

## Gander North Residential Development – Traffic Analysis

A traffic analysis has been prepared by Gorove Slade for the Gander North Residential Development. The analysis was based on a scoping meeting between Gorove Sade, VDOT, Albemarle County, and Collins Engineering. The approved trip distribution by VDOT and Albemarle County for the proposed Gander North residential development is listed below:

- 45% trips to/from the south on US 29 (Seminole Trail)
- 30% trips to/from the north on US 29 (Seminole Trail)
- 20% trips to/from the west on Hilton Heights Road
- 5% trips to/from the east on Carrsbrook Drive

(the overall distribution table and exhibits are shown in the Traffic Analysis Report)

Based on this data, VDOT required a traffic analysis of the Hilton Heights/Route 29 (Seminole Trail) intersection to ensure that the intersection and particularly the left turn/U-turn movements at this intersection could accommodate the traffic movements from the proposed development. The traffic analysis indicates a negligible effect on this intersection in the year 2030 between the No-build traffic condition and the Build-out traffic condition, with no change in the level of service of the intersection with the full build condition in 2030 when compared to the current intersection conditions today. See the attached approved traffic analysis. The VDOT TIA analysis was approved during the 3<sup>rd</sup> review of the Gander North Residential development rezoning application.

During the second Community meeting held with the adjacent neighbors of the Carrsbrook community, traffic was a big discussion. The community had several questions and concerns on current and future traffic issues in the neighborhood and the potential effects of the new development on these traffic concerns. Based on the concerns from the neighborhood, the applicant and Collins Engineering made the decision to run an additional traffic analysis to help the neighborhood determine the current traffic issues and any additional impacts on the current traffic issues from proposed development. For this additional traffic study, traffic cameras were set up at the intersection of Carrsbrook/Route 29 intersection, Old Brook Road/Northfield Road/ Rio Road intersection, and Huntington Road/Rio Road intersection to film and collect data over a 24 hour period that could be analyzed to help determine the traffic patterns of the neighborhood. In addition, speed tubes were installed on Huntington Drive, Northfield Drive, and the entrance at Carrsbrook from Route 29. The data was collected with the speed tubes and the cameras on May 27<sup>th</sup>, which was a Wednesday and public schools were still in session. The following are some of the current traffic concerns that we heard from the neighborhood and some answers to these concerns, based on the results from this additional traffic analysis and traffic data that was collected.

1. **Vehicles turning right from Route 29 (Seminole Trail) onto Carrsbrook Drive are going too fast and there is not enough distance between this intersection and the entrances to the subject property for a safe entrance:** The speed tubes placed at the Carrsbrook Drive/Route 29 intersection collected the speed of the vehicles existing the turning movement from Route 29 onto Carrsbrook Drive. The following are the results from the speed analysis:

- **Total Vehicles turning right from Route 29 to Carrsbrook (24 hour period):** 1063 vehicles
- **Speed Analysis:**
  - **Speed between 10 mph-15 mph:** 160 vehicles (15.0%)
  - **Speed between 15 mph-20 mph:** 772 vehicles (72.6%)
  - **Speed between 20 mph-25 mph:** 124 vehicles (11.6%)
  - **Speeds over 25 mph:** 1 vehicle
  - **Average speed:** 17.3 mph (85<sup>th</sup> Percentile speed: 19.8 mph)
- **Conclusion:** Based on this information, the speeds entering the Carrsbrook neighborhood are primarily less than 20 mph. The minimum required sight distance at 20 mph speeds is 200 feet. The entrance into the southern portion of the property meets this 200 foot sight distance requirement and the entrance into the northern portion of the site well exceeds this sight distance requirement. Therefore, the current proposed intersections into the subject property meet VDOT requirements, and these intersections provide the necessary sight distances for safe turning movements. See attached speed study report.

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2. **There is a large amount of “cut-thru” traffic through the Neighborhood from Rio Road to Route 29 through Old Brook Road, Northfield Road, and Huntington Road to Carrsbrook to avoid the stoplights along Rio Road heading west to Route 29 and then north on Route 29:** Cameras collected video at these intersections over a 24 hour period for an analysis of the vehicles entering the Carrsbrook neighborhood from Rio Road, turning onto either Old Brook Road, Northfield Road or Huntington Road and leaving the neighborhood at Carrsbrook Drive turning onto Route 29 heading north. During a field test, Collins Engineering determined that it takes a vehicle approximately 4 minutes and 28 seconds to drive through the Carrsbrook neighborhood from Rio Road to Route 29, abiding by the current 25 mph & 30 mph speed limits. Collins Engineering ran an analysis of all the vehicles turning right from Rio Road into the Carrsbrook neighborhood between 7 AM and 7 PM and all the vehicles leaving the Carrsbrook neighborhood and turning right onto Route 29 north between the same period of time with a delay between 3 minutes and 30 seconds and 5 minutes to determine if the vehicles turning from Rio Road were “cut-thru” traffic continuing to Route 29 north. Below are the following results:

- **Timing:**
  - **Travel time through Carrsbrook Neighborhood (at speed limit):** 4 minutes & 30 seconds
  - **Travel time via Rio Road and Route 29 (at speed limit):** 2 minutes & 45 seconds to 4 minutes & 50 seconds, depending on the lights at Albemarle Square shopping center and Woobrook & Gander intersections
- **Northfield Road, Old Brook Road, and Huntington Road Intersections:**
  - **Total vehicles turning right from Rio Road between 7 AM & 7 PM:** 866 vehicles
  - **Total vehicles turning right onto Route 29 at Carrsbrook (matching the incoming vehicles with a 3-5 minute delay):** 165 vehicles
  - **Total percentage of potential “cut-thru” traffic:** approximately 19%
- **Conclusion:**

Yes, there is “cut-thru” traffic from Rio Road to Route 29 North, but the amount of “cut-thru” traffic is less than what was anticipated, based on the feedback and concerns from the neighborhood. Collins Engineering’s analysis of the travel times indicates that if a car is traveling the speed limit through the Carrsbrook neighborhood, the estimated trip times through the “cut-thru” in the neighborhood would be longer than the estimated trip times when traveling Rio road directly to Route 29 North. 19% “cut thru” traffic (only for traffic turning right into the Carrsbrook neighborhood) is a realistic percentage, when considering the average time through the neighborhood is longer than staying on the intended route (Rio Road to Route 29). When analyzing all the traffic from Rio Road into the neighborhood, the percentage of “cut-thru” traffic decreases to 17.6% of the total westbound traffic turning into Carrsbrook from Rio Road.

The development of this project is not intended to increase the overall “cut-thru” traffic in the neighborhood. It is expected that there will be an increase of traffic (approximately 5% of the traffic from the proposed development) that will travel through the Carrsbrook neighborhood to the development. This 5% of the site traffic equates to a maximum of 55 cars/day (based on the highest density of the development). Based on the 1901 VDP from the speed study on Northfield Road and Huntington Road, this would be less than a 3% increase in trips on these (2) roadways.

3. **There is currently a speeding issue through the Carrsbrook Neighborhood, particularly on Northfield Road and Huntington Road.** Speed tubes were placed on Northfield Road and on Huntington Road over a 24 hour period and collected the speed results on these (2) roadways. The following are the results from the data analysis provided by these speed tubes. The entire data information is attached:

- **Northfield Road** – The speed tubes indicated the following results:
  - **Total Vehicles:** 800 vehicle trips over the 24 hour period
    - Total Eastbound Vehicles: 359 vehicles heading east to Rio Road
    - Total Westbound Vehicles: 521 vehicles heading west toward Route 29.

