to the west of the signalized intersection and have full access for left turns, through movements and right turns via a median opening.

There are two study intersections:

1. McCulloch Road at Unsignalized Full Median Opening (330 feet west of SR 434)
2. McCulloch Road at SR 434 (Signalized)

**Figure 1** illustrates the project area and study intersections.

**Figure 1: Study Area**



Section 2
Data Collection

# DATA COLLECTION

## TURNING MOVEMENT COUNTS

Data collection was conducted to develop turning movement volumes at both study intersections. Counts were collected on Tuesday, September 8, 2022, during the AM (7-9 AM) and PM (4-6 PM) peak periods. Raw turning movement counts are provided in **Appendix A**.

## SIGNAL TIMING

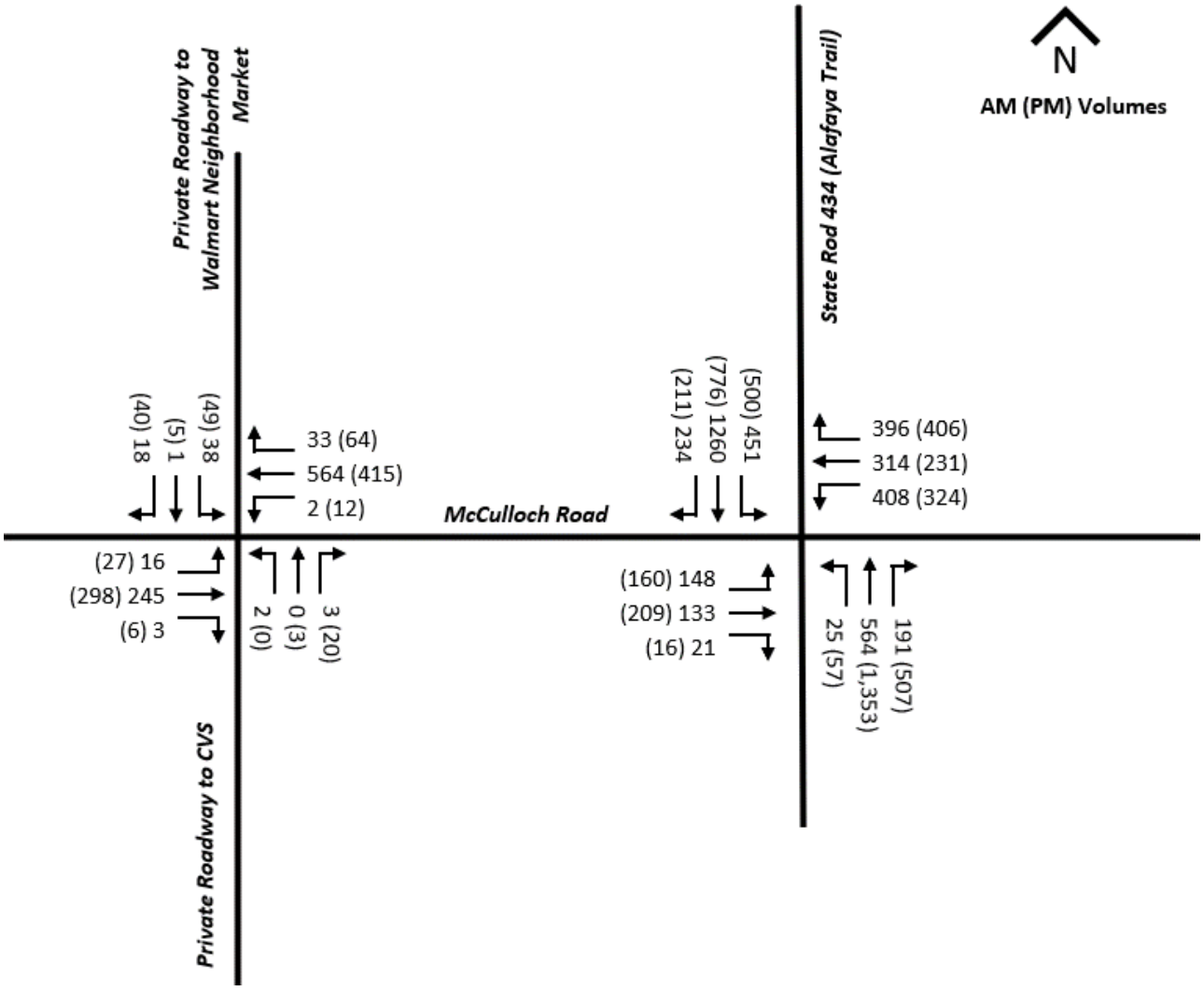
Current signal timing plans, provided in **Appendix B**, were obtained from Orange County for the signalized intersection of McCulloch Road and SR 434.

# Section 3
# Volume Development

# VOLUME DEVELOPMENT

Traffic volumes were developed to be used in the operational analysis. Intersection turning volumes collected at both intersections in September 2022 were adjusted using a seasonal factor of 1.03. No growth factors were applied. These adjusted existing (2022) AM and PM peak hour intersection volume estimates are illustrated in **Figure 2**. The seasonal factor report is provided in **Appendix C**.

**Figure 2: Existing 2022 AM and PM Peak Hour Intersection Volumes**



# Section 4
# Existing Conditions Analysis

# EXISTING CONDITIONS ANALYSIS

The purpose of the existing conditions analysis is to gain an understanding of the study area's traffic operations and safety performance to identify existing deficiencies and inform potential improvement alternatives. This section describes issues and opportunities observed through field observations, existing intersection operations analysis, and historical crash analysis.

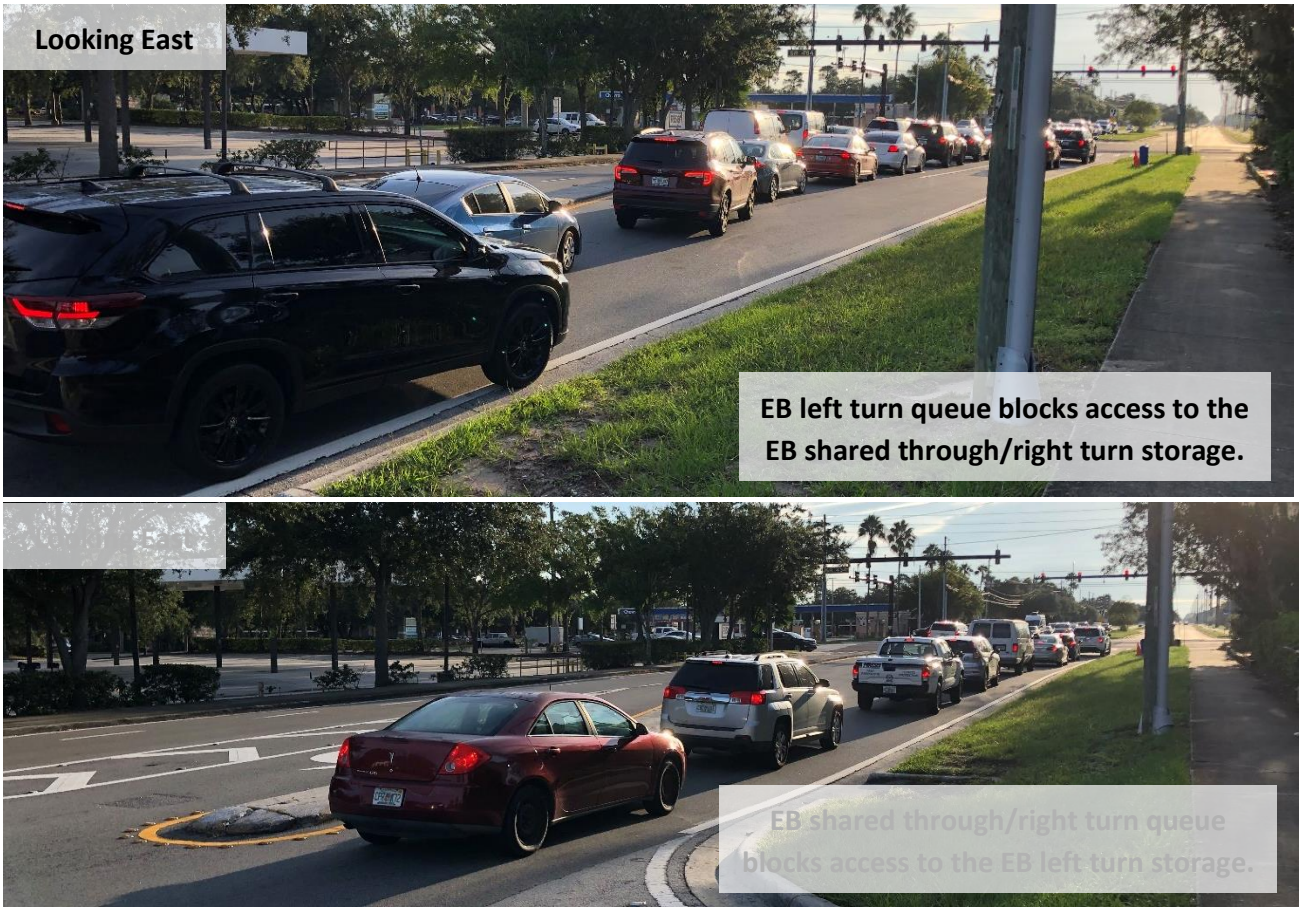
## FIELD OBSERVATIONS

Field reviews were conducted during the AM and PM peak hours on Wednesday, September 14, 2022, and Thursday, September 15, 2022, to observe traffic operations at the intersection of McCulloch Road and SR 434 and the surrounding study area. The following are observations from these field reviews.

### AM Peak Period

- The queue for the eastbound approach often blocked access to either the left turn storage or the through lane (see **Figure 3**).

**Figure 3: Eastbound Traffic Queueing at McCulloch Road and SR 434, AM**



- The eastbound approach cleared during most cycles.
- Vehicles turning out of the northbound and southbound private roadway approaches through the median opening sometimes halted the flow of eastbound traffic, causing cycle failures.

## PM Peak Period

- The queue for the eastbound approach often blocked the left turn storage (see **Figure 4**).

**Figure 4: Eastbound Traffic Queueing at McCulloch Road and SR 434, PM**


- Eastbound queues were observed extending through the median opening (see **Figure 5**).

**Figure 5: Eastbound Traffic Queueing at McCulloch Road and SR 434, PM**


- The eastbound approach failed to clear for several cycles during the PM peak hour.
- Vehicles turning out of the northbound and southbound private roadway approaches through the median opening oftentimes halted the flow of eastbound traffic, causing cycle failures.
- Toward the end of the green time, vehicles were observed accelerating hard to make it through the intersection.

- During one cycle when the eastbound left turn storage was blocked by the queue (see **Figure 6**), a vehicle was observed bypassing the queue by driving over the concrete traffic separator into the left turn storage.

**Figure 6: Queue Blocks Left-Turn Storage on Eastbound McCulloch Road at SR 434, PM**

## EXISTING INTERSECTION OPERATIONS ANALYSIS

The existing intersection operating conditions (2022) were evaluated for the weekday AM and PM peak hour traffic volume conditions. The intersection level of service (LOS) was analyzed using *Highway Capacity Manual (HCM) 6th Edition* methodologies as implemented by Synchro Version 11. **Table 1** and **Table 2** summarize the existing AM and PM peak hour intersection operations. For the unsignalized, two-way stop-controlled intersection, average delay and LOS are presented for the critical movement on each approach. For the signalized intersection, average delay and LOS are presented for each movement and for the overall intersection. The volume-to-capacity (V/C) ratios are reported for the critical movement on each approach. Detailed HCM output reports are provided in **Appendix D**.

**Table 1: Existing 2022 Intersection Operations Analysis, AM Peak Hour**

| Intersection | Control | Measure | AM Peak Hour | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Overall | EB | | WB | | | NB | | | SB | | |
| | | | | L | T/R | L | T | R | L | T | R | L | T | R |
| McCulloch Road & Private Roadway | Two-Way Stop Control | LOS | - | A | - | A | - | - | A | | | C | | B |
| | | Delay (s) | - | 9.3 | - | 7.8 | - | - | 9.7 | | | 23.9 | | 13 |
| | | V/C | - | 0.02 | - | 0.00 | - | - | 0.00 | | | 0.18 | | 0.04 |
| | | Queue (ft) | - | 25 | - | 25 | - | - | 0 | | | 25 | | 25 |
| McCulloch Road & SR 434 | Signal | LOS | E | F | F | E | E | F | F | D | B | F | C | C |
| | | Delay (s) | 57.0 | 96.1 | 96.3 | 67.0 | 68.9 | 93.8 | 122.3 | 44.9 | 14.2 | 88.0 | 33.4 | 27.3 |
| | | V/C | - | 0.81 | 0.88 | 0.65 | 0.77 | 0.94 | 0.81 | 0.37 | 0.27 | 0.91 | 0.58 | 0.26 |
| | | Queue (ft) | - | 200 | 325 | 375 | 550 | 650 | 75 | 300 | 125 | 450 | 525 | 225 |

**Table 2: Existing 2022 Intersection Operations Analysis, PM Peak Hour**

| Intersection | Control | Measure | PM Peak Hour | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Overall | EB | | WB | | | NB | | | SB | | |
| | | | | L | T/R | L | T | R | L | T | R | L | T | R |
| McCulloch Road & Private Roadway | Two-Way Stop Control | LOS | - | A | - | A | - | - | B | | | C | | B |
| | | Delay (s) | - | 8.5 | - | 7.9 | - | - | 11.5 | | | 24.5 | | 11.7 |
| | | V/C | - | 0.03 | - | 0.01 | - | - | 0.04 | | | 0.24 | | 0.08 |
| | | Queue (ft) | - | 25 | - | 0 | - | - | 25 | | | 25 | | 25 |
| McCulloch Road & SR 434 | Signal | LOS | E | F | F | F | E | F | E | D | E | F | C | B |
| | | Delay (s) | 67.4 | 110.5 | 109.8 | 104.9 | 73.4 | 99.0 | 78.9 | 54.5 | 58.6 | 97.8 | 33.8 | 17.6 |
| | | V/C | - | 0.84 | 0.92 | 0.91 | 0.68 | 0.91 | 0.33 | 0.78 | 0.75 | 0.93 | 0.38 | 0.22 |
| | | Queue (ft) | - | 225 | 500 | 375 | 425 | 550 | 125 | 725 | 650 | 525 | 350 | 150 |

All movements at the unsignalized full median opening operate at LOS C or better from a capacity standpoint, but the HCM capacity model does not account for the interaction with eastbound queues from the adjacent signalized intersection. The signalized intersection movements at McCulloch Road & SR 434 operate at LOS E or better and with v/c ratios less than 1.0, with the following exceptions:

- In the AM peak hour:
  - The eastbound left turn movement operates at LOS F with an average delay of 96 seconds.
  - The eastbound shared through and right turn lane movement operates at LOS F with an average delay of 96 seconds.
  - The westbound right turn movement operates at LOS F with an average delay of 94 seconds.
  - The northbound left turn movement operates at LOS F with an average delay of 122 seconds.
  - The southbound left turn movement operates at LOS F with an average delay of 88 seconds.
- In the PM peak hour:
  - The eastbound left turn movement operates at LOS F with an average delay of 111 seconds.
  - The eastbound shared through and right turn lane movement operates at LOS F with an average delay of 110 seconds.
  - The westbound left turn movement operates at LOS F with an average delay of 105 seconds.
  - The westbound right turn movement operates at LOS F with an average delay of 99 seconds.
  - The southbound left turn movement operates at LOS F with an average delay of 98 seconds.