- **Posted Speed limit:** 30 mph
  - Average Eastbound speed: 37.7 mph
  - Average Westbound speed: 36.6 mph
- **Speeds between 30 mph – 40 mph:**
  - Percentage of Eastbound vehicles: 51.8%
  - Percentage of Westbound vehicles: 60.7%
- **Speeds between 40 mph – 50 mph:**
  - Percentage of Eastbound vehicles: 32.8%
  - Percentage of Westbound vehicles: 26.9%
- **Speeds above 50 mph:**
  - Percentage of Eastbound vehicles: 11 vehicles
  - Number of Westbound vehicles: 4 vehicles
- **Huntington Road** – The speed tubes indicated the following results:
  - **Total Vehicles:** 1101 vehicle trips over the 24 hour period
    - Total Eastbound Vehicles: 689 vehicles heading east to Rio Road
    - Total Westbound Vehicles: 412 vehicles heading west toward Route 29.
  - **Posted Speed limit:** 30 mph
    - Average Eastbound speed: 31.6 mph
    - Average Westbound speed: 34.5 mph
  - **Speeds between 30 mph – 40 mph:**
    - Percentage of Eastbound vehicles: 65.5%
    - Percentage of Westbound vehicles: 62.1%
  - **Speeds between 40 mph – 50 mph:**
    - Percentage of Eastbound vehicles: 16.8%
    - Percentage of Westbound vehicles: 3.6%
  - **Speeds above 50 mph:**
    - Percentage of Eastbound vehicles: 11 vehicles
    - Number of Westbound vehicles: 0 vehicles
- **Conclusion:** Based on this speed study analysis, speeding along these (2) roadways is a concern; however, the speeding the neighborhood is not directly related to “cut-thru” traffic. The average speed was higher on both roadways for vehicles heading east toward Rio Road versus vehicles heading west toward Route 29, so not all the speeding can be attributed to “cut-thru” traffic. The speed studies can be used by the Carrsbrook Neighborhood to help warrant speed enforcement on these roadways.

4. **The stacking at Carrsbrook/Route 29 intersection will result in delay of vehicles leaving the neighborhood:** The video analysis at the Carrsbrook/Route 29 intersection did not show more than 2 or 3 vehicles stacking before making the right turn onto Route 29 during the 24 hour period. The total number of vehicles leaving the proposed development in the peak AM is 72 vehicles and 36 vehicles in the peak PM. The peak AM and peak PM vehicles will result in an additional 1 vehicle per minute leaving the site and turning onto Route 29, which would result in a maximum of 1 or 2 additional vehicles stacking at the intersection during peak AM and peak PM traffic. When the traffic light turns red at the Gander Drive / Route 29 intersection, any cars waiting at the Carrsbrook intersection and Route 29 can safely turn onto Route 29.

#### **Overall Conclusion:**

Based on the data collected within the Carrsbrook neighborhood, the proposed development is not considered to have a traffic impact on the existing neighborhood. There is an existing speeding problem through the neighborhood, but it is not solely due to “cut-thru” traffic, and the HOA can use this information to work with Albemarle County police to help monitor the speed limits on the neighborhood streets. “Cut-thru traffic in the neighborhood is approximately 17.6% of the traffic through the neighborhood roadways, and the proposed increase of traffic on these streets associated with this rezoning is less than a 3% increase.

## Daily Eastbound Speeds (MPH)

Study Date: Wednesday, 05/27/2026

Unit ID: 3

Location: Northfield

Posted Speed: 30

|                  | 0-<br>9.99 | 10-<br>14.99 | 15-<br>19.99 | 20-<br>24.99 | 25-<br>29.99 | 30-<br>34.99 | 35-<br>39.99 | 40-<br>44.99 | 45-<br>49.99 | 50-<br>54.99 | 55-<br>59.99 | 60-<br>64.99 | 65-<br>69.99 | 70-<br>74.99 | 75+ | Total |
|------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|-------|
| 00:00 - 00:59    | 0          | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| 01:00 - 01:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 02:00 - 02:59    | 0          | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| 03:00 - 03:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 04:00 - 04:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 05:00 - 05:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| 06:00 - 06:59    | 0          | 0            | 0            | 0            | 0            | 2            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 3     |
| 07:00 - 07:59    | 0          | 0            | 0            | 0            | 1            | 1            | 1            | 2            | 1            | 1            | 0            | 0            | 0            | 0            | 0   | 7     |
| 08:00 - 08:59    | 0          | 0            | 0            | 0            | 3            | 3            | 4            | 6            | 1            | 1            | 0            | 0            | 0            | 0            | 0   | 18    |
| 09:00 - 09:59    | 0          | 0            | 0            | 0            | 2            | 1            | 6            | 3            | 4            | 0            | 0            | 0            | 0            | 0            | 0   | 16    |
| 10:00 - 10:59    | 0          | 0            | 1            | 2            | 3            | 5            | 3            | 2            | 0            | 2            | 0            | 0            | 0            | 0            | 0   | 18    |
| 11:00 - 11:59    | 0          | 0            | 1            | 0            | 0            | 6            | 9            | 7            | 1            | 1            | 0            | 0            | 0            | 0            | 0   | 25    |
| 12:00 - 12:59    | 0          | 0            | 0            | 1            | 1            | 5            | 9            | 6            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 23    |
| 13:00 - 13:59    | 0          | 0            | 1            | 0            | 1            | 5            | 6            | 7            | 6            | 0            | 0            | 0            | 0            | 0            | 0   | 26    |
| 14:00 - 14:59    | 0          | 0            | 1            | 0            | 3            | 6            | 9            | 8            | 2            | 0            | 0            | 0            | 0            | 0            | 0   | 29    |
| 15:00 - 15:59    | 0          | 0            | 1            | 2            | 3            | 5            | 16           | 6            | 3            | 1            | 0            | 0            | 0            | 0            | 0   | 37    |
| 16:00 - 16:59    | 0          | 0            | 0            | 0            | 0            | 4            | 14           | 13           | 3            | 0            | 1            | 0            | 0            | 0            | 0   | 35    |
| 17:00 - 17:59    | 0          | 0            | 2            | 1            | 3            | 10           | 12           | 4            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 33    |
| 18:00 - 18:59    | 0          | 0            | 0            | 0            | 1            | 5            | 8            | 6            | 5            | 1            | 0            | 1            | 0            | 0            | 0   | 27    |
| 19:00 - 19:59    | 0          | 0            | 0            | 0            | 4            | 6            | 10           | 4            | 5            | 0            | 0            | 1            | 0            | 0            | 0   | 30    |
| 20:00 - 20:59    | 0          | 0            | 0            | 0            | 2            | 4            | 3            | 3            | 2            | 0            | 1            | 0            | 0            | 0            | 0   | 15    |
| 21:00 - 21:59    | 0          | 0            | 0            | 1            | 1            | 1            | 4            | 4            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 12    |
| 22:00 - 22:59    | 0          | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| 23:00 - 23:59    | 0          | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| Totals           | 0          | 0            | 7            | 7            | 30           | 70           | 116          | 82           | 36           | 7            | 2            | 2            | 0            | 0            | 0   | 359   |
| Percent of Total | 0.0        | 0.0          | 1.9          | 1.9          | 8.4          | 19.5         | 32.3         | 22.8         | 10.0         | 1.9          | 0.6          | 0.6          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of AM    | 0.0        | 0.0          | 2.2          | 2.2          | 11.1         | 21.1         | 26.7         | 23.3         | 7.8          | 5.6          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of PM    | 0.0        | 0.0          | 1.9          | 1.9          | 7.4          | 19.0         | 34.2         | 22.7         | 10.8         | 0.7          | 0.7          | 0.7          | 0.0          | 0.0          | 0.0 | 100   |

Standard Deviation: 7.3 MPH

Ten Mile Pace: 35 to 44 MPH

85th Percentile: 44.6 MPH

Mean Speed: 37.7 MPH

Percent in Ten Mile Pace: 55.2%

Median Speed: 37.8 MPH

15th Percentile: 30.7 MPH

Modal Speed: 37.5 MPH

90th Percentile: 46.5 MPH

95th Percentile: 49.0 MPH

## Daily Westbound Speeds (MPH)

Study Date: Wednesday, 05/27/2026

Unit ID: 3

Location: Northfield

Posted Speed: 30

|                         | 0-<br>9.99 | 10-<br>14.99 | 15-<br>19.99 | 20-<br>24.99 | 25-<br>29.99 | 30-<br>34.99 | 35-<br>39.99 | 40-<br>44.99 | 45-<br>49.99 | 50-<br>54.99 | 55-<br>59.99 | 60-<br>64.99 | 65-<br>69.99 | 70-<br>74.99 | 75+        | Total      |
|-------------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|------------|
| 00:00 - 00:59           | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 0          |
| 01:00 - 01:59           | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 0          |
| 02:00 - 02:59           | 0          | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 1          |
| 03:00 - 03:59           | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 0          |
| 04:00 - 04:59           | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 0          |
| 05:00 - 05:59           | 0          | 0            | 0            | 0            | 0            | 1            | 2            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 4          |
| 06:00 - 06:59           | 0          | 0            | 0            | 1            | 2            | 4            | 9            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 18         |
| 07:00 - 07:59           | 0          | 0            | 2            | 1            | 6            | 11           | 23           | 12           | 2            | 0            | 0            | 0            | 0            | 0            | 0          | 57         |
| 08:00 - 08:59           | 0          | 1            | 0            | 1            | 6            | 18           | 19           | 14           | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 59         |
| 09:00 - 09:59           | 0          | 0            | 0            | 0            | 1            | 6            | 15           | 7            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 29         |
| 10:00 - 10:59           | 0          | 0            | 0            | 1            | 5            | 7            | 8            | 13           | 3            | 2            | 0            | 0            | 0            | 0            | 0          | 39         |
| 11:00 - 11:59           | 0          | 0            | 0            | 1            | 2            | 7            | 11           | 5            | 3            | 1            | 0            | 0            | 0            | 0            | 0          | 30         |
| 12:00 - 12:59           | 0          | 0            | 0            | 2            | 3            | 8            | 12           | 5            | 1            | 0            | 0            | 0            | 0            | 0            | 0          | 31         |
| 13:00 - 13:59           | 0          | 0            | 0            | 1            | 2            | 9            | 13           | 11           | 5            | 0            | 0            | 0            | 0            | 0            | 0          | 41         |
| 14:00 - 14:59           | 0          | 1            | 1            | 1            | 1            | 8            | 15           | 7            | 2            | 1            | 0            | 0            | 0            | 0            | 0          | 37         |
| 15:00 - 15:59           | 0          | 1            | 0            | 0            | 1            | 4            | 15           | 7            | 3            | 0            | 0            | 0            | 0            | 0            | 0          | 31         |
| 16:00 - 16:59           | 0          | 0            | 0            | 0            | 2            | 8            | 12           | 10           | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 32         |
| 17:00 - 17:59           | 0          | 0            | 1            | 1            | 3            | 10           | 22           | 6            | 4            | 0            | 0            | 0            | 0            | 0            | 0          | 47         |
| 18:00 - 18:59           | 0          | 0            | 0            | 1            | 0            | 8            | 11           | 6            | 2            | 0            | 0            | 0            | 0            | 0            | 0          | 28         |
| 19:00 - 19:59           | 0          | 0            | 0            | 0            | 7            | 3            | 3            | 1            | 2            | 0            | 0            | 0            | 0            | 0            | 0          | 16         |
| 20:00 - 20:59           | 0          | 0            | 0            | 0            | 0            | 7            | 3            | 3            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 13         |
| 21:00 - 21:59           | 0          | 0            | 0            | 1            | 1            | 1            | 1            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 6          |
| 22:00 - 22:59           | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 1          |
| 23:00 - 23:59           | 0          | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0          | 1          |
| <b>Totals</b>           | <b>0</b>   | <b>3</b>     | <b>4</b>     | <b>12</b>    | <b>42</b>    | <b>122</b>   | <b>194</b>   | <b>113</b>   | <b>27</b>    | <b>4</b>     | <b>0</b>     | <b>0</b>     | <b>0</b>     | <b>0</b>     | <b>0</b>   | <b>521</b> |
| <b>Percent of Total</b> | <b>0.0</b> | <b>0.6</b>   | <b>0.8</b>   | <b>2.3</b>   | <b>8.1</b>   | <b>23.4</b>  | <b>37.2</b>  | <b>21.7</b>  | <b>5.2</b>   | <b>0.8</b>   | <b>0.0</b>   | <b>0.0</b>   | <b>0.0</b>   | <b>0.0</b>   | <b>0.0</b> | <b>100</b> |
| <b>Percent of AM</b>    | <b>0.0</b> | <b>0.4</b>   | <b>0.8</b>   | <b>2.1</b>   | <b>9.3</b>   | <b>23.2</b>  | <b>36.7</b>  | <b>22.8</b>  | <b>3.4</b>   | <b>1.3</b>   | <b>0.0</b>   | <b>0.0</b>   | <b>0.0</b>   | <b>0.0</b>   | <b>0.0</b> | <b>100</b> |
| <b>Percent of PM</b>    | <b>0.0</b> | <b>0.7</b>   | <b>0.7</b>   | <b>2.5</b>   | <b>7.0</b>   | <b>23.6</b>  | <b>37.7</b>  | <b>20.8</b>  | <b>6.7</b>   | <b>0.4</b>   | <b>0.0</b>   | <b>0.0</b>   | <b>0.0</b>   | <b>0.0</b>   | <b>0.0</b> | <b>100</b> |

|                     |          |                           |              |                  |          |
|---------------------|----------|---------------------------|--------------|------------------|----------|
| Standard Deviation: | 6.3 MPH  | Ten Mile Pace:            | 30 to 39 MPH | 85th Percentile: | 42.9 MPH |
| Mean Speed:         | 36.6 MPH | Percent in Ten Mile Pace: | 60.7%        | 15th Percentile: | 30.7 MPH |
| Median Speed:       | 37.0 MPH |                           |              | 90th Percentile: | 44.0 MPH |
| Modal Speed:        | 37.5 MPH |                           |              | 95th Percentile: | 45.8 MPH |

## Daily Total Speeds (MPH)

Study Date: Wednesday, 05/27/2026

Unit ID: 3

Location: Northfield

Posted Speed: 30

|                  | 0-<br>9.99 | 10-<br>14.99 | 15-<br>19.99 | 20-<br>24.99 | 25-<br>29.99 | 30-<br>34.99 | 35-<br>39.99 | 40-<br>44.99 | 45-<br>49.99 | 50-<br>54.99 | 55-<br>59.99 | 60-<br>64.99 | 65-<br>69.99 | 70-<br>74.99 | 75+ | Total |
|------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|-------|
| 00:00 - 00:59    | 0          | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| 01:00 - 01:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 02:00 - 02:59    | 0          | 0            | 0            | 0            | 1            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 2     |
| 03:00 - 03:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 04:00 - 04:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 05:00 - 05:59    | 0          | 0            | 0            | 0            | 0            | 1            | 2            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 5     |
| 06:00 - 06:59    | 0          | 0            | 0            | 1            | 2            | 6            | 10           | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 21    |
| 07:00 - 07:59    | 0          | 0            | 2            | 1            | 7            | 12           | 24           | 14           | 3            | 1            | 0            | 0            | 0            | 0            | 0   | 64    |
| 08:00 - 08:59    | 0          | 1            | 0            | 1            | 9            | 21           | 23           | 20           | 1            | 1            | 0            | 0            | 0            | 0            | 0   | 77    |
| 09:00 - 09:59    | 0          | 0            | 0            | 0            | 3            | 7            | 21           | 10           | 4            | 0            | 0            | 0            | 0            | 0            | 0   | 45    |
| 10:00 - 10:59    | 0          | 0            | 1            | 3            | 8            | 12           | 11           | 15           | 3            | 4            | 0            | 0            | 0            | 0            | 0   | 57    |
| 11:00 - 11:59    | 0          | 0            | 1            | 1            | 2            | 13           | 20           | 12           | 4            | 2            | 0            | 0            | 0            | 0            | 0   | 55    |
| 12:00 - 12:59    | 0          | 0            | 0            | 3            | 4            | 13           | 21           | 11           | 2            | 0            | 0            | 0            | 0            | 0            | 0   | 54    |
| 13:00 - 13:59    | 0          | 0            | 1            | 1            | 3            | 14           | 19           | 18           | 11           | 0            | 0            | 0            | 0            | 0            | 0   | 67    |
| 14:00 - 14:59    | 0          | 1            | 2            | 1            | 4            | 14           | 24           | 15           | 4            | 1            | 0            | 0            | 0            | 0            | 0   | 66    |
| 15:00 - 15:59    | 0          | 1            | 1            | 2            | 4            | 9            | 31           | 13           | 6            | 1            | 0            | 0            | 0            | 0            | 0   | 68    |
| 16:00 - 16:59    | 0          | 0            | 0            | 0            | 2            | 12           | 26           | 23           | 3            | 0            | 1            | 0            | 0            | 0            | 0   | 67    |
| 17:00 - 17:59    | 0          | 0            | 3            | 2            | 6            | 20           | 34           | 10           | 5            | 0            | 0            | 0            | 0            | 0            | 0   | 80    |
| 18:00 - 18:59    | 0          | 0            | 0            | 1            | 1            | 13           | 19           | 12           | 7            | 1            | 0            | 1            | 0            | 0            | 0   | 55    |
| 19:00 - 19:59    | 0          | 0            | 0            | 0            | 11           | 9            | 13           | 5            | 7            | 0            | 0            | 1            | 0            | 0            | 0   | 46    |
| 20:00 - 20:59    | 0          | 0            | 0            | 0            | 2            | 11           | 6            | 6            | 2            | 0            | 1            | 0            | 0            | 0            | 0   | 28    |
| 21:00 - 21:59    | 0          | 0            | 0            | 2            | 2            | 2            | 5            | 6            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 18    |
| 22:00 - 22:59    | 0          | 0            | 0            | 0            | 1            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 2     |
| 23:00 - 23:59    | 0          | 0            | 0            | 0            | 0            | 1            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 2     |
| Totals           | 0          | 3            | 11           | 19           | 72           | 192          | 310          | 195          | 63           | 11           | 2            | 2            | 0            | 0            | 0   | 880   |
| Percent of Total | 0.0        | 0.3          | 1.3          | 2.2          | 8.2          | 21.8         | 35.2         | 22.2         | 7.2          | 1.3          | 0.2          | 0.2          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of AM    | 0.0        | 0.3          | 1.2          | 2.1          | 9.8          | 22.6         | 33.9         | 22.9         | 4.6          | 2.4          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of PM    | 0.0        | 0.4          | 1.3          | 2.2          | 7.2          | 21.3         | 36.0         | 21.7         | 8.7          | 0.5          | 0.4          | 0.4          | 0.0          | 0.0          | 0.0 | 100   |