## HISTORICAL CRASH ANALYSIS

Crash data at the study intersections for the most recent five (5) years (2017-2021) and partial 2022 data through August 31, 2022, was obtained from FDOT's Crash Analysis Reporting (CAR) System, the State Safety Office GIS (SSOGis), and Signal Four Analytics (S4). A crash analysis summary is provided in this section. Full crash summary sheets are provided in **Appendix E**.

Crashes by Year

- A total of 297 crashes occurred at the study intersections between January 1, 2017, and August 31, 2022.
- There were sixty-three (63) crashes in 2017, sixty-one (61) crashes in 2018, fifty-seven (57) crashes in 2019, forty-four (44) crashes in 2020, forty-four (44) crashes in 2021, and twenty-eight (28) crashes through August 31, 2022.
    - No geometric or land-use changes occurred within the study area from 2017 to 2022.
    - SR 434 AADT has fluctuated year to year from 51,180 in 2017, to 51,833 in 2018, to 60,648 in 2019, to 45,552 in 2020, to 40,388 in 2021.
- There were no fatal crashes reported between January 1, 2017, and August 31, 2022.
- Forty-three (43) crashes involved possible injuries, nineteen (19) involved non-incapacitating injuries, and four (4) involved incapacitating injuries. Injury-related crashes accounted for 22% of crashes.
- Two hundred and thirty-one (231) crashes were property damage only (PDO), accounting for 78% of all crashes.
- One hundred (100) crashes, or 34%, occurred during nighttime conditions.
    - Roadway lighting is present at the SR 434 and McCulloch Road intersection. There is no lighting at the median opening on McCulloch.
- Sixty-three (63) crashes, or 22%, occurred under wet pavement conditions.
- One (1) crash involved a pedestrian. There were three (3) bicycle crashes, or 1%.
    - The pedestrian crash (Crash #248881936) occurred when a pedestrian crossing McCulloch Road on the east leg crosswalk of the SR 434 intersection was struck by a westbound right turning vehicle. The crash occurred at 6:18 PM at dusk, clear weather, and dry roadway surface conditions. The pedestrian experienced non-incapacitating injuries due to the crash. The driver was determined to be at fault for failing to yield right of way to the pedestrian at the intersection.
    - One bicyclist crash (Crash #88219029) occurred when a bicyclist crossing the CVS driveway along SR 434 was struck by an eastbound right turning vehicle coming out of the CVS driveway. The crash occurred at 10:37 AM under daylight, clear weather, and dry roadway surface conditions. The bicyclist experienced no injuries due to the crash.
    - The second bicyclist crash (Crash #88232537) occurred when a bicyclist crossing SR 434 on the north leg crosswalk of the McCulloch Road intersection was struck by a westbound right turning vehicle. The crash occurred at 1:42 PM under daylight, clear weather, and dry roadway surface conditions. The bicyclist experienced non-incapacitating injuries due to the crash. No fault was determined.

- The third bicyclist crash (Crash #88315222) occurred when a bicyclist traveling southbound along SR 434 at the east leg crosswalk of the McCulloch Road intersection was struck by a westbound right turning vehicle. The crash occurred at 2:32 PM under daylight, clear weather, and dry roadway surface conditions. The bicyclist experienced non-incapacitating injuries due to the crash.

Forty-one (41) angle and left-turn crashes were identified in the study area from historical data. The following list provides a breakdown of the angle and left turn crashes by intersection:

- Nineteen (19) angle and left turn crashes occurred at the McCulloch Road and SR 434 intersection.
- Nine (9) angle and left-turn crashes occurred at the median opening north of McCulloch Road on SR 434 (access to Walmart Neighborhood Market to the west and Publix to the east).
- Four (4) angle and left-turn crashes occurred at the median opening east of SR 434 at McCulloch Road (access to Publix and other shops to the north).
- One (1) left-turn crash occurred at the median opening south of McCulloch Road; a northbound left vehicle hit a southbound vehicle.

Crash data was examined more thoroughly at the median opening to the west of SR 434 on McCulloch Road (access to CVS to the south and Walmart Neighborhood Market to the north). There were 8 angle and left turn crashes at the median opening.

- Five (5) southbound left vehicles collided with eastbound through vehicles.
- Three (3) southbound left vehicles collided with a westbound through vehicle.

# Section 5
# Alternative Evaluation

# ALTERNATIVE EVALUATION

One alternative was developed and evaluated to address the existing traffic operations and safety issues. This section describes the development, operations analysis, and safety screening of this potential alternative.

## MEDIAN CLOSURE ALTERNATIVE DEVELOPMENT

The median opening along McCulloch Road west of SR 434 was modified to allow right-in/right-out only. The eastbound left turn storage at SR 434 and McCulloch Road was extended from 90 feet of storage and 100 feet of taper to 250 feet of storage and 300 feet of taper. The following describes the traffic volume rerouting assumptions associated with the proposed alternative:

- The existing northbound left turn volume from the Private Roadway near CVS was rerouted to make a northbound right turn and travel eastbound to the signalized intersection at McCulloch Road and SR 434, where they would proceed eastbound through, then U-turn and proceed westbound through the same signalized intersection and the median closure. See **Figure 7**.
- The existing northbound through volume from the Private Roadway near CVS was rerouted to make a northbound right turn and travel eastbound to the signalized intersection at McCulloch Road and SR 434, where they would proceed eastbound left to proceed northbound to reach the other entrance to the Walmart Neighborhood Market. See **Figure 7**.
- The existing southbound left turn volume from the Private Roadway near the Walmart Neighborhood Market was rerouted to make an eastbound right turn at the other exit of the Walmart Neighborhood Market on SR 434 to travel southbound to the signalized intersection of McCulloch Road and SR 434, where they were assigned to southbound through and left based on engineering judgement using existing traffic patterns and percentages. See **Figure 7**.
- The existing southbound through volume from the Private Roadway near the Walmart Neighborhood Market was rerouted to make an eastbound right turn at the other exit of the Walmart Neighborhood Market on SR 434 to travel southbound to the signalized intersection of McCulloch Road and SR 434, where they would go through the intersection and continue southbound to reach the other entrance to the CVS on SR 434. See **Figure 7**.
- The existing eastbound left turn volume from McCulloch Road toward the Walmart Neighborhood Market (via the Private Roadway) was rerouted through to the signalized intersection of McCulloch Road and SR 434, then travels eastbound left to proceed northbound toward the other entrance to the Walmart Neighborhood Market on SR 434. See **Figure 8**.
- The existing westbound left turn volume from McCulloch Road toward the CVS (via the Private Roadway) was rerouted at the signalized intersection of McCulloch Road and CR 434 before they got to this approach. Trips were shifted from southbound right to southbound through and from westbound through to westbound left to the other CVS entrance on SR 434. See **Figure 8**.

**Figure 7: North/South Volume Re-route**

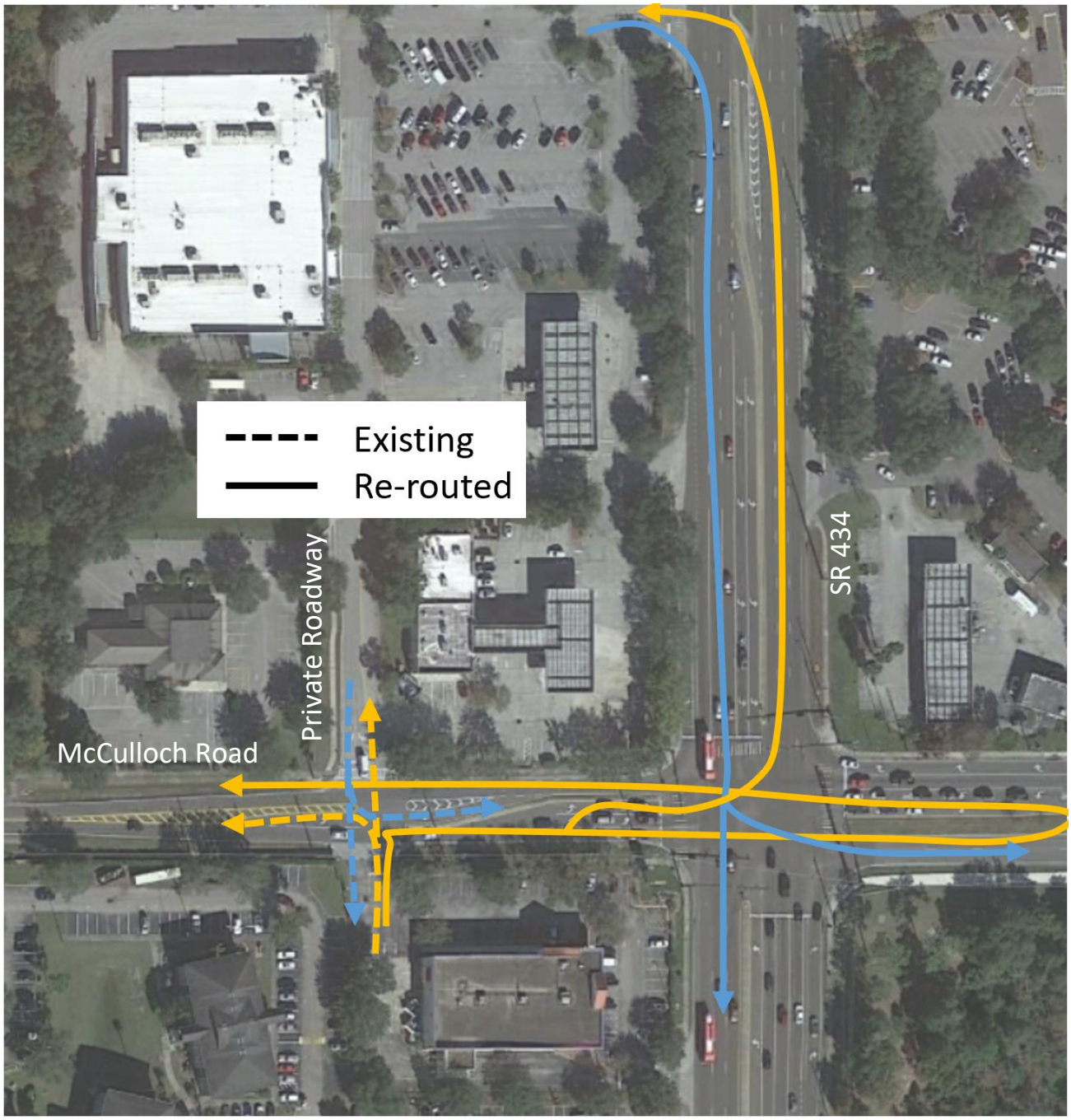
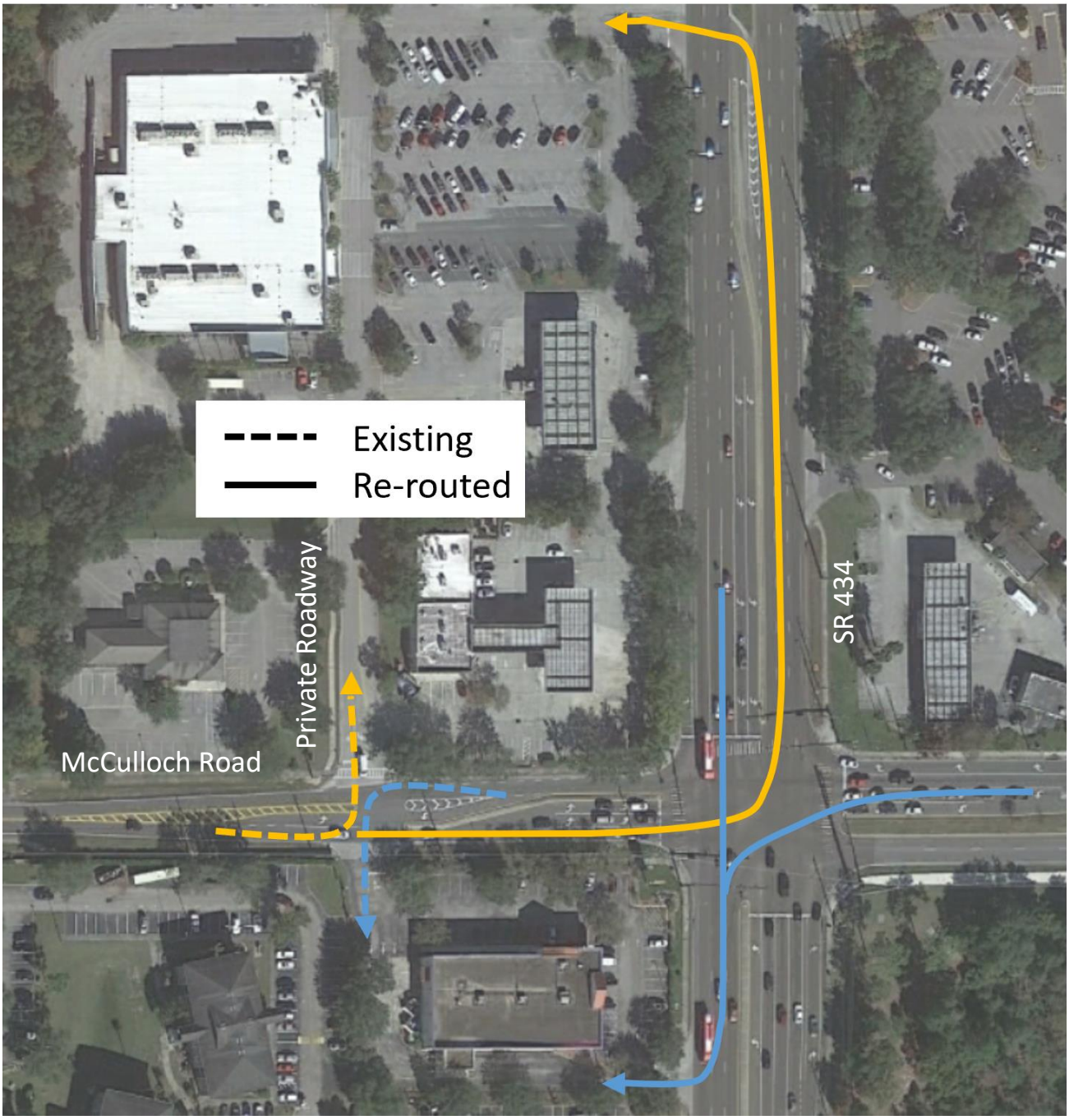
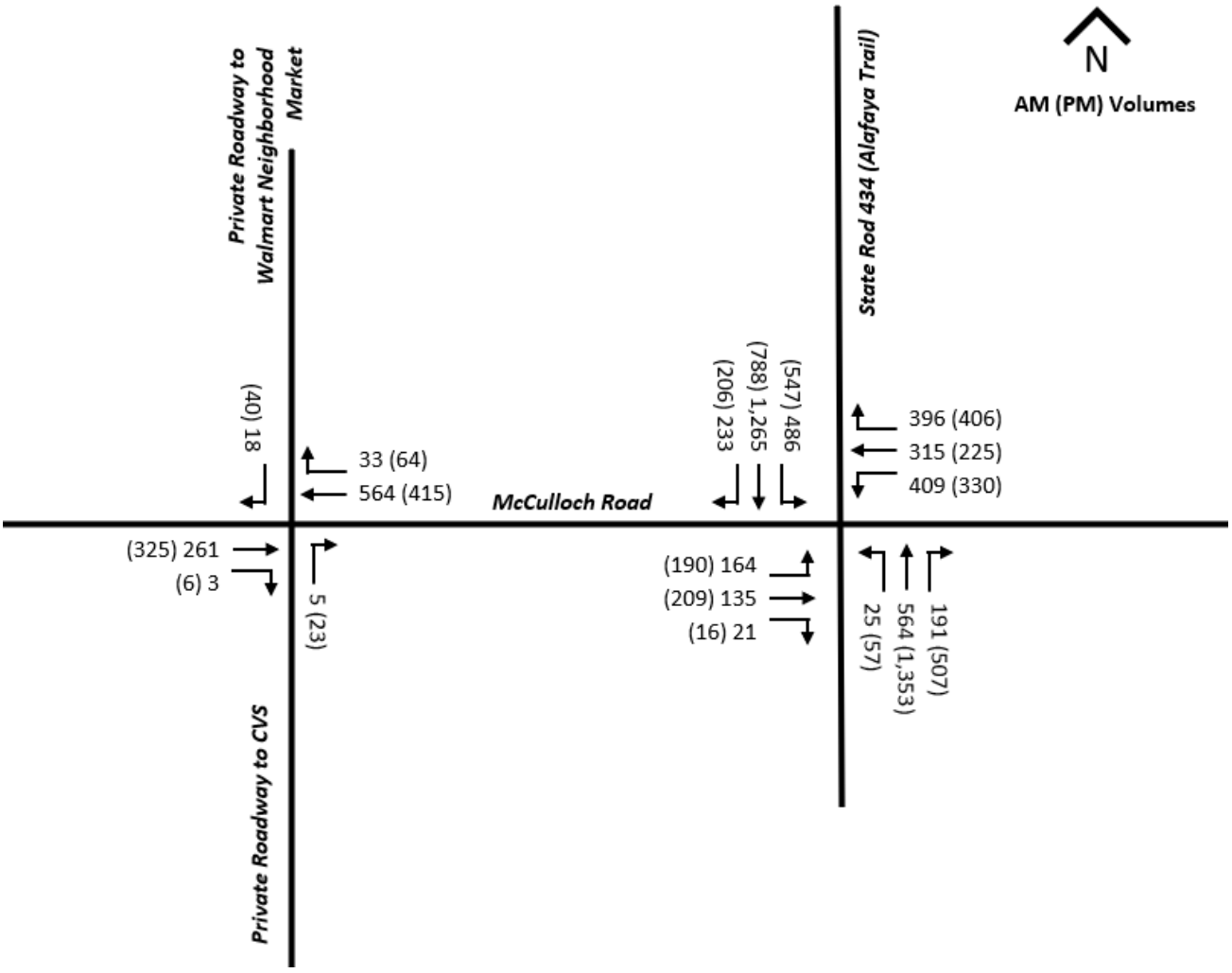