|                     |          |                           |              |                  |          |
|---------------------|----------|---------------------------|--------------|------------------|----------|
| Standard Deviation: | 6.7 MPH  | Ten Mile Pace:            | 35 to 44 MPH | 85th Percentile: | 43.6 MPH |
| Mean Speed:         | 37.0 MPH | Percent in Ten Mile Pace: | 57.4%        | 15th Percentile: | 30.7 MPH |
| Median Speed:       | 37.3 MPH |                           |              | 90th Percentile: | 44.7 MPH |
| Modal Speed:        | 37.5 MPH |                           |              | 95th Percentile: | 47.7 MPH |

## Daily Eastbound Speeds (MPH)

Study Date: Wednesday, 05/27/2026

Unit ID: 4

Location: Huntington

Posted Speed: 30

|                  | 0-<br>9.99 | 10-<br>14.99 | 15-<br>19.99 | 20-<br>24.99 | 25-<br>29.99 | 30-<br>34.99 | 35-<br>39.99 | 40-<br>44.99 | 45-<br>49.99 | 50-<br>54.99 | 55-<br>59.99 | 60-<br>64.99 | 65-<br>69.99 | 70-<br>74.99 | 75+ | Total |
|------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|-------|
| 00:00 - 00:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 01:00 - 01:59    | 0          | 0            | 0            | 0            | 1            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 3     |
| 02:00 - 02:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 03:00 - 03:59    | 0          | 0            | 0            | 0            | 0            | 0            | 1            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 2     |
| 04:00 - 04:59    | 0          | 0            | 0            | 0            | 0            | 1            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 2     |
| 05:00 - 05:59    | 0          | 0            | 0            | 1            | 1            | 1            | 2            | 1            | 0            | 0            | 1            | 0            | 0            | 0            | 0   | 7     |
| 06:00 - 06:59    | 0          | 0            | 0            | 1            | 1            | 3            | 1            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 8     |
| 07:00 - 07:59    | 0          | 0            | 0            | 1            | 3            | 12           | 9            | 6            | 2            | 0            | 0            | 0            | 0            | 0            | 0   | 33    |
| 08:00 - 08:59    | 0          | 0            | 1            | 1            | 11           | 17           | 10           | 3            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 44    |
| 09:00 - 09:59    | 0          | 0            | 0            | 0            | 6            | 13           | 6            | 8            | 2            | 0            | 0            | 0            | 0            | 0            | 0   | 35    |
| 10:00 - 10:59    | 0          | 1            | 1            | 1            | 5            | 17           | 10           | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 37    |
| 11:00 - 11:59    | 0          | 1            | 1            | 2            | 7            | 10           | 12           | 7            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 40    |
| 12:00 - 12:59    | 0          | 1            | 1            | 1            | 8            | 21           | 9            | 12           | 1            | 0            | 1            | 0            | 0            | 0            | 0   | 55    |
| 13:00 - 13:59    | 0          | 0            | 0            | 0            | 6            | 18           | 16           | 6            | 3            | 0            | 0            | 0            | 0            | 0            | 0   | 49    |
| 14:00 - 14:59    | 0          | 0            | 0            | 0            | 5            | 18           | 17           | 6            | 2            | 1            | 0            | 0            | 0            | 0            | 0   | 49    |
| 15:00 - 15:59    | 0          | 0            | 0            | 2            | 7            | 29           | 12           | 6            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 57    |
| 16:00 - 16:59    | 1          | 0            | 0            | 0            | 5            | 21           | 16           | 15           | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 59    |
| 17:00 - 17:59    | 0          | 0            | 0            | 3            | 9            | 32           | 23           | 7            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 75    |
| 18:00 - 18:59    | 0          | 0            | 2            | 1            | 4            | 26           | 14           | 9            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 56    |
| 19:00 - 19:59    | 0          | 0            | 1            | 0            | 2            | 15           | 13           | 4            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 35    |
| 20:00 - 20:59    | 0          | 0            | 1            | 0            | 7            | 2            | 4            | 1            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 16    |
| 21:00 - 21:59    | 0          | 0            | 0            | 1            | 2            | 9            | 6            | 2            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 21    |
| 22:00 - 22:59    | 0          | 0            | 0            | 0            | 1            | 2            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 4     |
| 23:00 - 23:59    | 0          | 0            | 0            | 0            | 1            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 2     |
| Totals           | 1          | 3            | 8            | 15           | 92           | 269          | 182          | 100          | 16           | 1            | 2            | 0            | 0            | 0            | 0   | 689   |
| Percent of Total | 0.1        | 0.4          | 1.2          | 2.2          | 13.4         | 39.0         | 26.4         | 14.5         | 2.3          | 0.1          | 0.3          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of AM    | 0.0        | 0.9          | 1.4          | 3.3          | 16.6         | 36.0         | 24.2         | 14.7         | 2.4          | 0.0          | 0.5          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of PM    | 0.2        | 0.2          | 1.0          | 1.7          | 11.9         | 40.4         | 27.4         | 14.4         | 2.3          | 0.2          | 0.2          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |

Standard Deviation: 6.1 MPH

Ten Mile Pace: 30 to 39 MPH

85th Percentile: 40.8 MPH

Mean Speed: 34.5 MPH

Percent in Ten Mile Pace: 65.5%

Median Speed: 34.2 MPH

15th Percentile: 29.1 MPH

Modal Speed: 32.5 MPH

90th Percentile: 42.5 MPH

95th Percentile: 44.2 MPH

## Daily Westbound Speeds (MPH)

Study Date: Wednesday, 05/27/2026

Unit ID: 4

Location: Huntington

Posted Speed: 30

|                  | 0-<br>9.99 | 10-<br>14.99 | 15-<br>19.99 | 20-<br>24.99 | 25-<br>29.99 | 30-<br>34.99 | 35-<br>39.99 | 40-<br>44.99 | 45-<br>49.99 | 50-<br>54.99 | 55-<br>59.99 | 60-<br>64.99 | 65-<br>69.99 | 70-<br>74.99 | 75+ | Total |
|------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|-------|
| 00:00 - 00:59    | 0          | 0            | 0            | 0            | 1            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 2     |
| 01:00 - 01:59    | 0          | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| 02:00 - 02:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 03:00 - 03:59    | 0          | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| 04:00 - 04:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| 05:00 - 05:59    | 0          | 0            | 0            | 0            | 0            | 3            | 4            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 7     |
| 06:00 - 06:59    | 0          | 0            | 0            | 0            | 5            | 3            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 9     |
| 07:00 - 07:59    | 0          | 0            | 1            | 5            | 9            | 15           | 3            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 33    |
| 08:00 - 08:59    | 0          | 1            | 1            | 1            | 6            | 9            | 6            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 24    |
| 09:00 - 09:59    | 0          | 0            | 0            | 2            | 10           | 12           | 6            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 32    |
| 10:00 - 10:59    | 0          | 0            | 0            | 1            | 3            | 15           | 6            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 26    |
| 11:00 - 11:59    | 0          | 0            | 0            | 2            | 5            | 9            | 5            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 23    |
| 12:00 - 12:59    | 0          | 0            | 0            | 0            | 12           | 13           | 9            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 36    |
| 13:00 - 13:59    | 0          | 0            | 2            | 2            | 7            | 6            | 8            | 2            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 28    |
| 14:00 - 14:59    | 0          | 0            | 2            | 4            | 8            | 11           | 3            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 28    |
| 15:00 - 15:59    | 0          | 2            | 0            | 1            | 3            | 13           | 5            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 25    |
| 16:00 - 16:59    | 0          | 0            | 2            | 2            | 6            | 14           | 7            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 31    |
| 17:00 - 17:59    | 0          | 0            | 0            | 2            | 6            | 14           | 8            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 31    |
| 18:00 - 18:59    | 0          | 0            | 0            | 0            | 8            | 12           | 9            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 29    |
| 19:00 - 19:59    | 0          | 0            | 0            | 4            | 3            | 5            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 14    |
| 20:00 - 20:59    | 0          | 0            | 2            | 1            | 3            | 6            | 2            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 15    |
| 21:00 - 21:59    | 0          | 0            | 0            | 2            | 2            | 2            | 3            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 9     |
| 22:00 - 22:59    | 0          | 0            | 0            | 0            | 1            | 3            | 1            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 6     |
| 23:00 - 23:59    | 0          | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| Totals           | 0          | 3            | 10           | 30           | 98           | 166          | 90           | 13           | 2            | 0            | 0            | 0            | 0            | 0            | 0   | 412   |
| Percent of Total | 0.0        | 0.7          | 2.4          | 7.3          | 23.8         | 40.3         | 21.8         | 3.2          | 0.5          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of AM    | 0.0        | 0.6          | 1.3          | 7.5          | 24.5         | 42.1         | 20.1         | 3.8          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of PM    | 0.0        | 0.8          | 3.2          | 7.1          | 23.3         | 39.1         | 22.9         | 2.8          | 0.8          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |

Standard Deviation: 5.7 MPH

Mean Speed: 31.6 MPH

Median Speed: 31.9 MPH

Modal Speed: 32.5 MPH

Ten Mile Pace: 25 to 34 MPH

Percent in Ten Mile Pace: 64.1%

85th Percentile: 37.4 MPH

15th Percentile: 25.9 MPH

90th Percentile: 38.5 MPH

95th Percentile: 39.7 MPH

## Daily Total Speeds (MPH)

Study Date: Wednesday, 05/27/2026

Unit ID: 4

Location: Huntington

Posted Speed: 30

|                  | 0-<br>9.99 | 10-<br>14.99 | 15-<br>19.99 | 20-<br>24.99 | 25-<br>29.99 | 30-<br>34.99 | 35-<br>39.99 | 40-<br>44.99 | 45-<br>49.99 | 50-<br>54.99 | 55-<br>59.99 | 60-<br>64.99 | 65-<br>69.99 | 70-<br>74.99 | 75+ | Total |
|------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|-------|
| 00:00 - 00:59    | 0          | 0            | 0            | 0            | 1            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 2     |
| 01:00 - 01:59    | 0          | 0            | 0            | 1            | 1            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 4     |
| 02:00 - 02:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 03:00 - 03:59    | 0          | 0            | 0            | 0            | 0            | 1            | 1            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 3     |
| 04:00 - 04:59    | 0          | 0            | 0            | 0            | 0            | 1            | 0            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 3     |
| 05:00 - 05:59    | 0          | 0            | 0            | 1            | 1            | 4            | 6            | 1            | 0            | 0            | 1            | 0            | 0            | 0            | 0   | 14    |
| 06:00 - 06:59    | 0          | 0            | 0            | 1            | 6            | 6            | 2            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 17    |
| 07:00 - 07:59    | 0          | 0            | 1            | 6            | 12           | 27           | 12           | 6            | 2            | 0            | 0            | 0            | 0            | 0            | 0   | 66    |
| 08:00 - 08:59    | 0          | 1            | 2            | 2            | 17           | 26           | 16           | 3            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 68    |
| 09:00 - 09:59    | 0          | 0            | 0            | 2            | 16           | 25           | 12           | 10           | 2            | 0            | 0            | 0            | 0            | 0            | 0   | 67    |
| 10:00 - 10:59    | 0          | 1            | 1            | 2            | 8            | 32           | 16           | 3            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 63    |
| 11:00 - 11:59    | 0          | 1            | 1            | 4            | 12           | 19           | 17           | 9            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 63    |
| 12:00 - 12:59    | 0          | 1            | 1            | 1            | 20           | 34           | 18           | 14           | 1            | 0            | 1            | 0            | 0            | 0            | 0   | 91    |
| 13:00 - 13:59    | 0          | 0            | 2            | 2            | 13           | 24           | 24           | 8            | 4            | 0            | 0            | 0            | 0            | 0            | 0   | 77    |
| 14:00 - 14:59    | 0          | 0            | 2            | 4            | 13           | 29           | 20           | 6            | 2            | 1            | 0            | 0            | 0            | 0            | 0   | 77    |
| 15:00 - 15:59    | 0          | 2            | 0            | 3            | 10           | 42           | 17           | 7            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 82    |
| 16:00 - 16:59    | 1          | 0            | 2            | 2            | 11           | 35           | 23           | 15           | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 90    |
| 17:00 - 17:59    | 0          | 0            | 0            | 5            | 15           | 46           | 31           | 8            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 106   |
| 18:00 - 18:59    | 0          | 0            | 2            | 1            | 12           | 38           | 23           | 9            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 85    |
| 19:00 - 19:59    | 0          | 0            | 1            | 4            | 5            | 20           | 15           | 4            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 49    |
| 20:00 - 20:59    | 0          | 0            | 3            | 1            | 10           | 8            | 6            | 1            | 2            | 0            | 0            | 0            | 0            | 0            | 0   | 31    |
| 21:00 - 21:59    | 0          | 0            | 0            | 3            | 4            | 11           | 9            | 2            | 1            | 0            | 0            | 0            | 0            | 0            | 0   | 30    |
| 22:00 - 22:59    | 0          | 0            | 0            | 0            | 2            | 5            | 1            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 10    |
| 23:00 - 23:59    | 0          | 0            | 0            | 0            | 1            | 0            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 3     |
| Totals           | 1          | 6            | 18           | 45           | 190          | 435          | 272          | 113          | 18           | 1            | 2            | 0            | 0            | 0            | 0   | 1101  |
| Percent of Total | 0.1        | 0.5          | 1.6          | 4.1          | 17.3         | 39.5         | 24.7         | 10.3         | 1.6          | 0.1          | 0.2          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of AM    | 0.0        | 0.8          | 1.4          | 5.1          | 20.0         | 38.6         | 22.4         | 10.0         | 1.4          | 0.0          | 0.3          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of PM    | 0.1        | 0.4          | 1.8          | 3.6          | 15.9         | 39.9         | 25.9         | 10.4         | 1.8          | 0.1          | 0.1          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |

|                     |          |                           |              |                  |          |
|---------------------|----------|---------------------------|--------------|------------------|----------|
| Standard Deviation: | 6.1 MPH  | Ten Mile Pace:            | 30 to 39 MPH | 85th Percentile: | 39.4 MPH |
| Mean Speed:         | 33.4 MPH | Percent in Ten Mile Pace: | 64.2%        | 15th Percentile: | 27.5 MPH |
| Median Speed:       | 33.3 MPH |                           |              | 90th Percentile: | 41.0 MPH |
| Modal Speed:        | 32.5 MPH |                           |              | 95th Percentile: | 43.5 MPH |