**Figure 8: East/West Left Volume Re-route**



After incorporating the re-routed traffic movements described above, the revised traffic volumes are illustrated in **Figure 9.**

**Figure 9: Median Closure Alternative 2022 Volumes**



# ALTERNATIVE INTERSECTION OPERATIONS ANALYSIS

The purpose of the alternative intersection operations analysis is to gain an understanding of how the alternative performs in comparison to the existing condition.

## Capacity Analysis

The 2022 intersection operating conditions for the Closed Median Alternative were evaluated for weekday AM and PM peak hour traffic volume conditions. Existing cycle lengths were maintained at the signalized intersection. In addition to the geometry improvements described in the previous section, minor signal timing improvements to the splits were made to the existing timings due to the rerouting of some traffic volume. The intersections were analyzed using HCM methodologies as implemented by Synchro Version 11 and summarized similarly to the Existing Conditions. **Table 3** and **Table 4** summarize the AM and PM peak hour intersection operations for the median closure alternative. Detailed HCM output reports are provided in **Appendix F**.

**Table 3: Median Closure Alternative 2022 Intersection Operations Analysis, AM Peak Hour**

| Intersection | Control | Measure | AM Peak Hour | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Overall | EB | | WB | | | NB | | | SB | | |
| | | | | L | T/R | L | T | R | L | T | R | L | T | R |
| McCulloch Road & Private Roadway | Two-Way Stop Control | LOS | - | | - | | - | - | | | A | | | B |
| | | Delay (s) | - | | - | | - | - | | | 9.8 | | | 13.0 |
| | | V/C | - | | - | | - | - | | | 0.01 | | | 0.04 |
| | | Queue (ft) | - | | - | | - | - | | | 0 | | | 25 |
| McCulloch Road & SR 434 | Signal | LOS | E | F | F | E | F | E | F | D | B | F | C | C |
| | | Delay (s) | 55.9 | 97.5 | 98.2 | 76.9 | 88.0 | 73.1 | 122.3 | 41.9 | 15.0 | 87.4 | 29.1 | 23.7 |
| | | V/C | - | 0.83 | 0.88 | 0.78 | 0.91 | 0.77 | 0.81 | 0.35 | 0.26 | 0.92 | 0.55 | 0.24 |
| | | Queue (ft) | - | 200 | 350 | 400 | 600 | 425 | 75 | 275 | 125 | 475 | 500 | 200 |

**Table 4: Median Closure Alternative 2022 Intersection Operations Analysis, PM Peak Hour**

| Intersection | Control | Measure | PM Peak Hour | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Overall | EB | | WB | | | NB | | | SB | | |
| | | | | L | T/R | L | T | R | L | T | R | L | T | R |
| McCulloch Road & Private Roadway | Two-Way Stop Control | LOS | - | | - | | - | - | | | B | | | B |
| | | Delay (s) | - | | - | | - | - | | | 10.4 | | | 11.7 |
| | | V/C | - | | - | | - | - | | | 0.04 | | | 0.08 |
| | | Queue (ft) | - | | - | | - | - | | | 25 | | | 25 |
| McCulloch Road & SR 434 | Signal | LOS | E | F | F | F | E | F | E | E | E | F | C | B |
| | | Delay (s) | 70.2 | 114.4 | 104.3 | 105.0 | 73.6 | 102.8 | 79.3 | 59.4 | 64.6 | 97.5 | 34.3 | 17.0 |
| | | V/C | - | 0.87 | 0.90 | 0.91 | 0.68 | 0.93 | 0.34 | 0.83 | 0.79 | 0.94 | 0.39 | 0.21 |
| | | Queue (ft) | - | 250 | 500 | 375 | 425 | 550 | 125 | 750 | 675 | 575 | 350 | 150 |

With the Closed Median Alternative in place, all movements at the unsignalized median opening operate at the same LOS as the existing condition, from a capacity standpoint. At McCulloch Road and SR 434 all movements in the Alternative condition operate at the same LOS as the existing condition, with the following exceptions:

- In the AM peak hour:
  - The westbound through movement operates worse, at LOS F, with average delay of 88 seconds, compared to LOS E (69 seconds of delay) in the existing condition.
- In the PM peak hour:
  - The northbound through movement operates worse, at LOS E, with average delay of 59 seconds, compared to LOS D (55 seconds of delay) in the existing condition.

The median closure affects traffic operations from a capacity perspective as explained above, but all movements remain under capacity. In addition to evaluating the capacity impacts, queue storage impacts were evaluated as discussed in the following section.

## Queue Storage Evaluation

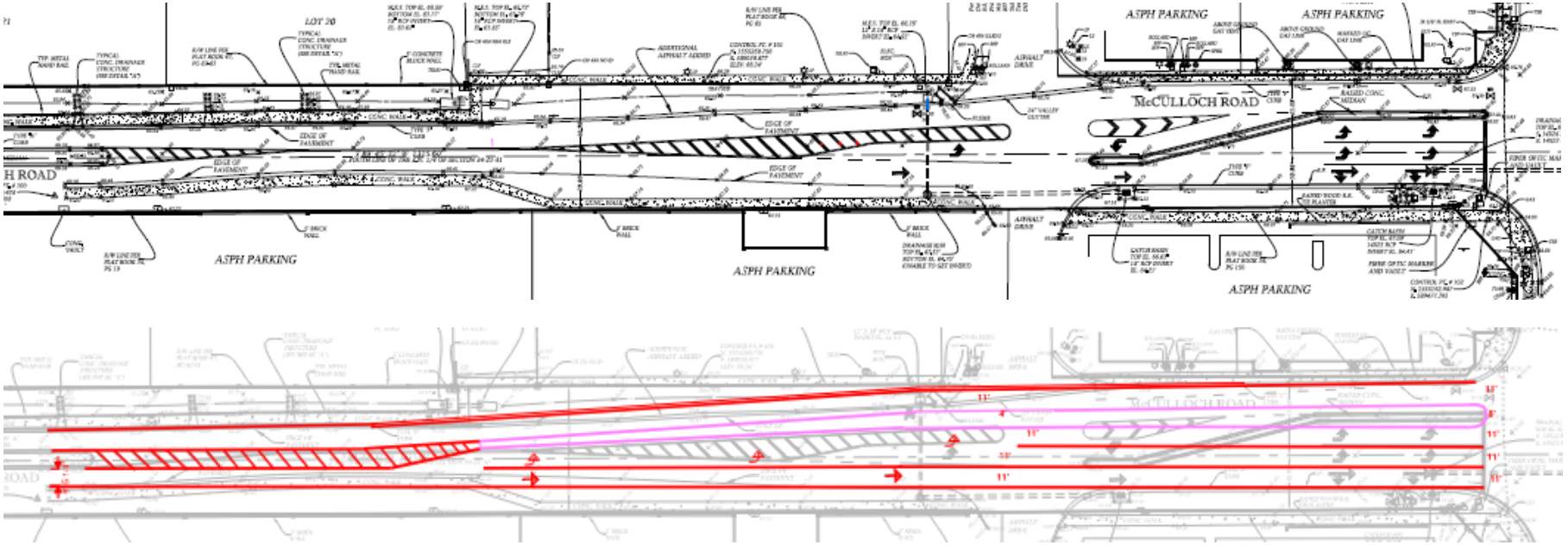
The existing eastbound approach at SR 434 and McCulloch Road includes dual left turn lanes and a shared through/right turn lane. The existing condition provides 90 feet of storage for each left turn lane and 100 feet of taper. Based on the 95$^{th}$ percentile queue in the existing conditions analysis, the eastbound left turn needs 225 feet (PM peak hour) of storage for both turn lanes. Field observations confirmed that the existing queues extend past the dedicated storage and the median opening during both AM and PM peak hours. With the proposed median closure and re-routed traffic volumes, the left-turn queue will require 250 feet (PM peak hour) of storage for both turn lanes. **Figure 10** depicts a planning level illustration of the proposed reconfiguration at the study intersections, which allows 250 feet of storage and another 300 feet of taper. **Table 5** describes the existing and proposed queue storage in comparison to what is needed.

**Table 5: SR 434 and McCulloch Rd Eastbound Approach Taper and Queue Storage**

| Scenario | Taper (ft) | Queue Storage (ft) | Needed (ft) |
|---|---|---|---|
| Existing | 100 | 90 | 225 |
| Alternative | 300 | 250 | 250 |

The Closed Median Alternative restricts access to right in/right out and extends the queue storage space which provides better access to the queue storage. With better access to storage, the eastbound movements will be able to better utilize their allotted green time.

**Figure 10: Existing Median Opening and Median Closure Alternative**



## SAFETY SCREENING

The median closure alternative was evaluated for safety impacts related to the improvement. A qualitative evaluation was conducted based on field observations and engineering judgement. The following describes the safety benefits of the proposed alternative:

- Improvement: The median opening along McCulloch Road, 330 feet west of SR 434, was modified to allow right-in/right-out only.
    - Safety Benefit: The restriction of access to only right turns into and out of the private roadways reduces conflicts by eliminating the ability to turn left across traffic in both directions. The eight crashes observed at the median opening from 2017 to 2021 were by drivers making southbound left-turn maneuvers, which will no longer be allowed. It is anticipated that crashes of this type will be eliminated.
    - A review of the Crash Modification Factor (CMF) Clearinghouse was conducted to determine if research has been done that may help evaluate the crash implications of closing the median opening. Two CMFs were found that are similar to the modifications proposed by the Median Closure Alternative but are not an exact match, and so should not be directly applied.
        - CMF 2219 – Install Raised Median
            - This CMF is intended to be applied on roadway segments, which would include median closures along a segment leading to a reduction in crashes. This is like the proposed improvement as it closes a full median opening.
            - A CMF value of 0.29 is provided for all crash types, which means crashes may be reduced by 71 percent with the associated improvement.
        - CMF 9821 – Install Right-in-Right-out (RIRO) Operations at Stop-Controlled Intersections
            - This CMF is intended to be applied when closing a median opening at a three-leg intersection. This is like the proposed improvement, but the study location is a four-leg intersection.
            - A CMF value of 0.55 is provided for all crash types, which means crashes may be reduced by 45 percent with the associated improvement.
        - While neither CMF 2219 or 9821 should be directly applied to the study intersection as they do not match the proposed alternative, both provide similar scenarios and therefore can be used to qualitatively show a reduction in crashes can be expected following the median closure.
- Improvement: Left-turn storage capacity was increased and access to the storage was improved for the eastbound approach at SR 434 and McCulloch Road.
    - Safety Benefit: In the current scenario, storage is often blocked by the raised median and the shared through/right lane traffic queue spilling back. With the left turn storage extended, vehicles will be able to properly store prior to green time and will not need to accelerate as heavily to make it through the intersection. Risk of red-light-running and median jumping will be reduced.

# SUMMARY

Kittelson & Associates, Inc. was retained by Seminole County Public Works Department to conduct a traffic operations and safety evaluation of McCulloch Road's intersections at SR 434 and the unsignalized full median opening that is located 330 feet west of SR 434. The proximity of these intersections and the current median structure presents challenges for peak hour traffic operations, driver expectancy, and intersection safety – often resulting in an eastbound queue on McCulloch Road backing up from SR 434 past the median opening. The primary purpose of this study is to evaluate operations and safety concerns with the eastbound approach of McCulloch Road at SR 434 and the interaction with the adjacent median opening.

An alternative geometry was proposed to address the existing operations and safety concerns. In this alternative, the median opening is closed such that access to the private roadways is restricted to right-in/right-out. The median closure alternative provides similar operational results from a capacity perspective when compared to the existing condition. Closing the median allows the eastbound left turn storage to be increased, accommodating the storage needs based on the re-routed volumes. The addition of left turn storage would improve operations and safety for traffic on the eastbound approach, allowing for better utilization of green time. The median closure also provides safety benefits by reducing conflicts at the median opening, which may reduce crashes.

It is recommended that Seminole County proceed with feasibility discussions with Orange County and the adjacent commercial properties regarding the median closure and turn lane storage adjustment.

# Appendix A:
# Raw Count Data

# Roadway Count Summary

*Vanasse Hangen Brustlin, Inc.*

**County** Orange **City** Orlando

**Intersection** CVS **&** McCulloch Rd

**Date** September 8, 2022 **All Vehicles**

**VHB Project #:** 63289.04

*AM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 7:00 AM - 7:15 AM | 0 | 0 | 0 | 4 | 0 | 1 | 5 | 32 | 1 | 0 | 83 | 2 |
| 7:15 AM - 7:30 AM | 0 | 0 | 1 | 5 | 0 | 9 | 1 | 40 | 0 | 0 | 162 | 6 |
| 7:30 AM - 7:45 AM | 0 | 0 | 0 | 6 | 0 | 5 | 4 | 35 | 0 | 3 | 149 | 3 |
| 7:45 AM - 8:00 AM | 0 | 0 | 0 | 8 | 1 | 7 | 1 | 48 | 1 | 0 | 149 | 6 |
| 8:00 AM - 8:15 AM | 0 | 0 | 0 | 7 | 0 | 5 | 6 | 66 | 0 | 0 | 157 | 5 |
| 8:15 AM - 8:30 AM | 0 | 0 | 1 | 13 | 0 | 7 | 3 | 50 | 0 | 2 | 130 | 9 |
| 8:30 AM - 8:45 AM | 1 | 0 | 2 | 8 | 0 | 3 | 3 | 55 | 1 | 0 | 141 | 6 |
| 8:45 AM - 9:00 AM | 1 | 0 | 0 | 9 | 1 | 2 | 4 | 67 | 2 | 0 | 120 | 12 |
| TOTAL | 2 | 0 | 4 | 60 | 2 | 39 | 27 | 393 | 5 | 5 | 1,091 | 49 |
| **Peak Hour** | | | | | | | | | | | | |
| **7:45 AM - 8:45 AM** | **1** | **0** | **3** | **36** | **1** | **22** | **13** | **219** | **2** | **2** | **577** | **26** |

*PM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 4:00 PM - 4:15 PM | 0 | 1 | 4 | 15 | 1 | 17 | 7 | 76 | 1 | 3 | 98 | 17 |
| 4:15 PM - 4:30 PM | 0 | 0 | 5 | 14 | 2 | 15 | 5 | 64 | 3 | 3 | 75 | 16 |
| 4:30 PM - 4:45 PM | 0 | 0 | 1 | 6 | 2 | 6 | 7 | 84 | 2 | 0 | 84 | 13 |
| 4:45 PM - 5:00 PM | 0 | 1 | 3 | 10 | 0 | 7 | 3 | 78 | 3 | 2 | 85 | 10 |
| 5:00 PM - 5:15 PM | 0 | 2 | 5 | 6 | 0 | 11 | 7 | 76 | 0 | 1 | 94 | 9 |
| 5:15 PM - 5:30 PM | 0 | 0 | 5 | 6 | 2 | 9 | 8 | 73 | 1 | 1 | 121 | 22 |
| 5:30 PM - 5:45 PM | 0 | 0 | 4 | 23 | 2 | 10 | 9 | 71 | 1 | 3 | 97 | 20 |
| 5:45 PM - 6:00 PM | 0 | 1 | 5 | 13 | 1 | 9 | 2 | 69 | 4 | 7 | 91 | 11 |
| TOTAL | 0 | 5 | 32 | 93 | 10 | 84 | 48 | 591 | 15 | 20 | 745 | 118 |
| **Peak Hour** | | | | | | | | | | | | |
| **5:00 PM - 6:00 PM** | **0** | **3** | **19** | **48** | **5** | **39** | **26** | **289** | **6** | **12** | **403** | **62** |

# Roadway Count Summary

*Vanasse Hangen Brustlin, Inc.*

**County** Orange **City** Orlando

**Intersection** CVS **&** McCulloch Rd

**Date** September 8, 2022 **Trucks**

**VHB Project #:** 63289.04

*AM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 7:00 AM - 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 |
| 7:15 AM - 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM - 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 |
| 7:45 AM - 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 8:00 AM - 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 1 | 0 |
| 8:15 AM - 8:30 AM | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 |
| 8:30 AM - 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 0 |
| 8:45 AM - 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 3 | 1 |
| TOTAL | 0 | 0 | 0 | 2 | 0 | 1 | 4 | 10 | 0 | 0 | 20 | 2 |
| **Peak Hour** | | | | | | | | | | | | |
| **7:15 AM - 8:15 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **5** | **0** | **0** | **4** | **0** |
| | 0% | 0% | 0% | 0% | 0% | 0% | 15% | 2% | 0% | 0% | 1% | 0% |

*PM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 4:00 PM - 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 |
| 4:15 PM - 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM - 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 4:45 PM - 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 5:00 PM - 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM - 5:30 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM - 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 5:45 PM - 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 4 | 1 |
| **Peak Hour** | | | | | | | | | | | | |
| **5:00 PM - 6:00 PM** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **1** | **0** |
| | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 0% | 0% | 0% | 0% | 0% |

# Roadway Count Summary

*Vanasse Hangen Brustlin, Inc.*

**County** Orange **City** Orlando

**Intersection** CVS **&** McCulloch Rd

**Date** September 8, 2022 **U-Turns & RTOR**

**VHB Project #:** 63289.04

*AM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 7:00 AM - 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM - 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM - 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM - 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM - 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM - 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:30 AM - 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM - 9:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| **Peak Hour** | | | | | | | | | | | | |
| **7:30 AM - 8:30 AM** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** |

*PM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 4:00 PM - 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 4:15 PM - 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM - 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM - 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM - 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM - 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM - 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 5:45 PM - 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| **Peak Hour** | | | | | | | | | | | | |
| **3:15 PM - 4:15 PM** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** |

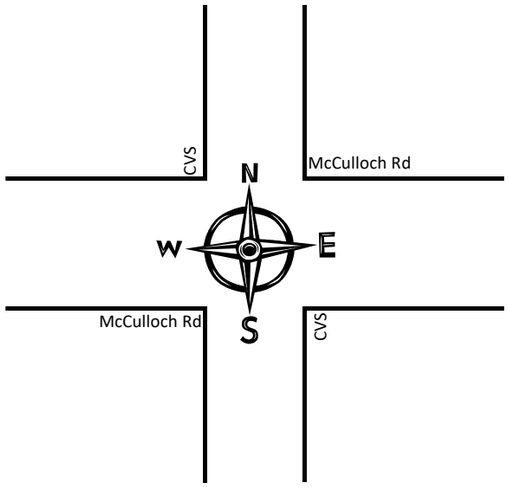
## Pedestrian & Bicycle Summary

**Project #:** 63289.04 **NB/SB:** CVS

**Date:** 9/8/2022 **EB/WB:** McCulloch Rd

| | | Hour | 7:00 | 8:00 | 11:00 | 12:00 | 14:00 | 15:00 | 16:00 | 17:00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| **Eastbound** | ▶ | Bike | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| | | Ped | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| **Westbound** | ◀ | Bike | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| | | Ped | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | **2** |

| Hour | Southbound Ped ▼ | Southbound Bike ▼ | Northbound Ped ▲ | Northbound Bike ▲ |
|---|---|---|---|---|
| 1 7:00 | 0 | 1 | 0 | 0 |
| 2 8:00 | 0 | 0 | 1 | 0 |
| 3 11:00 | 0 | 0 | 0 | 0 |
| 4 12:00 | 0 | 0 | 0 | 0 |
| 5 14:00 | 0 | 0 | 0 | 0 |
| 6 15:00 | 0 | 0 | 0 | 0 |
| 7 16:00 | 1 | 0 | 0 | 0 |
| 8 17:00 | 0 | 0 | 0 | 0 |
| | **1** | **1** | **1** | **0** |




| Hour | Southbound Ped ▼ | Southbound Bike ▼ | Northbound Ped ▲ | Northbound Bike ▲ | Hour |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 1 7:00 |
| 2 | 0 | 0 | 0 | 0 | 2 8:00 |
| 3 | 0 | 0 | 0 | 0 | 3 11:00 |
| 4 | 0 | 0 | 0 | 0 | 4 12:00 |
| 5 | 0 | 0 | 0 | 0 | 5 14:00 |
| 6 | 0 | 0 | 0 | 0 | 6 15:00 |
| 7 | 0 | 0 | 0 | 0 | 7 16:00 |
| 8 | 0 | 0 | 0 | 0 | 8 17:00 |
| | **0** | **0** | **0** | **0** | |

| | | | 7:00 | 8:00 | 11:00 | 12:00 | 14:00 | 15:00 | 16:00 | 17:00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Eastbound** | ▶ | Bike | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| | | Ped | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | **2** |
| **Westbound** | ◀ | Bike | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | **1** |
| | | Ped | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| | | Hour | | | | | | | | | |

**8** **2**

# Roadway Count Summary

*Vanasse Hangen Brustlin, Inc.*

**County** Orange **City** Orlando

**Intersection** SR 434 **&** McCulloch Rd

**Date** September 8, 2022 **All Vehicles**

**VHB Project #:** 63289.04

*AM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 7:00 AM - 7:15 AM | 2 | 82 | 19 | 42 | 180 | 39 | 18 | 15 | 1 | 68 | 83 | 104 |
| 7:15 AM - 7:30 AM | 5 | 90 | 17 | 65 | 221 | 59 | 24 | 21 | 2 | 83 | 93 | 98 |
| 7:30 AM - 7:45 AM | 1 | 133 | 36 | 41 | 227 | 71 | 20 | 19 | 2 | 86 | 90 | 88 |
| 7:45 AM - 8:00 AM | 3 | 112 | 26 | 82 | 301 | 64 | 40 | 18 | 4 | 97 | 84 | 101 |
| 8:00 AM - 8:15 AM | 3 | 116 | 35 | 85 | 313 | 64 | 39 | 36 | 4 | 100 | 75 | 118 |
| 8:15 AM - 8:30 AM | 6 | 129 | 51 | 98 | 332 | 59 | 28 | 27 | 7 | 91 | 70 | 114 |
| 8:30 AM - 8:45 AM | 7 | 142 | 51 | 130 | 322 | 63 | 34 | 30 | 3 | 115 | 86 | 87 |
| 8:45 AM - 9:00 AM | 8 | 161 | 48 | 125 | 256 | 41 | 43 | 36 | 6 | 90 | 74 | 65 |
| TOTAL | 35 | 965 | 283 | 668 | 2,152 | 460 | 246 | 202 | 29 | 730 | 655 | 775 |
| **Peak Hour** | | | | | | | | | | | | |
| **8:00 AM - 9:00 AM** | **24** | **548** | **185** | **438** | **1,223** | **227** | **144** | **129** | **20** | **396** | **305** | **384** |

*PM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 4:00 PM - 4:15 PM | 14 | 293 | 117 | 101 | 187 | 52 | 41 | 41 | 8 | 73 | 54 | 101 |
| 4:15 PM - 4:30 PM | 13 | 277 | 94 | 92 | 169 | 45 | 35 | 30 | 1 | 59 | 39 | 78 |
| 4:30 PM - 4:45 PM | 16 | 282 | 98 | 102 | 140 | 37 | 46 | 44 | 2 | 60 | 40 | 88 |
| 4:45 PM - 5:00 PM | 8 | 234 | 111 | 109 | 175 | 41 | 36 | 57 | 3 | 67 | 43 | 86 |
| 5:00 PM - 5:15 PM | 10 | 336 | 131 | 117 | 203 | 59 | 31 | 48 | 5 | 64 | 52 | 96 |
| 5:15 PM - 5:30 PM | 14 | 352 | 120 | 125 | 203 | 55 | 45 | 46 | 3 | 82 | 69 | 105 |
| 5:30 PM - 5:45 PM | 16 | 320 | 117 | 131 | 195 | 50 | 46 | 52 | 6 | 77 | 53 | 99 |
| 5:45 PM - 6:00 PM | 15 | 306 | 124 | 112 | 152 | 41 | 33 | 57 | 2 | 92 | 50 | 94 |
| TOTAL | 106 | 2,400 | 912 | 889 | 1,424 | 380 | 313 | 375 | 30 | 574 | 400 | 747 |
| **Peak Hour** | | | | | | | | | | | | |
| **5:00 PM - 6:00 PM** | **55** | **1,314** | **492** | **485** | **753** | **205** | **155** | **203** | **16** | **315** | **224** | **394** |

# Roadway Count Summary

*Vanasse Hangen Brustlin, Inc.*

**County** Orange **City** Orlando

**Intersection** SR 434 **&** McCulloch Rd

**Date** September 8, 2022 **Trucks**

**VHB Project #:** 63289.04

*AM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 7:00 AM - 7:15 AM | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 4 | 0 |
| 7:15 AM - 7:30 AM | 0 | 4 | 0 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM - 7:45 AM | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 3 | 0 | 0 | 0 | 0 |
| 7:45 AM - 8:00 AM | 0 | 10 | 0 | 4 | 4 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 8:00 AM - 8:15 AM | 0 | 1 | 0 | 3 | 3 | 0 | 1 | 1 | 1 | 0 | 2 | 2 |
| 8:15 AM - 8:30 AM | 0 | 1 | 2 | 1 | 5 | 1 | 0 | 1 | 1 | 3 | 1 | 2 |
| 8:30 AM - 8:45 AM | 0 | 0 | 1 | 4 | 4 | 2 | 0 | 3 | 0 | 0 | 1 | 1 |
| 8:45 AM - 9:00 AM | 0 | 2 | 1 | 4 | 6 | 2 | 1 | 2 | 0 | 1 | 3 | 1 |
| TOTAL | 0 | 19 | 5 | 19 | 29 | 8 | 3 | 12 | 2 | 4 | 12 | 6 |
| **Peak Hour** | | | | | | | | | | | | |
| **8:00 AM - 9:00 AM** | **0** | **4** | **4** | **12** | **18** | **5** | **2** | **7** | **2** | **4** | **7** | **6** |
| | 0% | 1% | 2% | 3% | 1% | 2% | 1% | 5% | 10% | 1% | 2% | 2% |

*PM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 4:00 PM - 4:15 PM | 0 | 1 | 1 | 2 | 3 | 0 | 1 | 1 | 0 | 1 | 3 | 3 |
| 4:15 PM - 4:30 PM | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 3 |
| 4:30 PM - 4:45 PM | 0 | 1 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 4:45 PM - 5:00 PM | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 5:00 PM - 5:15 PM | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:15 PM - 5:30 PM | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 5:30 PM - 5:45 PM | 0 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM - 6:00 PM | 0 | 4 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| TOTAL | 0 | 9 | 3 | 14 | 12 | 1 | 1 | 2 | 0 | 4 | 5 | 15 |
| **Peak Hour** | | | | | | | | | | | | |
| **5:00 PM - 6:00 PM** | **0** | **6** | **1** | **6** | **4** | **0** | **0** | **1** | **0** | **0** | **0** | **7** |
| | 0% | 0% | 0% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 2% |