## Daily Eastbound Speeds (MPH)

Study Date: Wednesday, 05/27/2026

Unit ID: 5

Location: Carrsbrook NB Right

Posted Speed: 25

|                  | 0-<br>9.99 | 10-<br>14.99 | 15-<br>19.99 | 20-<br>24.99 | 25-<br>29.99 | 30-<br>34.99 | 35-<br>39.99 | 40-<br>44.99 | 45-<br>49.99 | 50-<br>54.99 | 55-<br>59.99 | 60-<br>64.99 | 65-<br>69.99 | 70-<br>74.99 | 75+ | Total |
|------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|-------|
| 00:00 - 00:59    | 0          | 0            | 2            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 3     |
| 01:00 - 01:59    | 0          | 0            | 2            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 3     |
| 02:00 - 02:59    | 0          | 0            | 0            | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 2     |
| 03:00 - 03:59    | 0          | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1     |
| 04:00 - 04:59    | 0          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 0     |
| 05:00 - 05:59    | 0          | 2            | 1            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 4     |
| 06:00 - 06:59    | 0          | 2            | 10           | 3            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 15    |
| 07:00 - 07:59    | 1          | 10           | 26           | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 39    |
| 08:00 - 08:59    | 0          | 8            | 50           | 2            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 60    |
| 09:00 - 09:59    | 0          | 11           | 38           | 6            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 55    |
| 10:00 - 10:59    | 2          | 9            | 38           | 5            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 54    |
| 11:00 - 11:59    | 1          | 9            | 48           | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 59    |
| 12:00 - 12:59    | 1          | 12           | 51           | 4            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 68    |
| 13:00 - 13:59    | 0          | 11           | 62           | 8            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 81    |
| 14:00 - 14:59    | 0          | 18           | 63           | 9            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 90    |
| 15:00 - 15:59    | 1          | 15           | 56           | 6            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 78    |
| 16:00 - 16:59    | 0          | 12           | 82           | 6            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 100   |
| 17:00 - 17:59    | 0          | 8            | 77           | 29           | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 114   |
| 18:00 - 18:59    | 0          | 11           | 60           | 17           | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 88    |
| 19:00 - 19:59    | 0          | 9            | 38           | 2            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 50    |
| 20:00 - 20:59    | 0          | 3            | 30           | 6            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 39    |
| 21:00 - 21:59    | 0          | 4            | 23           | 8            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 35    |
| 22:00 - 22:59    | 0          | 6            | 11           | 3            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 20    |
| 23:00 - 23:59    | 0          | 0            | 4            | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 5     |
| Totals           | 6          | 160          | 772          | 124          | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0   | 1063  |
| Percent of Total | 0.6        | 15.1         | 72.6         | 11.7         | 0.1          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of AM    | 1.4        | 17.3         | 72.9         | 8.5          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |
| Percent of PM    | 0.3        | 14.2         | 72.5         | 12.9         | 0.1          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0 | 100   |

Standard Deviation: 3.1 MPH

Ten Mile Pace: 10 to 19 MPH

85th Percentile: 19.8 MPH

Mean Speed: 17.3 MPH

Percent in Ten Mile Pace: 87.7%

Median Speed: 17.4 MPH

15th Percentile: 14.8 MPH

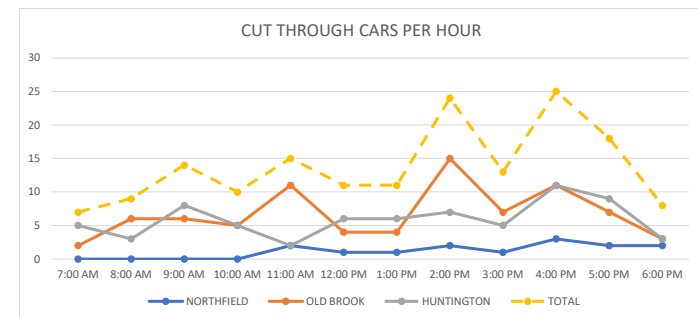
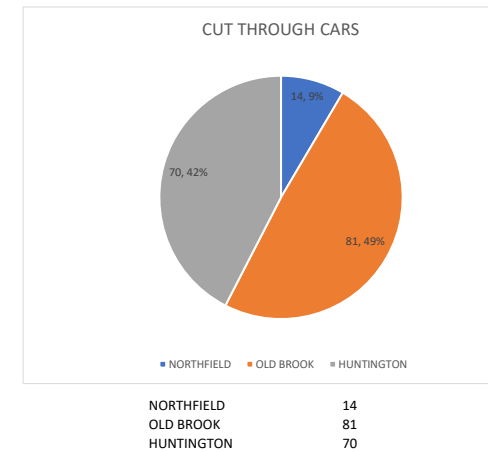
Modal Speed: 17.5 MPH

90th Percentile: 20.7 MPH

95th Percentile: 22.9 MPH

# CARRSBROOK NEIGHBORHOOD - "CUT-THRU" TRAFFIC ANALYSIS

| CATEGORY                                                                                  | Column2  | TOTAL      | Column1 | Column12             |
|-------------------------------------------------------------------------------------------|----------|------------|---------|----------------------|
| CUT THROUGH (NORTHFIELD, OLD BROOK, AND HUNTINGTON)                                       |          |            |         | <a href="#">LINK</a> |
| CUT THROUGH CARS (TOTAL)                                                                  |          | 165        |         | <a href="#">LINK</a> |
| NUMBER OF CUT THROUGH CARS (NORTHFIELD & OLD BROOK TO CARRSBROOK)                         |          | 95         |         |                      |
| NUMBER OF CUT THROUGH CARS (HUNTINGTON TO CARRSBROOK)                                     |          | 70         |         | <a href="#">LINK</a> |
| ALL CARS TURNING RIGHT INTO OLD BROOK, NORTHFIELD, AND HUNTINGTON                         |          | 866        |         |                      |
| PERCENTAGE CUT THROUGH (OF CARS TURNING RIGHT INTO OLD BROOK, NORTHFIELD, AND HUNTINGTON) |          | 19.05      |         |                      |
| TOTAL CARS LEAVING CARRSBROOK                                                             |          | 959        |         |                      |
| PERCENTAGE CUT THROUGH (OF CARS LEAVING CARRSBROOK)                                       |          | 9.92       |         |                      |
| CUT THROUGH (NORTHFIELD)                                                                  |          |            |         |                      |
| CUT THROUGH CARS (NORTHFIELD)                                                             |          | 14         |         |                      |
| ALL CARS TURNING RIGHT INTO NORTHFIELD                                                    |          | 77         |         |                      |
| PERCENTAGE CUT THROUGH (OF ALL CARS TURNING RIGHT INTO NORTHFIELD)                        |          | 18.18      |         |                      |
| PERCENTAGE OF TOTAL CUT THROUGH (CARS COMING FROM NORTHFIELD)                             |          | 8.48       |         |                      |
| CUT THROUGH (OLD BROOK)                                                                   |          |            |         |                      |
| CUT THROUGH CARS (OLD BROOK)                                                              |          | 81         |         |                      |
| ALL CARS TURNING RIGHT INTO OLD BROOK                                                     |          | 544        |         |                      |
| PERCENTAGE CUT THROUGH (OF ALL CARS TURNING RIGHT INTO OLD BROOK)                         |          | 14.89      |         |                      |
| PERCENTAGE OF TOTAL CUT THROUGH (CARS COMING FROM OLD BROOK)                              |          | 49.09      |         |                      |
| CUT THROUGH (HUNTINGTON)                                                                  |          |            |         |                      |
| CUT THROUGH CARS (HUNTINGTON)                                                             |          | 70         |         |                      |
| ALL CARS TURNING RIGHT INTO HUNTINGTON                                                    |          | 245        |         |                      |
| PERCENTAGE CUT THROUGH (OF ALL CARS TURNING RIGHT INTO HUNTINGTON)                        |          | 28.57      |         |                      |
| PERCENTAGE OF TOTAL CUT THROUGH (CARS COMING FROM HUNTINGTON)                             |          | 42.42      |         |                      |
| CUT THROUGH CARS PER HOUR                                                                 |          |            |         |                      |
|                                                                                           |          | OLD        |         |                      |
|                                                                                           |          | BROOK      |         |                      |
|                                                                                           |          | HUNTINGTON |         |                      |
|                                                                                           |          | TOTAL      |         |                      |
|                                                                                           |          |            |         |                      |
|                                                                                           | 7:00 AM  | 0          | 2       | 5                    |
|                                                                                           | 8:00 AM  | 0          | 6       | 3                    |
|                                                                                           | 9:00 AM  | 0          | 6       | 8                    |
|                                                                                           | 10:00 AM | 0          | 5       | 5                    |
|                                                                                           |          |            |         |                      |
|                                                                                           | 11:00 AM | 2          | 11      | 2                    |
|                                                                                           | 12:00 PM | 1          | 4       | 6                    |
|                                                                                           | 1:00 PM  | 1          | 4       | 6                    |
|                                                                                           | 2:00 PM  | 2          | 15      | 7                    |
|                                                                                           | 3:00 PM  | 1          | 7       | 5                    |
|                                                                                           | 4:00 PM  | 3          | 11      | 11                   |
|                                                                                           | 5:00 PM  | 2          | 7       | 9                    |
|                                                                                           | 6:00 PM  | 2          | 3       | 3                    |
|                                                                                           |          | 14         | 81      | 70                   |
|                                                                                           |          |            |         | 165                  |