# Roadway Count Summary

*Vanasse Hangen Brustlin, Inc.*

**County** Orange **City** Orlando

**Intersection** SR 434 **&** McCulloch Rd

**Date** September 8, 2022 **U-Turns & RTOR**

**VHB Project #:** 63289.04

*AM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 7:00 AM - 7:15 AM | 1 | 0 | 11 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 65 |
| 7:15 AM - 7:30 AM | 0 | 0 | 5 | 4 | 0 | 12 | 0 | 0 | 0 | 2 | 0 | 38 |
| 7:30 AM - 7:45 AM | 0 | 0 | 6 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 45 |
| 7:45 AM - 8:00 AM | 1 | 0 | 2 | 2 | 0 | 16 | 0 | 0 | 1 | 0 | 0 | 39 |
| 8:00 AM - 8:15 AM | 1 | 0 | 16 | 5 | 0 | 14 | 0 | 0 | 1 | 0 | 0 | 45 |
| 8:15 AM - 8:30 AM | 1 | 0 | 19 | 1 | 0 | 15 | 0 | 0 | 3 | 0 | 0 | 62 |
| 8:30 AM - 8:45 AM | 4 | 0 | 15 | 4 | 0 | 16 | 0 | 0 | 0 | 1 | 0 | 41 |
| 8:45 AM - 9:00 AM | 1 | 0 | 14 | 6 | 0 | 15 | 0 | 0 | 1 | 0 | 0 | 23 |
| TOTAL | 9 | 0 | 88 | 23 | 0 | 113 | 0 | 0 | 6 | 3 | 0 | 358 |
| **Peak Hour** | | | | | | | | | | | | |
| **7:45 AM - 8:45 AM** | **7** | **0** | **52** | **12** | **0** | **61** | **0** | **0** | **5** | **1** | **0** | **187** |

*PM Peak Hour*

| Time Period | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Through | Right | Left | Through | Right | Left | Through | Right | Left | Through | Right |
| 4:00 PM - 4:15 PM | 0 | 0 | 23 | 4 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 54 |
| 4:15 PM - 4:30 PM | 3 | 0 | 34 | 5 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 25 |
| 4:30 PM - 4:45 PM | 5 | 0 | 24 | 6 | 0 | 16 | 0 | 0 | 1 | 1 | 0 | 38 |
| 4:45 PM - 5:00 PM | 2 | 0 | 16 | 4 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 45 |
| 5:00 PM - 5:15 PM | 2 | 0 | 29 | 10 | 0 | 20 | 0 | 0 | 1 | 1 | 0 | 33 |
| 5:15 PM - 5:30 PM | 1 | 0 | 37 | 6 | 0 | 23 | 0 | 0 | 1 | 2 | 0 | 31 |
| 5:30 PM - 5:45 PM | 2 | 0 | 28 | 9 | 0 | 14 | 1 | 0 | 2 | 2 | 0 | 39 |
| 5:45 PM - 6:00 PM | 6 | 0 | 14 | 5 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 44 |
| TOTAL | 21 | 0 | 205 | 49 | 0 | 134 | 1 | 0 | 5 | 6 | 0 | 309 |
| **Peak Hour** | | | | | | | | | | | | |
| **4:45 PM - 5:45 PM** | **7** | **0** | **110** | **29** | **0** | **75** | **1** | **0** | **4** | **5** | **0** | **148** |

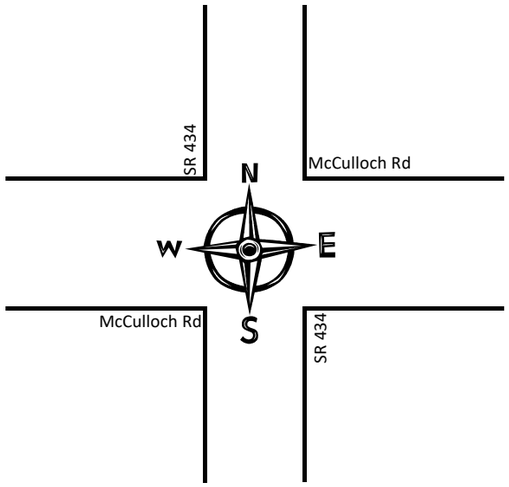
## Pedestrian & Bicycle Summary

**Project #:** 63289.04 **NB/SB:** SR 434

**Date:** 9/8/2022 **EB/WB:** McCulloch Rd

| | | Hour | 7:00 | 8:00 | 11:00 | 12:00 | 14:00 | 15:00 | 16:00 | 17:00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| **Eastbound** | ▶ | Bike | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | **2** |
| | | Ped | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | **3** |
| **Westbound** | ◀ | Bike | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| | | Ped | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **2** |

| | Southbound | | Northbound | | |
|---|---|---|---|---|---|
| Hour | Ped ▼ | Bike | Ped ▲ | Bike | |
| 1 7:00 | 3 | 0 | 2 | 0 | |
| 2 8:00 | 1 | 1 | 2 | 0 | |
| 3 11:00 | 0 | 0 | 0 | 0 | |
| 4 12:00 | 0 | 0 | 0 | 0 | |
| 5 14:00 | 0 | 0 | 0 | 0 | |
| 6 15:00 | 0 | 0 | 0 | 0 | |
| 7 16:00 | 0 | 1 | 0 | 0 | |
| 8 17:00 | 1 | 1 | 0 | 0 | |
| | **5** | **3** | **4** | **0** | |




| | Southbound | | Northbound | | |
|---|---|---|---|---|---|
| | Ped ▼ | Bike | Ped ▲ | Bike | Hour |
| 1 | 0 | 1 | 0 | 0 | 1 7:00 |
| 2 | 1 | 0 | 1 | 1 | 2 8:00 |
| 3 | 0 | 0 | 0 | 0 | 3 11:00 |
| 4 | 0 | 0 | 0 | 0 | 4 12:00 |
| 5 | 0 | 0 | 0 | 0 | 5 14:00 |
| 6 | 0 | 0 | 0 | 0 | 6 15:00 |
| 7 | 0 | 0 | 0 | 0 | 7 16:00 |
| 8 | 2 | 0 | 1 | 0 | 8 17:00 |
| | **3** | **1** | **2** | **1** | |

| | | | 7:00 | 8:00 | 11:00 | 12:00 | 14:00 | 15:00 | 16:00 | 17:00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Eastbound** | ▶ | Bike | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| | | Ped | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Westbound** | ◀ | Bike | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| | | Ped | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| | | Hour | 7:00 | 8:00 | 11:00 | 12:00 | 14:00 | 15:00 | 16:00 | 17:00 | |

**19** **8**

# Appendix B:
# Signal Timing Plans

# ORANGE COUNTY TRAFFIC SIGNAL TIMING

**Intersection: Alafaya Tl & McCulloch Rd** **Node: 337**
**Equipment: Eagle** **CDI:** **CDO:** **Date: 07/30/19**

## BASIC TIMING

| Phase | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Direction | NBL | SB | EBL | WB | SBL | NB | WBL | EB |
| Min Green (sec) | 5 | 10 | 5 | 5 | 5 | 10 | 5 | 5 |
| Vehicle Gap (sec) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Max Green 1 (sec) | 15 | 55 | 15 | 20 | 15 | 55 | 25 | 20 |
| Max Green 2 (sec) | 15 | 55 | 15 | 20 | 15 | 55 | 25 | 20 |
| Yellow (sec) | 4.9 | 5.1 | 4.1 | 4.9 | 5.1 | 4.9 | 4.9 | 4.1 |
| All-Red (sec) | 3.3 | 2.0 | 3.0 | 2.0 | 3.1 | 2.0 | 2.8 | 2.2 |
| Walk (sec) | | 7 | | 7 | | 7 | | |
| Flash Don't Walk (sec) | | 28 | | 38 | | 38 | | |
| Recall/Memory | NL | SF/NL | NL | NL | NL | SF/NL | NL | NL |
| Delay (sec) | | | | | | | | |
| Detector Switching | | | | | | | | |
| Dual Entry | | Y | | Y | | Y | | Y |
| Overlap | | | | | | | | |
| Flash | R | Y | R | R | R | Y | R | R |
| Speed (mph) | 45 | 50 | 35 | 45 | 50 | 45 | 45 | 35 |
| Veh Distance (ft) | 135 | 90 | 140 | 142 | 90 | 135 | 142 | 140 |
| Ped Distance (ft) | | 95.0 | | 131.0 | | 132.0 | | |
| Ped Clearance (sec) | | 27 | | 37 | | 38 | | |

## COORDINATION PLANS

| Coordination Pattern | 1/1/1 | 2/1/1 | 2/2/1 | 3/1/1 | | Day | Time | Pattern |
|---|---|---|---|---|---|---|---|---|
| Cycle | 180 | 160 | 180 | 190 | | 1 | 0:30 | FREE |
| Split 1 | 20 | 24 | 25 | 30 | | 1 | 10:00 | 2/2/1 |
| Split 2 | 75 | 56 | 78 | 82 | | 2 | 0:30 | FREE |
| Split 3 | 20 | 28 | 27 | 27 | | 2 | 6:00 | 1/1/1 |
| Split 4 | 65 | 52 | 50 | 51 | | 2 | 9:30 | 2/2/1 |
| Split 5 | 35 | 26 | 35 | 30 | | 2 | 15:30 | 3/1/1 |
| Split 6 | 60 | 54 | 68 | 82 | | 2 | 19:00 | 2/1/1 |
| Split 7 | 55 | 35 | 45 | 38 | | | | |
| Split 8 | 30 | 45 | 32 | 40 | | | | |
| Offset | 102 | 155 | 103 | 61 | | | | |
| Lagging Phases | 0/0/0/7 | 1/3/0/7 | 0/0/0/0 | 1/0/0/0 | | | | |
| Source Day | Equate 1 | Equate 2 | Equate 3 | Equate 4 | Equate 5 | | | |
| 1 | 7 | | | | | | | |
| 2 | 3 | 4 | 5 | 6 | | | | |
| | | | | | | | | |
| | | | | | | | | |

Notes:
ALT SEQ 1 = REVERSE PHASE 1 & 2
ALT SEQ 8 = REVERSE PHASE 7 & 8
ALT SEQ 11 = REVERSE PHASE 1 & 2, 3 & 4 AND 7 & 8

1. This intersection operates under adaptive control
2. When not running adaptive control adjust Vehicle Gap to 3.0 for all phases

# Appendix C:
# Peak Season Factor Category Report

2021 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
CATEGORY: 7700  SEMINOLE COUNTYWIDE

MOCF: 0.98

| WEEK | DATES | SF | PSCF |
|---|---|---|---|
| 1 | 01/01/2021 - 01/02/2021 | 1.01 | 1.03 |
| 2 | 01/03/2021 - 01/09/2021 | 1.04 | 1.06 |
| 3 | 01/10/2021 - 01/16/2021 | 1.07 | 1.09 |
| 4 | 01/17/2021 - 01/23/2021 | 1.06 | 1.08 |
| 5 | 01/24/2021 - 01/30/2021 | 1.05 | 1.07 |
| 6 | 01/31/2021 - 02/06/2021 | 1.04 | 1.06 |
| 7 | 02/07/2021 - 02/13/2021 | 1.03 | 1.05 |
| 8 | 02/14/2021 - 02/20/2021 | 1.02 | 1.04 |
| 9 | 02/21/2021 - 02/27/2021 | 1.01 | 1.03 |
| 10 | 02/28/2021 - 03/06/2021 | 0.99 | 1.01 |
| *11 | 03/07/2021 - 03/13/2021 | 0.98 | 1.00 |
| *12 | 03/14/2021 - 03/20/2021 | 0.97 | 0.99 |
| *13 | 03/21/2021 - 03/27/2021 | 0.97 | 0.99 |
| *14 | 03/28/2021 - 04/03/2021 | 0.97 | 0.99 |
| *15 | 04/04/2021 - 04/10/2021 | 0.98 | 1.00 |
| *16 | 04/11/2021 - 04/17/2021 | 0.98 | 1.00 |
| *17 | 04/18/2021 - 04/24/2021 | 0.98 | 1.00 |
| *18 | 04/25/2021 - 05/01/2021 | 0.98 | 1.00 |
| *19 | 05/02/2021 - 05/08/2021 | 0.97 | 0.99 |
| *20 | 05/09/2021 - 05/15/2021 | 0.97 | 0.99 |
| *21 | 05/16/2021 - 05/22/2021 | 0.98 | 1.00 |
| *22 | 05/23/2021 - 05/29/2021 | 0.98 | 1.00 |
| *23 | 05/30/2021 - 06/05/2021 | 0.99 | 1.01 |
| 24 | 06/06/2021 - 06/12/2021 | 0.99 | 1.01 |
| 25 | 06/13/2021 - 06/19/2021 | 1.00 | 1.02 |
| 26 | 06/20/2021 - 06/26/2021 | 1.00 | 1.02 |
| 27 | 06/27/2021 - 07/03/2021 | 1.01 | 1.03 |
| 28 | 07/04/2021 - 07/10/2021 | 1.01 | 1.03 |
| 29 | 07/11/2021 - 07/17/2021 | 1.02 | 1.04 |
| 30 | 07/18/2021 - 07/24/2021 | 1.02 | 1.04 |
| 31 | 07/25/2021 - 07/31/2021 | 1.03 | 1.05 |
| 32 | 08/01/2021 - 08/07/2021 | 1.03 | 1.05 |
| 33 | 08/08/2021 - 08/14/2021 | 1.04 | 1.06 |
| 34 | 08/15/2021 - 08/21/2021 | 1.04 | 1.06 |
| 35 | 08/22/2021 - 08/28/2021 | 1.04 | 1.06 |
| 36 | 08/29/2021 - 09/04/2021 | 1.04 | 1.06 |
| 37 | 09/05/2021 - 09/11/2021 | 1.03 | 1.05 |
| 38 | 09/12/2021 - 09/18/2021 | 1.03 | 1.05 |
| 39 | 09/19/2021 - 09/25/2021 | 1.02 | 1.04 |
| 40 | 09/26/2021 - 10/02/2021 | 1.01 | 1.03 |
| 41 | 10/03/2021 - 10/09/2021 | 0.99 | 1.01 |
| 42 | 10/10/2021 - 10/16/2021 | 0.98 | 1.00 |
| 43 | 10/17/2021 - 10/23/2021 | 0.99 | 1.01 |
| 44 | 10/24/2021 - 10/30/2021 | 0.99 | 1.01 |
| 45 | 10/31/2021 - 11/06/2021 | 1.00 | 1.02 |
| 46 | 11/07/2021 - 11/13/2021 | 1.00 | 1.02 |
| 47 | 11/14/2021 - 11/20/2021 | 1.01 | 1.03 |
| 48 | 11/21/2021 - 11/27/2021 | 1.01 | 1.03 |
| 49 | 11/28/2021 - 12/04/2021 | 1.01 | 1.03 |
| 50 | 12/05/2021 - 12/11/2021 | 1.01 | 1.03 |
| 51 | 12/12/2021 - 12/18/2021 | 1.01 | 1.03 |
| 52 | 12/19/2021 - 12/25/2021 | 1.04 | 1.06 |
| 53 | 12/26/2021 - 12/31/2021 | 1.07 | 1.09 |

* PEAK SEASON

# Appendix D:
# Existing Condition Synchro Reports

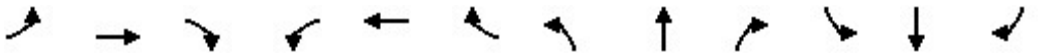
| Intersection | |
|---|---|
| Int Delay, s/veh | 1.5 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 16 | 245 | 3 | 2 | 564 | 33 | 2 | 0 | 3 | 38 | 1 | 18 |
| Future Vol, veh/h | 16 | 245 | 3 | 2 | 564 | 33 | 2 | 0 | 3 | 38 | 1 | 18 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 120 | - | - | 80 | - | - | - | - | - | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 |
| Heavy Vehicles, % | 19 | 3 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 5 | 0 | 6 |
| Mvmt Flow | 18 | 269 | 3 | 2 | 620 | 36 | 2 | 0 | 3 | 42 | 1 | 20 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 656 | 0 | 0 | 272 | 0 | 0 | 960 | 967 | 271 | 950 | 950 | 638 |
| Stage 1 | - | - | - | - | - | - | 307 | 307 | - | 642 | 642 | - |
| Stage 2 | - | - | - | - | - | - | 653 | 660 | - | 308 | 308 | - |
| Critical Hdwy | 4.29 | - | - | 4.1 | - | - | 7.1 | 6.5 | 6.2 | 7.15 | 6.5 | 6.26 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.1 | 5.5 | - | 6.15 | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.1 | 5.5 | - | 6.15 | 5.5 | - |
| Follow-up Hdwy | 2.371 | - | - | 2.2 | - | - | 3.5 | 4 | 3.3 | 3.545 | 4 | 3.354 |
| Pot Cap-1 Maneuver | 856 | - | - | 1303 | - | - | 238 | 256 | 773 | 237 | 262 | 469 |
| Stage 1 | - | - | - | - | - | - | 707 | 665 | - | 458 | 472 | - |
| Stage 2 | - | - | - | - | - | - | 460 | 463 | - | 696 | 664 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 856 | - | - | 1303 | - | - | 223 | 250 | 773 | 232 | 256 | 469 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 223 | 250 | - | 232 | 256 | - |
| Stage 1 | - | - | - | - | - | - | 692 | 651 | - | 448 | 471 | - |
| Stage 2 | - | - | - | - | - | - | 439 | 462 | - | 678 | 650 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.6 | 0 | 9.7 | 20.5 |
| HCM LOS | | | A | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 773 | 856 | - | - | 1303 | - | - | 233 | 469 |
| HCM Lane V/C Ratio | 0.004 | 0.021 | - | - | 0.002 | - | - | 0.184 | 0.042 |
| HCM Control Delay (s) | 9.7 | 9.3 | - | - | 7.8 | - | - | 23.9 | 13 |
| HCM Lane LOS | A | A | - | - | A | - | - | C | B |
| HCM 95th %tile Q(veh) | 0 | 0.1 | - | - | 0 | - | - | 0.7 | 0.1 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 148 | 133 | 21 | 408 | 314 | 396 | 25 | 564 | 191 | 451 | 1260 | 234 |
| Future Volume (veh/h) | 148 | 133 | 21 | 408 | 314 | 396 | 25 | 564 | 191 | 451 | 1260 | 234 |
| 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 | | 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 | 1697 | 1670 | 1617 | 1697 | 1697 | 1697 | 1710 | 1710 | 1697 | 1683 | 1697 | 1697 |
| Adj Flow Rate, veh/h | 157 | 141 | 17 | 434 | 334 | 345 | 27 | 600 | 135 | 480 | 1340 | 185 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 3 | 7 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 1 |
| Cap, veh/h | 193 | 160 | 19 | 666 | 434 | 368 | 34 | 1614 | 497 | 527 | 2291 | 711 |
| Arrive On Green | 0.06 | 0.11 | 0.11 | 0.21 | 0.26 | 0.26 | 0.02 | 0.35 | 0.35 | 0.17 | 0.49 | 0.49 |
| Sat Flow, veh/h | 3135 | 1462 | 176 | 3135 | 1697 | 1438 | 1629 | 4668 | 1438 | 3110 | 4632 | 1438 |
| Grp Volume(v), veh/h | 157 | 0 | 158 | 434 | 334 | 345 | 27 | 600 | 135 | 480 | 1340 | 185 |
| Grp Sat Flow(s),veh/h/ln | 1567 | 0 | 1638 | 1567 | 1697 | 1438 | 1629 | 1556 | 1438 | 1555 | 1544 | 1438 |
| Q Serve(g_s), s | 8.9 | 0.0 | 17.1 | 22.8 | 32.8 | 42.3 | 3.0 | 17.4 | 6.7 | 27.3 | 37.0 | 13.4 |
| Cycle Q Clear(g_c), s | 8.9 | 0.0 | 17.1 | 22.8 | 32.8 | 42.3 | 3.0 | 17.4 | 6.7 | 27.3 | 37.0 | 13.4 |
| Prop In Lane | 1.00 | | 0.11 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 193 | 0 | 179 | 666 | 434 | 368 | 34 | 1614 | 497 | 527 | 2291 | 711 |
| V/C Ratio(X) | 0.81 | 0.00 | 0.88 | 0.65 | 0.77 | 0.94 | 0.81 | 0.37 | 0.27 | 0.91 | 0.58 | 0.26 |
| Avail Cap(c_a), veh/h | 266 | 0 | 283 | 666 | 476 | 403 | 71 | 1614 | 497 | 658 | 2291 | 711 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 83.4 | 0.0 | 79.0 | 64.8 | 62.0 | 65.5 | 87.8 | 44.2 | 12.8 | 73.4 | 32.3 | 26.4 |
| Incr Delay (d2), s/veh | 12.6 | 0.0 | 17.3 | 2.3 | 6.9 | 28.2 | 34.5 | 0.7 | 1.3 | 14.6 | 1.1 | 0.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 7.2 | 0.0 | 12.8 | 14.4 | 21.5 | 25.5 | 2.9 | 11.3 | 4.4 | 17.7 | 20.5 | 8.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 96.1 | 0.0 | 96.3 | 67.0 | 68.9 | 93.8 | 122.3 | 44.9 | 14.2 | 88.0 | 33.4 | 27.3 |
| LnGrp LOS | F | A | F | E | E | F | F | D | B | F | C | C |
| Approach Vol, veh/h | | 315 | | | 1113 | | | 762 | | | 2005 | |
| Approach Delay, s/veh | | 96.2 | | | 75.9 | | | 42.2 | | | 45.9 | |
| Approach LOS | | F | | | E | | | D | | | D | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.9 | 96.1 | 18.2 | 53.8 | 38.7 | 69.3 | 46.0 | 26.0 |
| Change Period (Y+Rc), s | * 8.2 | 7.1 | 7.1 | * 7.7 | 8.2 | * 7.1 | * 7.7 | * 6.3 |
| Max Green Setting (Gmax), s | * 7.8 | 77.1 | 15.3 | * 51 | 38.1 | * 47 | * 35 | * 31 |
| Max Q Clear Time (g_c+I1), s | 5.0 | 39.0 | 10.9 | 44.3 | 29.3 | 19.4 | 24.8 | 19.1 |
| Green Ext Time (p_c), s | 0.0 | 14.3 | 0.2 | 1.8 | 1.2 | 5.0 | 1.2 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 57.0 |
| HCM 6th LOS | E |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

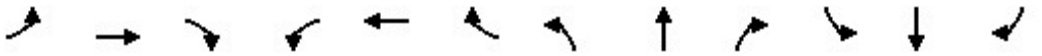
| Intersection | |
|---|---|
| Int Delay, s/veh | 2.5 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 27 | 298 | 6 | 12 | 415 | 64 | 0 | 3 | 20 | 49 | 5 | 40 |
| Future Vol, veh/h | 27 | 298 | 6 | 12 | 415 | 64 | 0 | 3 | 20 | 49 | 5 | 40 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 120 | - | - | 80 | - | - | - | - | - | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Mvmt Flow | 29 | 324 | 7 | 13 | 451 | 70 | 0 | 3 | 22 | 53 | 5 | 43 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 521 | 0 | 0 | 331 | 0 | 0 | - | 933 | 328 | 910 | 901 | 486 |
| Stage 1 | - | - | - | - | - | - | - | 386 | - | 512 | 512 | - |
| Stage 2 | - | - | - | - | - | - | - | 547 | - | 398 | 389 | - |
| Critical Hdwy | 4.1 | - | - | 4.1 | - | - | - | 6.5 | 6.2 | 7.1 | 6.5 | 6.23 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | 5.5 | - | 6.1 | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | 5.5 | - | 6.1 | 5.5 | - |
| Follow-up Hdwy | 2.2 | - | - | 2.2 | - | - | - | 4 | 3.3 | 3.5 | 4 | 3.327 |
| Pot Cap-1 Maneuver | 1056 | - | - | 1240 | - | - | 0 | 268 | 718 | 258 | 280 | 579 |
| Stage 1 | - | - | - | - | - | - | 0 | 614 | - | 548 | 540 | - |
| Stage 2 | - | - | - | - | - | - | 0 | 521 | - | 632 | 612 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1056 | - | - | 1240 | - | - | - | 258 | 718 | 241 | 270 | 579 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | 258 | - | 241 | 270 | - |
| Stage 1 | - | - | - | - | - | - | - | 597 | - | 533 | 535 | - |
| Stage 2 | - | - | - | - | - | - | - | 516 | - | 593 | 595 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.7 | 0.2 | 11.5 | 19.1 |
| HCM LOS | | | B | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 583 | 1056 | - | - | 1240 | - | - | 243 | 579 |
| HCM Lane V/C Ratio | 0.043 | 0.028 | - | - | 0.011 | - | - | 0.242 | 0.075 |
| HCM Control Delay (s) | 11.5 | 8.5 | - | - | 7.9 | - | - | 24.5 | 11.7 |
| HCM Lane LOS | B | A | - | - | A | - | - | C | B |
| HCM 95th %tile Q(veh) | 0.1 | 0.1 | - | - | 0 | - | - | 0.9 | 0.2 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 160 | 209 | 16 | 324 | 231 | 406 | 57 | 1353 | 507 | 500 | 776 | 211 |
| Future Volume (veh/h) | 160 | 209 | 16 | 324 | 231 | 406 | 57 | 1353 | 507 | 500 | 776 | 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 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1710 | 1710 | 1710 | 1710 | 1710 | 1697 | 1710 | 1710 | 1710 | 1697 | 1710 | 1710 |
| Adj Flow Rate, veh/h | 168 | 220 | 13 | 341 | 243 | 272 | 60 | 1424 | 420 | 526 | 817 | 146 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 200 | 239 | 14 | 376 | 356 | 299 | 182 | 1816 | 564 | 563 | 2160 | 670 |
| Arrive On Green | 0.06 | 0.15 | 0.15 | 0.12 | 0.21 | 0.21 | 0.11 | 0.39 | 0.39 | 0.18 | 0.46 | 0.46 |
| Sat Flow, veh/h | 3159 | 1599 | 94 | 3159 | 1710 | 1438 | 1629 | 4668 | 1449 | 3135 | 4668 | 1449 |
| Grp Volume(v), veh/h | 168 | 0 | 233 | 341 | 243 | 272 | 60 | 1424 | 420 | 526 | 817 | 146 |
| Grp Sat Flow(s),veh/h/ln | 1580 | 0 | 1693 | 1580 | 1710 | 1438 | 1629 | 1556 | 1449 | 1567 | 1556 | 1449 |
| Q Serve(g_s), s | 10.0 | 0.0 | 25.8 | 20.3 | 24.9 | 35.1 | 6.5 | 51.0 | 47.4 | 31.4 | 21.7 | 8.5 |
| Cycle Q Clear(g_c), s | 10.0 | 0.0 | 25.8 | 20.3 | 24.9 | 35.1 | 6.5 | 51.0 | 47.4 | 31.4 | 21.7 | 8.5 |
| Prop In Lane | 1.00 | | 0.06 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 200 | 0 | 253 | 376 | 356 | 299 | 182 | 1816 | 564 | 563 | 2160 | 670 |
| V/C Ratio(X) | 0.84 | 0.00 | 0.92 | 0.91 | 0.68 | 0.91 | 0.33 | 0.78 | 0.75 | 0.93 | 0.38 | 0.22 |
| Avail Cap(c_a), veh/h | 219 | 0 | 297 | 414 | 405 | 341 | 182 | 1816 | 564 | 607 | 2160 | 670 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 88.0 | 0.0 | 79.7 | 82.7 | 69.5 | 73.5 | 77.8 | 51.0 | 49.9 | 76.8 | 33.3 | 16.8 |
| Incr Delay (d2), s/veh | 22.5 | 0.0 | 30.1 | 22.2 | 4.0 | 25.5 | 1.0 | 3.5 | 8.7 | 20.9 | 0.5 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 8.3 | 0.0 | 19.5 | 14.6 | 17.0 | 21.6 | 5.0 | 28.1 | 25.8 | 20.6 | 13.3 | 5.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 110.5 | 0.0 | 109.8 | 104.9 | 73.4 | 99.0 | 78.9 | 54.5 | 58.6 | 97.8 | 33.8 | 17.6 |
| LnGrp LOS | F | A | F | F | E | F | E | D | E | F | C | B |
| Approach Vol, veh/h | | 401 | | | 856 | | | 1904 | | | 1489 | |
| Approach Delay, s/veh | | 110.1 | | | 94.1 | | | 56.2 | | | 54.8 | |
| Approach LOS | | F | | | F | | | E | | | D | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 29.4 | 95.0 | 19.2 | 46.4 | 42.3 | 82.1 | 30.3 | 35.3 |
| Change Period (Y+Rc), s | 8.2 | * 7.1 | 7.1 | 6.9 | 8.2 | * 8.2 | * 7.7 | * 6.9 |
| Max Green Setting (Gmax), s | 14.6 | * 88 | 13.2 | 45.0 | 36.8 | * 66 | * 25 | * 33 |
| Max Q Clear Time (g_c+I1), s | 8.5 | 23.7 | 12.0 | 37.1 | 33.4 | 53.0 | 22.3 | 27.8 |
| Green Ext Time (p_c), s | 0.0 | 7.7 | 0.1 | 1.5 | 0.7 | 9.0 | 0.3 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 67.4 |
| HCM 6th LOS | E |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