# GANDER NORTH - APPROVED VDOT TRAFFIC ANALYSIS

## NORTH GANDER APARTMENTS TRAFFIC CAPACITY ANALYSIS

To: Michael Barnes, AICP  
From: Carl Hultgren, P.E., PTOE  
Cc: Scott Collins, P.E.  
Date: February 13, 2026  
Subject: North Gander Apartments – Traffic Capacity Analysis

Albemarle County  
Gorove Slade  
Collins Engineering



Landshark, LLC is proposing a multifamily community on the east side of U.S. 29 on both sides of Carrsbrook Drive. The development plan includes up to 237 multifamily units with four buildings and the clubhouse on the north side of Carrsbrook Drive, and one building on the south side of Carrsbrook Drive. The proposed access plan includes two full-movement driveways on Carrsbrook Drive. If approved, the project is expected to be complete by 2030.

At the request of the County, this analysis was performed to evaluate the impact of the proposed multifamily trips on the intersection of U.S. 29 (Seminole Trail) at Hilton Heights Road / Seminole Lane.

## Existing Conditions

Existing lane configurations and turn lane storage lengths were collected in the field by Gorove Slade. A description of the roadways in this study is presented in Table 1.

**Table 1: Existing Roadway Network**

| Roadway             | RTE #   | VDOT Classification | Posted Speed Limit (mph) | VDOT 2024 AADT (vpd) |
|---------------------|---------|---------------------|--------------------------|----------------------|
| Seminole Trail      | U.S. 29 | Principal Arterial  | 45                       | 45,000               |
| Hilton Heights Road | SC-1438 | Major Collector     | 35                       | 4,100                |
| Carrsbrook Drive    | SC-854  | Major Collector     | 25                       | 1,900                |

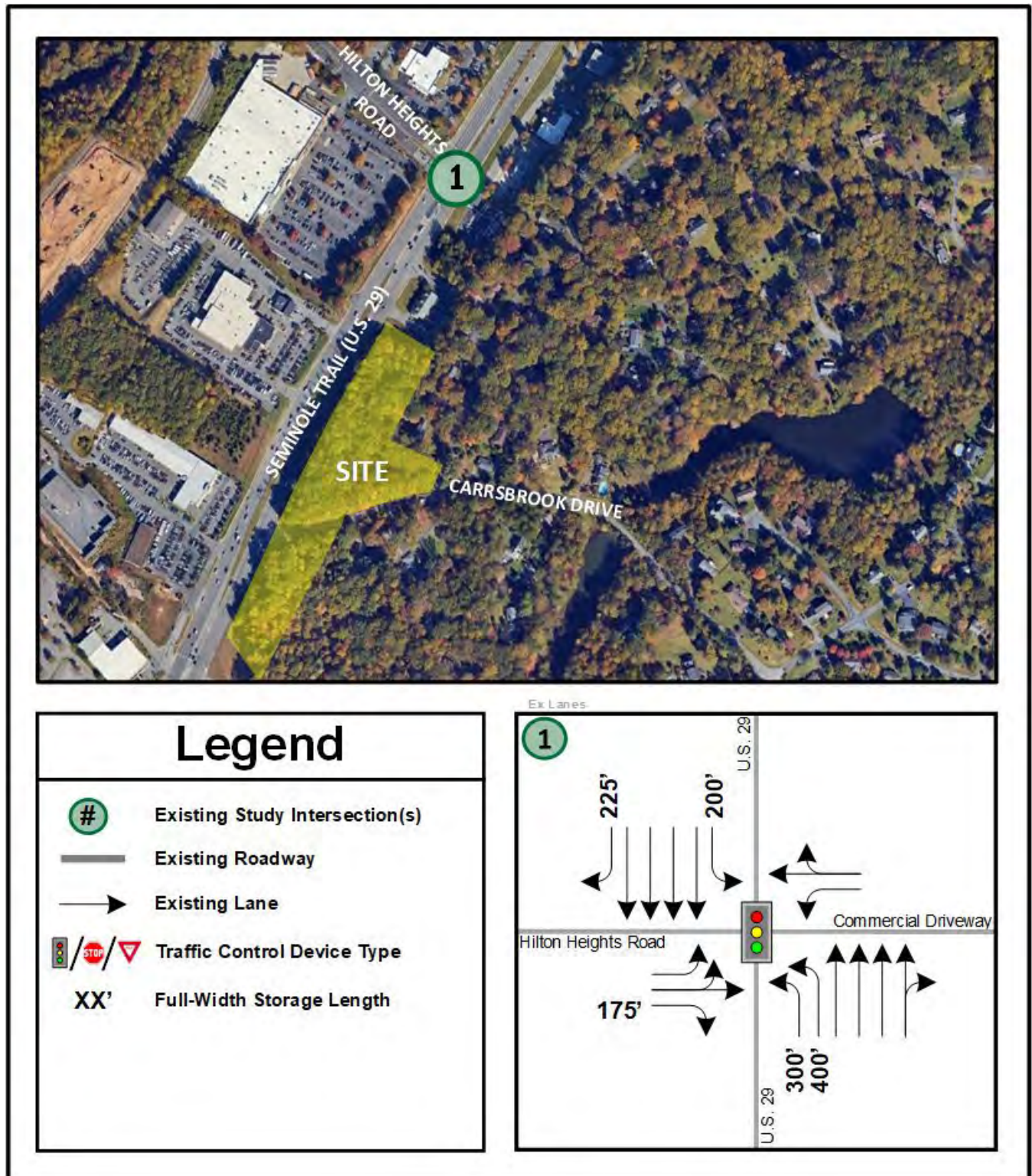


Figure 1: Existing Roadway Laneage

The AM peak hour (7:00 to 9:00 AM) and PM peak hour (4:00 to 6:00 PM) turning movement counts were conducted at the study intersection by Burns Services, Inc. on October 8, 2025. Figure 2 shows the existing AM and PM peak hour turning movement volumes.