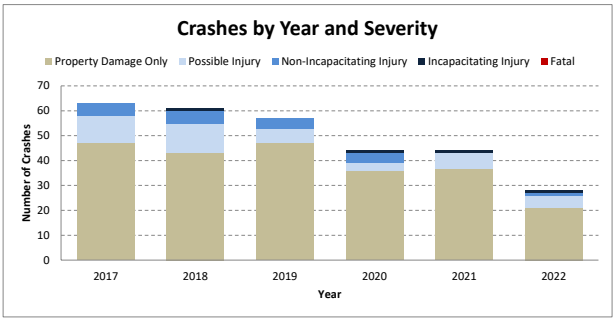
# Appendix E:
# Crash Data

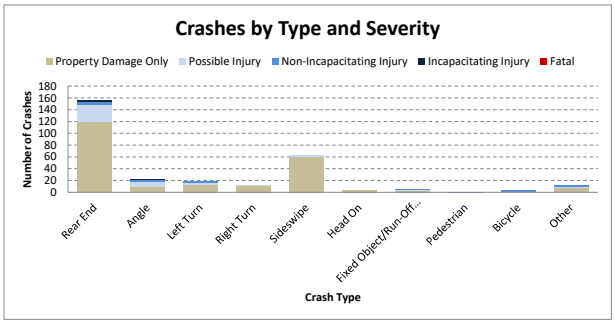
# *CRASH ANALYSIS - SR 434 at McCulloch Road and Surrounding Area*

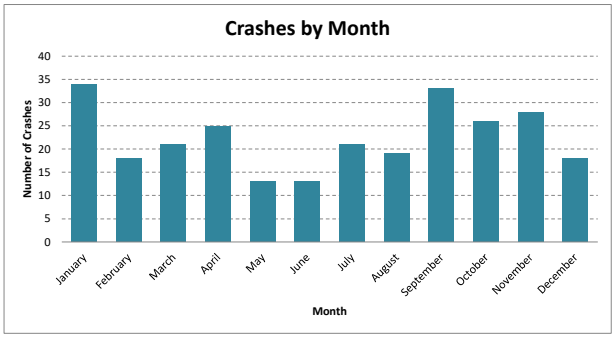
| | | Analysis Year* | | | | | | Severity | | | | | Total | Annual Average* | Percent* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Property Damage Only | Possible Injury | Non-Incapacitating Injury | Incapacitating Injury | Fatal | | | |
| Type of Crash | Rear End | 34 | 28 | 34 | 23 | 27 | *11* | 120 | 28 | 6 | 3 | 0 | 157 | 29.2 | 54.3% |
| | Angle | 6 | 8 | 4 | 1 | 1 | *3* | 10 | 7 | 5 | 1 | 0 | 23 | 4.0 | 7.4% |
| | Left Turn | 3 | 7 | 0 | 4 | 1 | *3* | 14 | 2 | 2 | 0 | 0 | 18 | 3.0 | 5.6% |
| | Right Turn | 2 | 2 | 2 | 0 | 3 | *3* | 11 | 1 | 0 | 0 | 0 | 12 | 1.8 | 3.3% |
| | Sideswipe | 13 | 12 | 13 | 8 | 11 | *6* | 60 | 3 | 0 | 0 | 0 | 63 | 11.4 | 21.2% |
| | Head On | 1 | 0 | 1 | 2 | 0 | *0* | 4 | 0 | 0 | 0 | 0 | 4 | 0.8 | 1.5% |
| | Fixed Object/Run-Off Road | 1 | 1 | 1 | 1 | 0 | *1* | 3 | 1 | 1 | 0 | 0 | 5 | 0.8 | 1.5% |
| | Pedestrian | 0 | 0 | 0 | 0 | 0 | *1* | 0 | 0 | 1 | 0 | 0 | 1 | 0.0 | 0.0% |
| | Bicycle | 0 | 0 | 1 | 2 | 0 | *0* | 1 | 0 | 2 | 0 | 0 | 3 | 0.6 | 1.1% |
| | Other | 3 | 3 | 1 | 3 | 1 | *0* | 8 | 1 | 2 | 0 | 0 | 11 | 2.2 | 4.1% |
| | **Total Crashes** | **63** | **61** | **57** | **44** | **44** | *28* | **231** | **43** | **19** | **4** | **0** | **297** | **53.8** | **100.0%** |
| Crash Severity | Property Damage Only | 47 | 43 | 47 | 36 | 37 | *21* | | | | | | 231 | 42.0 | 78.1% |
| | Possible Injury | 11 | 12 | 6 | 3 | 6 | *5* | | | | | | 43 | 7.6 | 14.1% |
| | Non-Incapacitating Injury | 5 | 5 | 4 | 4 | 0 | *1* | | | | | | 19 | 3.6 | 6.7% |
| | Incapacitating Injury | 0 | 1 | 0 | 1 | 1 | *1* | | | | | | 4 | 0.6 | 1.1% |
| | Fatal | 0 | 0 | 0 | 0 | 0 | *0* | | | | | | 0 | 0.0 | 0.0% |
| Light Conditions | Daylight | 42 | 35 | 39 | 30 | 32 | *19* | 158 | 24 | 12 | 3 | 0 | 197 | 35.6 | 66.2% |
| | Dusk | 3 | 3 | 0 | 2 | 0 | *0* | 6 | 2 | 0 | 0 | 0 | 8 | 1.6 | 3.0% |
| | Dawn | 1 | 0 | 2 | 1 | 1 | *1* | 3 | 1 | 2 | 0 | 0 | 6 | 1.0 | 1.9% |
| | Dark - Lighted | 10 | 19 | 10 | 10 | 9 | *8* | 49 | 13 | 3 | 1 | 0 | 66 | 11.6 | 21.6% |
| | Dark - Not Lighted | 7 | 4 | 6 | 1 | 1 | *0* | 14 | 3 | 2 | 0 | 0 | 19 | 3.8 | 7.1% |
| | Dark - Lighting Unknown | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0% |
| | Other/Unknown | 0 | 0 | 0 | 0 | 1 | *0* | 1 | 0 | 0 | 0 | 0 | 1 | 0.2 | 0.4% |
| Road Surface Condition | Dry | 58 | 42 | 47 | 32 | 32 | *23* | 180 | 35 | 15 | 4 | 0 | 234 | 42.2 | 78.4% |
| | Wet | 5 | 19 | 10 | 12 | 12 | *5* | 51 | 8 | 4 | 0 | 0 | 63 | 11.6 | 21.6% |
| | Other | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0% |
| Month | January | 8 | 8 | 8 | 8 | 2 | *5* | | | | | | 39 | 6.8 | 12.6% |
| | February | 4 | 5 | 0 | 6 | 3 | *2* | | | | | | 20 | 3.6 | 6.7% |
| | March | 2 | 5 | 9 | 3 | 2 | *3* | | | | | | 24 | 4.2 | 7.8% |
| | April | 10 | 4 | 7 | 0 | 4 | *8* | | | | | | 33 | 5.0 | 9.3% |
| | May | 3 | 5 | 1 | 0 | 4 | *4* | | | | | | 17 | 2.6 | 4.8% |
| | June | 2 | 4 | 4 | 1 | 2 | *3* | | | | | | 16 | 2.6 | 4.8% |
| | July | 5 | 3 | 5 | 3 | 5 | *0* | | | | | | 21 | 4.2 | 7.8% |
| | August | 6 | 4 | 4 | 1 | 4 | *3* | | | | | | 22 | 3.8 | 7.1% |
| | September | 5 | 9 | 3 | 6 | 10 | *0* | | | | | | 33 | 6.6 | 12.3% |
| | October | 3 | 5 | 6 | 8 | 4 | *0* | | | | | | 26 | 5.2 | 9.7% |
| | November | 8 | 6 | 6 | 5 | 3 | *0* | | | | | | 28 | 5.6 | 10.4% |
| | December | 7 | 3 | 4 | 3 | 1 | *0* | | | | | | 18 | 3.6 | 6.7% |
| Day of Week | Monday | 10 | 12 | 6 | 5 | 7 | *3* | 36 | 6 | 1 | 0 | 0 | 43 | 8.0 | 14.9% |
| | Tuesday | 13 | 13 | 7 | 6 | 6 | *5* | 44 | 5 | 1 | 0 | 0 | 50 | 9.0 | 16.7% |
| | Wednesday | 6 | 8 | 12 | 6 | 4 | *2* | 29 | 5 | 4 | 0 | 0 | 38 | 7.2 | 13.4% |
| | Thursday | 7 | 5 | 10 | 7 | 6 | *6* | 36 | 3 | 2 | 0 | 0 | 41 | 7.0 | 13.0% |
| | Friday | 12 | 9 | 12 | 10 | 10 | *5* | 42 | 10 | 4 | 2 | 0 | 58 | 10.6 | 19.7% |
| | Saturday | 9 | 7 | 5 | 4 | 7 | *5* | 22 | 10 | 4 | 1 | 0 | 37 | 6.4 | 11.9% |
| | Sunday | 6 | 7 | 5 | 6 | 4 | *2* | 22 | 4 | 3 | 1 | 0 | 30 | 5.6 | 10.4% |
| Hour of Day | 0:00 | 1 | 3 | 0 | 0 | 0 | *0* | 2 | 2 | 0 | 0 | 0 | 4 | 0.8 | 1.5% |
| | 1:00 | 1 | 0 | 2 | 1 | 0 | *0* | 3 | 0 | 1 | 0 | 0 | 4 | 0.8 | 1.5% |
| | 2:00 | 2 | 1 | 0 | 0 | 0 | *0* | 1 | 1 | 1 | 0 | 0 | 3 | 0.6 | 1.1% |
| | 3:00 | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0% |
| | 4:00 | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0% |
| | 5:00 | 1 | 0 | 0 | 0 | 0 | *0* | 0 | 1 | 0 | 0 | 0 | 1 | 0.2 | 0.4% |
| | 6:00 | 0 | 0 | 2 | 2 | 1 | *1* | 4 | 1 | 1 | 0 | 0 | 6 | 1.0 | 1.9% |
| | 7:00 | 2 | 1 | 3 | 1 | 1 | *1* | 8 | 1 | 0 | 0 | 0 | 9 | 1.6 | 3.0% |
| | 8:00 | 2 | 4 | 3 | 2 | 0 | *0* | 9 | 2 | 0 | 0 | 0 | 11 | 2.2 | 4.1% |
| | 9:00 | 2 | 1 | 2 | 4 | 0 | *1* | 5 | 3 | 1 | 1 | 0 | 10 | 1.8 | 3.3% |
| | 10:00 | 2 | 0 | 3 | 2 | 1 | *1* | 8 | 1 | 0 | 0 | 0 | 9 | 1.6 | 3.0% |
| | 11:00 | 4 | 3 | 1 | 1 | 5 | *1* | 13 | 1 | 1 | 0 | 0 | 15 | 2.8 | 5.2% |
| | 12:00 | 5 | 4 | 3 | 3 | 3 | *2* | 17 | 3 | 0 | 0 | 0 | 20 | 3.6 | 6.7% |
| | 13:00 | 3 | 3 | 0 | 5 | 4 | *3* | 12 | 2 | 3 | 1 | 0 | 18 | 3.0 | 5.6% |
| | 14:00 | 4 | 2 | 5 | 4 | 1 | *1* | 10 | 4 | 3 | 0 | 0 | 17 | 3.2 | 5.9% |
| | 15:00 | 5 | 3 | 2 | 3 | 2 | *3* | 15 | 2 | 0 | 1 | 0 | 18 | 3.0 | 5.6% |
| | 16:00 | 4 | 4 | 7 | 0 | 2 | *2* | 15 | 2 | 2 | 0 | 0 | 19 | 3.4 | 6.3% |
| | 17:00 | 12 | 5 | 7 | 1 | 8 | *1* | 32 | 1 | 1 | 0 | 0 | 34 | 6.6 | 12.3% |
| | 18:00 | 2 | 8 | 2 | 6 | 4 | *3* | 21 | 3 | 1 | 0 | 0 | 25 | 4.4 | 8.2% |
| | 19:00 | 4 | 5 | 4 | 5 | 3 | *2* | 19 | 2 | 2 | 0 | 0 | 23 | 4.2 | 7.8% |
| | 20:00 | 2 | 5 | 4 | 0 | 1 | *2* | 10 | 3 | 1 | 0 | 0 | 14 | 2.4 | 4.5% |
| | 21:00 | 1 | 4 | 3 | 3 | 4 | *1* | 12 | 3 | 1 | 0 | 0 | 16 | 3.0 | 5.6% |
| | 22:00 | 2 | 1 | 2 | 1 | 2 | *1* | 7 | 1 | 0 | 1 | 0 | 9 | 1.6 | 3.0% |
| | 23:00 | 2 | 4 | 2 | 0 | 2 | *2* | 8 | 4 | 0 | 0 | 0 | 12 | 2.0 | 3.7% |
| Time Period | 12AM-6AM | 5 | 4 | 2 | 1 | 0 | *0* | 6 | 4 | 2 | 0 | 0 | 12 | 2.4 | 4.5% |
| | 6AM-12PM | 12 | 9 | 14 | 12 | 8 | *5* | 47 | 9 | 3 | 1 | 0 | 60 | 11.0 | 20.4% |
| | 12PM-6PM | 33 | 21 | 24 | 16 | 20 | *12* | 101 | 14 | 9 | 2 | 0 | 126 | 22.8 | 42.4% |
| | 6PM-12AM | 13 | 27 | 17 | 15 | 16 | *11* | 77 | 16 | 5 | 1 | 0 | 99 | 17.6 | 32.7% |
| Alcohol & Drugs | None | 62 | 60 | 57 | 43 | 44 | *28* | 229 | 43 | 18 | 4 | 0 | 294 | 53.2 | 98.9% |
| | Alcohol Involved | 0 | 1 | 0 | 0 | 0 | *0* | 1 | 0 | 0 | 0 | 0 | 1 | 0.2 | 0.4% |
| | Drugs Involved | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0% |
| | Alcohol and Drugs | 1 | 0 | 0 | 1 | 0 | *0* | 1 | 0 | 1 | 0 | 0 | 2 | 0.4 | 0.7% |
| | Undetermined | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0% |
| Age of Driver 1 (Typically Driver at Fault) | 19 and Under | 4 | 10 | 6 | 5 | 0 | *0* | | | | | | 25 | 5.0 | 9.3% |
| | 20-24 | 13 | 8 | 11 | 13 | 0 | *0* | | | | | | 45 | 9.0 | 16.7% |
| | 25-29 | 3 | 7 | 4 | 2 | 1 | *0* | | | | | | 17 | 3.4 | 6.3% |
| | 30-34 | 5 | 4 | 0 | 2 | 0 | *0* | | | | | | 11 | 2.2 | 4.1% |
| | 35-39 | 2 | 0 | 3 | 1 | 0 | *0* | | | | | | 6 | 1.2 | 2.2% |
| | 40-44 | 1 | 3 | 0 | 3 | 0 | *0* | | | | | | 7 | 1.4 | 2.6% |
| | 45-49 | 0 | 1 | 0 | 0 | 0 | *1* | | | | | | 2 | 0.2 | 0.4% |
| | 50-54 | 0 | 0 | 0 | 2 | 0 | *0* | | | | | | 2 | 0.4 | 0.7% |
| | 55-59 | 1 | 1 | 2 | 2 | 0 | *0* | | | | | | 6 | 1.2 | 2.2% |
| | 60-64 | 2 | 0 | 1 | 1 | 0 | *0* | | | | | | 4 | 0.8 | 1.5% |
| | 65-69 | 0 | 0 | 0 | 0 | 0 | *0* | | | | | | 0 | 0.0 | 0.0% |
| | 70-74 | 1 | 0 | 1 | 1 | 0 | *0* | | | | | | 3 | 0.6 | 1.1% |
| | 75-79 | 0 | 0 | 1 | 0 | 0 | *0* | | | | | | 1 | 0.2 | 0.4% |
| | 80-84 | 1 | 1 | 0 | 0 | 0 | *0* | | | | | | 2 | 0.4 | 0.7% |
| | 85 and Over | 0 | 0 | 1 | 0 | 0 | *0* | | | | | | 1 | 0.2 | 0.4% |
| | Unknown | 2 | 4 | 5 | 2 | 0 | *0* | | | | | | 13 | 2.6 | 4.8% |

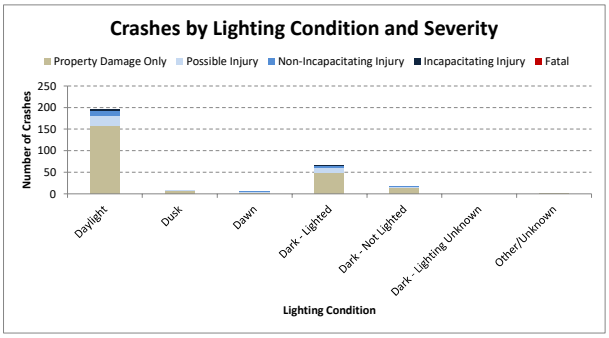
*Crash data for the current year (2022) is incomplete as it only includes data through September 06, 2022; therefore, it is not included in the average crashes per year or percent calculations, but is included in the crash totals.

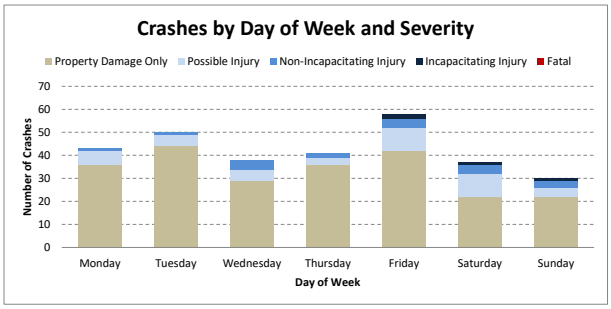
# *CRASH ANALYSIS - SR 434 at McCulloch Road and Surrounding Area*

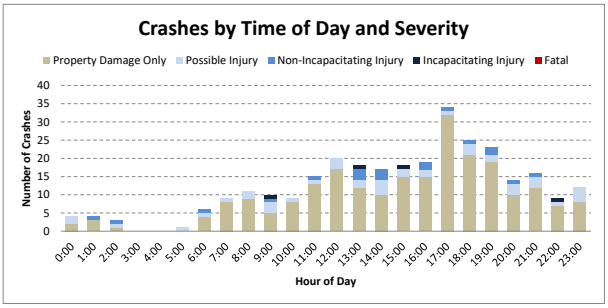


# Appendix F:
# Alternative Condition Synchro Reports

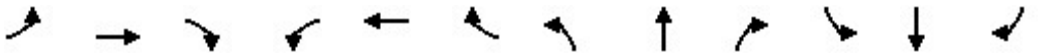
| Intersection | |
|---|---|
| Int Delay, s/veh | 0.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 261 | 3 | 0 | 564 | 33 | 0 | 0 | 5 | 0 | 0 | 18 |
| Future Vol, veh/h | 0 | 261 | 3 | 0 | 564 | 33 | 0 | 0 | 5 | 0 | 0 | 18 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 |
| Heavy Vehicles, % | 19 | 3 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 5 | 0 | 6 |
| Mvmt Flow | 0 | 287 | 3 | 0 | 620 | 36 | 0 | 0 | 5 | 0 | 0 | 20 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | 0 | 0 | - | - | 0 | - | - | 289 | - | - | 638 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | - | - | - | - | - | - | 6.2 | - | - | 6.26 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | - | - | - | - | - | - | 3.3 | - | - | 3.354 |
| Pot Cap-1 Maneuver | 0 | - | - | 0 | - | - | 0 | 0 | 755 | 0 | 0 | 469 |
| Stage 1 | 0 | - | - | 0 | - | - | 0 | 0 | - | 0 | 0 | - |
| Stage 2 | 0 | - | - | 0 | - | - | 0 | 0 | - | 0 | 0 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | - | - | - | - | - | - | - | - | 755 | - | - | 469 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 9.8 | 13 |
| HCM LOS | | | A | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 755 | - | - | - | - | 469 |
| HCM Lane V/C Ratio | 0.007 | - | - | - | - | 0.042 |
| HCM Control Delay (s) | 9.8 | - | - | - | - | 13 |
| HCM Lane LOS | A | - | - | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | - | 0.1 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 164 | 135 | 21 | 409 | 315 | 396 | 25 | 564 | 191 | 486 | 1265 | 233 |
| Future Volume (veh/h) | 164 | 135 | 21 | 409 | 315 | 396 | 25 | 564 | 191 | 486 | 1265 | 233 |
| 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 | | 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 | 1697 | 1670 | 1617 | 1697 | 1697 | 1697 | 1710 | 1710 | 1697 | 1683 | 1697 | 1697 |
| Adj Flow Rate, veh/h | 174 | 144 | 17 | 435 | 335 | 239 | 27 | 600 | 135 | 517 | 1346 | 184 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 1 | 3 | 7 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 1 |
| Cap, veh/h | 210 | 163 | 19 | 555 | 368 | 312 | 34 | 1715 | 528 | 565 | 2448 | 760 |
| Arrive On Green | 0.07 | 0.11 | 0.11 | 0.18 | 0.22 | 0.22 | 0.02 | 0.37 | 0.37 | 0.18 | 0.53 | 0.53 |
| Sat Flow, veh/h | 3135 | 1466 | 173 | 3135 | 1697 | 1438 | 1629 | 4668 | 1438 | 3110 | 4632 | 1438 |
| Grp Volume(v), veh/h | 174 | 0 | 161 | 435 | 335 | 239 | 27 | 600 | 135 | 517 | 1346 | 184 |
| Grp Sat Flow(s),veh/h/ln | 1567 | 0 | 1639 | 1567 | 1697 | 1438 | 1629 | 1556 | 1438 | 1555 | 1544 | 1438 |
| Q Serve(g_s), s | 9.9 | 0.0 | 17.4 | 23.9 | 34.7 | 28.1 | 3.0 | 16.8 | 7.0 | 29.4 | 34.8 | 12.5 |
| Cycle Q Clear(g_c), s | 9.9 | 0.0 | 17.4 | 23.9 | 34.7 | 28.1 | 3.0 | 16.8 | 7.0 | 29.4 | 34.8 | 12.5 |
| Prop In Lane | 1.00 | | 0.11 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 210 | 0 | 182 | 555 | 368 | 312 | 34 | 1715 | 528 | 565 | 2448 | 760 |
| V/C Ratio(X) | 0.83 | 0.00 | 0.88 | 0.78 | 0.91 | 0.77 | 0.81 | 0.35 | 0.26 | 0.92 | 0.55 | 0.24 |
| Avail Cap(c_a), veh/h | 277 | 0 | 275 | 606 | 463 | 392 | 71 | 1715 | 528 | 688 | 2448 | 760 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 83.0 | 0.0 | 78.9 | 70.8 | 68.8 | 66.2 | 87.8 | 41.3 | 13.8 | 72.3 | 28.2 | 22.9 |
| Incr Delay (d2), s/veh | 14.6 | 0.0 | 19.3 | 6.2 | 19.2 | 6.9 | 34.5 | 0.6 | 1.2 | 15.1 | 0.9 | 0.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 7.9 | 0.0 | 13.2 | 15.4 | 23.9 | 16.4 | 2.9 | 10.9 | 4.5 | 18.9 | 19.3 | 8.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 97.5 | 0.0 | 98.2 | 76.9 | 88.0 | 73.1 | 122.3 | 41.9 | 15.0 | 87.4 | 29.1 | 23.7 |
| LnGrp LOS | F | A | F | E | F | E | F | D | B | F | C | C |
| Approach Vol, veh/h | | 335 | | | 1009 | | | 762 | | | 2047 | |
| Approach Delay, s/veh | | 97.8 | | | 79.7 | | | 40.0 | | | 43.3 | |
| Approach LOS | | F | | | E | | | D | | | D | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.9 | 102.2 | 19.2 | 46.7 | 40.9 | 73.2 | 39.6 | 26.3 |
| Change Period (Y+Rc), s | * 8.2 | 7.1 | 7.1 | * 7.7 | 8.2 | * 7.1 | * 7.7 | * 6.3 |
| Max Green Setting (Gmax), s | * 7.8 | 77.9 | 15.9 | * 49 | 39.8 | * 46 | * 35 | * 30 |
| Max Q Clear Time (g_c+I1), s | 5.0 | 36.8 | 11.9 | 36.7 | 31.4 | 18.8 | 25.9 | 19.4 |
| Green Ext Time (p_c), s | 0.0 | 14.7 | 0.2 | 2.3 | 1.3 | 4.9 | 1.1 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 55.9 |
| HCM 6th LOS | E |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

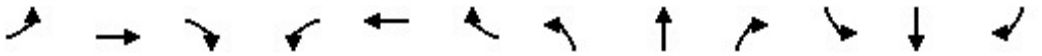
| Intersection | |
|---|---|
| Int Delay, s/veh | 0.8 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 0 | 325 | 6 | 0 | 415 | 64 | 0 | 0 | 23 | 0 | 0 | 40 |
| Future Vol, veh/h | 0 | 325 | 6 | 0 | 415 | 64 | 0 | 0 | 23 | 0 | 0 | 40 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | - | - | 0 | - | - | 0 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Mvmt Flow | 0 | 353 | 7 | 0 | 451 | 70 | 0 | 0 | 25 | 0 | 0 | 43 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | - | 0 | 0 | - | - | 0 | - | - | 357 | - | - | 486 |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy | - | - | - | - | - | - | - | - | 6.2 | - | - | 6.23 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| Follow-up Hdwy | - | - | - | - | - | - | - | - | 3.3 | - | - | 3.327 |
| Pot Cap-1 Maneuver | 0 | - | - | 0 | - | - | 0 | 0 | 692 | 0 | 0 | 579 |
| Stage 1 | 0 | - | - | 0 | - | - | 0 | 0 | - | 0 | 0 | - |
| Stage 2 | 0 | - | - | 0 | - | - | 0 | 0 | - | 0 | 0 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | - | - | - | - | - | - | - | - | 692 | - | - | 579 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 10.4 | 11.7 |
| HCM LOS | | | B | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 692 | - | - | - | - | 579 |
| HCM Lane V/C Ratio | 0.036 | - | - | - | - | 0.075 |
| HCM Control Delay (s) | 10.4 | - | - | - | - | 11.7 |
| HCM Lane LOS | B | - | - | - | - | B |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | - | 0.2 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 190 | 209 | 16 | 330 | 225 | 406 | 57 | 1353 | 507 | 547 | 788 | 206 |
| Future Volume (veh/h) | 190 | 209 | 16 | 330 | 225 | 406 | 57 | 1353 | 507 | 547 | 788 | 206 |
| 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 | | 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 | 1710 | 1710 | 1710 | 1710 | 1710 | 1697 | 1710 | 1710 | 1710 | 1697 | 1710 | 1710 |
| Adj Flow Rate, veh/h | 200 | 220 | 13 | 347 | 237 | 272 | 60 | 1424 | 420 | 576 | 829 | 141 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Cap, veh/h | 231 | 245 | 14 | 381 | 349 | 293 | 179 | 1718 | 533 | 611 | 2143 | 665 |
| Arrive On Green | 0.07 | 0.15 | 0.15 | 0.12 | 0.20 | 0.20 | 0.11 | 0.37 | 0.37 | 0.19 | 0.46 | 0.46 |
| Sat Flow, veh/h | 3159 | 1599 | 94 | 3159 | 1710 | 1438 | 1629 | 4668 | 1449 | 3135 | 4668 | 1449 |
| Grp Volume(v), veh/h | 200 | 0 | 233 | 347 | 237 | 272 | 60 | 1424 | 420 | 576 | 829 | 141 |
| Grp Sat Flow(s),veh/h/ln | 1580 | 0 | 1693 | 1580 | 1710 | 1438 | 1629 | 1556 | 1449 | 1567 | 1556 | 1449 |
| Q Serve(g_s), s | 11.9 | 0.0 | 25.7 | 20.6 | 24.3 | 35.3 | 6.5 | 52.7 | 49.0 | 34.4 | 22.2 | 8.1 |
| Cycle Q Clear(g_c), s | 11.9 | 0.0 | 25.7 | 20.6 | 24.3 | 35.3 | 6.5 | 52.7 | 49.0 | 34.4 | 22.2 | 8.1 |
| Prop In Lane | 1.00 | | 0.06 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 231 | 0 | 259 | 381 | 349 | 293 | 179 | 1718 | 533 | 611 | 2143 | 665 |
| V/C Ratio(X) | 0.87 | 0.00 | 0.90 | 0.91 | 0.68 | 0.93 | 0.34 | 0.83 | 0.79 | 0.94 | 0.39 | 0.21 |
| Avail Cap(c_a), veh/h | 231 | 0 | 301 | 417 | 405 | 341 | 179 | 1718 | 533 | 640 | 2143 | 665 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 87.1 | 0.0 | 79.0 | 82.5 | 69.9 | 74.2 | 78.2 | 54.6 | 53.4 | 75.4 | 33.8 | 16.3 |
| Incr Delay (d2), s/veh | 27.2 | 0.0 | 25.4 | 22.5 | 3.7 | 28.6 | 1.1 | 4.8 | 11.2 | 22.1 | 0.5 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 9.7 | 0.0 | 19.1 | 14.8 | 16.6 | 21.9 | 5.0 | 29.2 | 26.9 | 22.4 | 13.6 | 5.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 114.4 | 0.0 | 104.3 | 105.0 | 73.6 | 102.8 | 79.3 | 59.4 | 64.6 | 97.5 | 34.3 | 17.0 |
| LnGrp LOS | F | A | F | F | E | F | E | E | E | F | C | B |
| Approach Vol, veh/h | | 433 | | | 856 | | | 1904 | | | 1546 | |
| Approach Delay, s/veh | | 109.0 | | | 95.6 | | | 61.2 | | | 56.3 | |
| Approach LOS | | F | | | F | | | E | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 29.0 | 94.3 | 21.0 | 45.7 | 45.2 | 78.1 | 30.6 | 36.0 |
| Change Period (Y+Rc), s | 8.2 | * 7.1 | 7.1 | 6.9 | 8.2 | * 8.2 | * 7.7 | * 6.9 |
| Max Green Setting (Gmax), s | 14.6 | * 87 | 13.9 | 45.0 | 38.8 | * 63 | * 25 | * 34 |
| Max Q Clear Time (g_c+I1), s | 8.5 | 24.2 | 13.9 | 37.3 | 36.4 | 54.7 | 22.6 | 27.7 |
| Green Ext Time (p_c), s | 0.0 | 7.8 | 0.0 | 1.5 | 0.6 | 6.4 | 0.3 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 70.2 |
| HCM 6th LOS | E |

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.