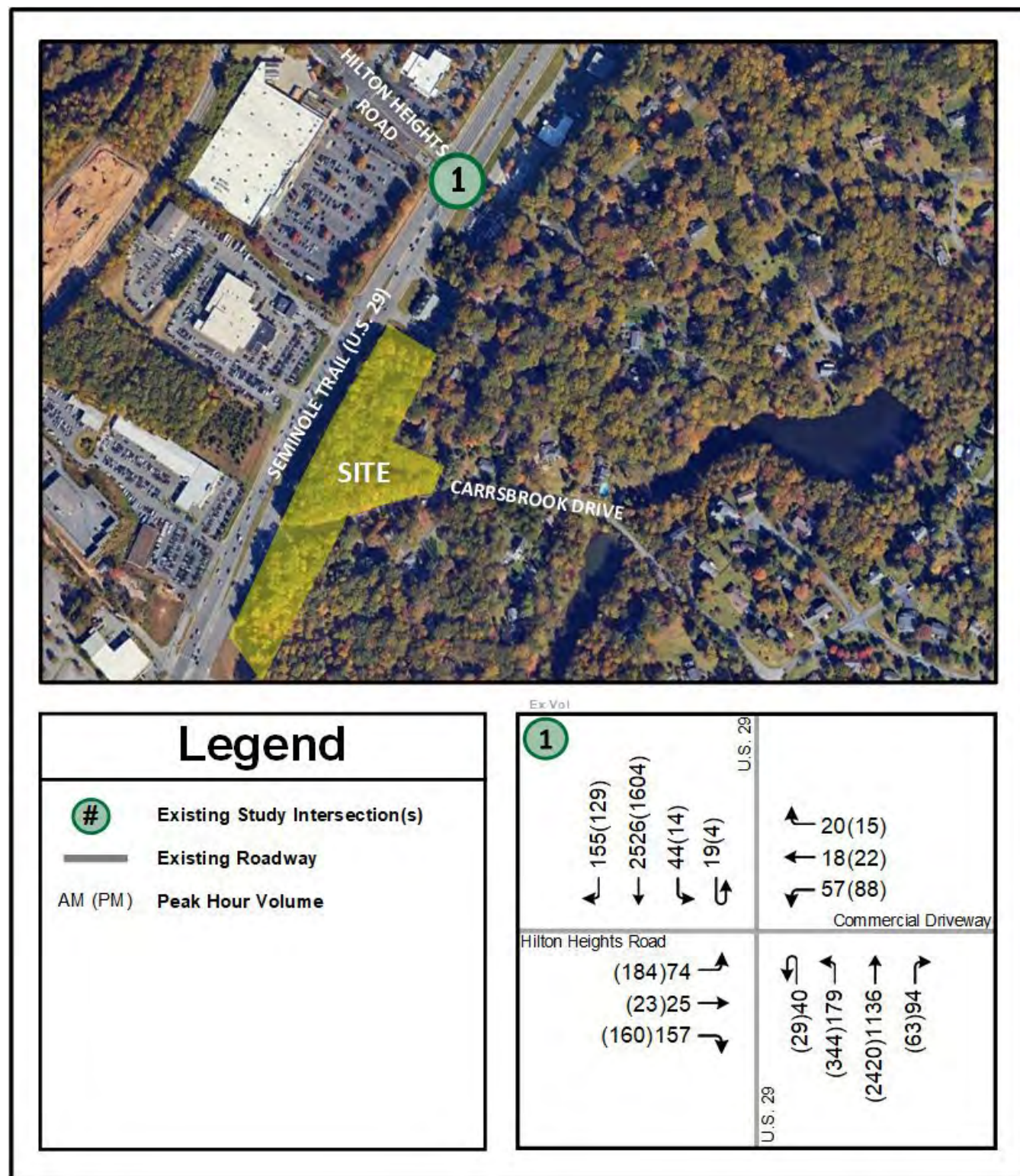


Figure 2: Existing (2025) AM and PM Peak Hour Traffic Volumes

## Background Traffic Growth

The existing 2025 traffic counts were increased by an annual growth rate of 2.0% for five years to estimate the 2030 peak hour traffic volumes. With compounding, this increases the existing traffic volumes by 10.4%.

Figure 3 shows the estimated 2030 AM and PM peak hour traffic volumes at the study intersection.

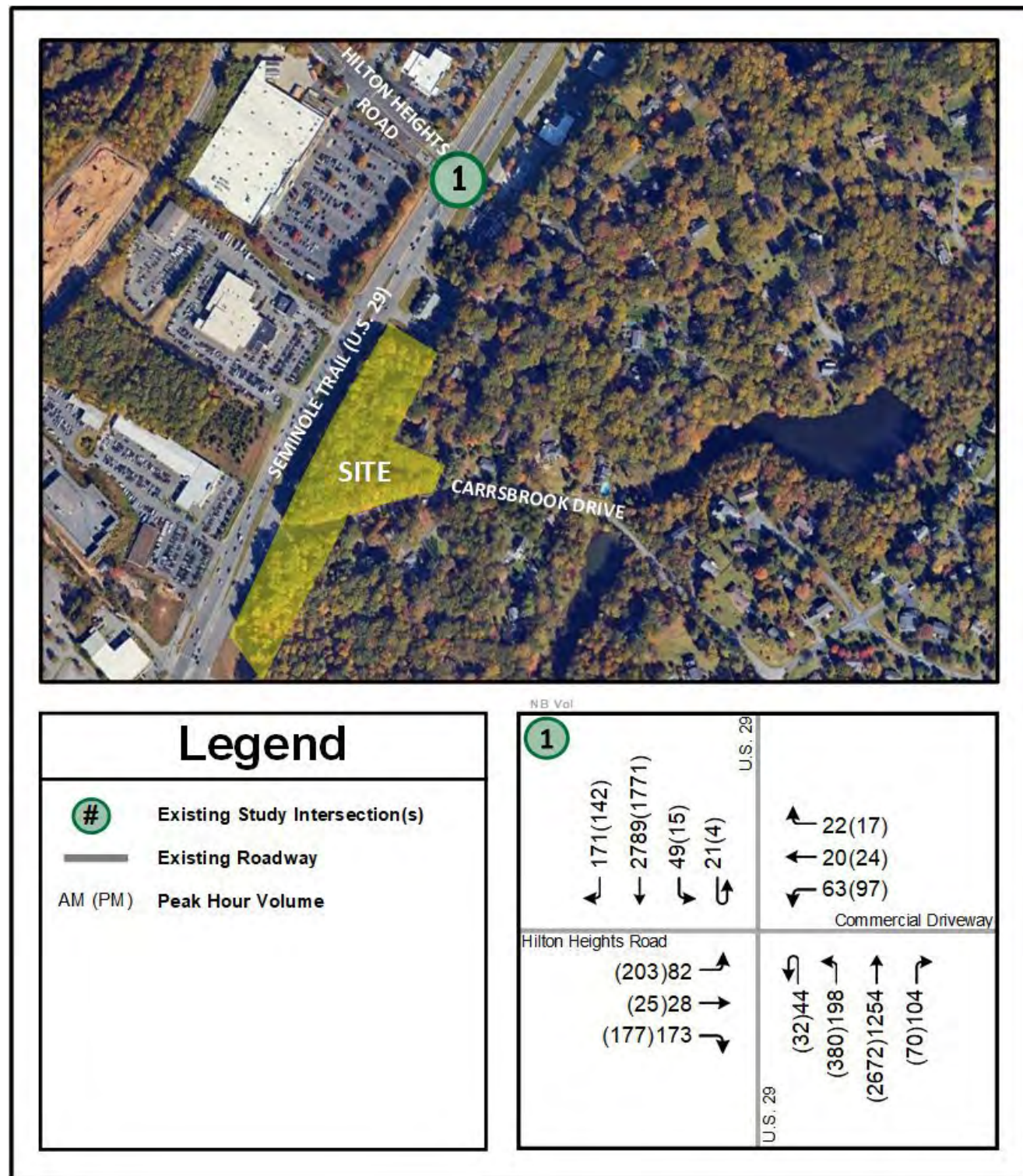


Figure 3: No-Build (2030) AM and PM Peak Hour Traffic Volumes

## Trip Generation Analysis

Table 1 shows the trip potential of the project based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11<sup>th</sup> edition.

**Table 2: ITE Trip Generation – Typical Weekday – 11<sup>th</sup> Edition**

| Land Use                       | ITE Code | Size Units | Average Weekday Daily Traffic (vpd) |      | AM Peak Hour (vph) |      | PM Peak Hour (vph) |      |
|--------------------------------|----------|------------|-------------------------------------|------|--------------------|------|--------------------|------|
|                                |          |            | Enter                               | Exit | Enter              | Exit | Enter              | Exit |
| Multifamily Housing (Mid-Rise) | 221      | 237        | 542                                 | 542  | 21                 | 72   | 57                 | 36   |

## Trip Distribution

The site trip distribution was determined based on a review of existing traffic patterns and surrounding land uses. The following trip distribution was applied to the proposed multifamily trips:

- 45% to / from the south on U.S. 29 (Seminole Trail)
- 30% to / from the north on U.S. 29 (Seminole Trail)
- 20% to / from the west on Hilton Heights Road
- 5% to / from the east on Carrsbrook Drive

Figure 4 shows the anticipated site trip distribution, and Figure 5 shows the trip assignment, which were added to no-build 2030 volumes (Figure 3) to estimate the build 2030 volumes (Figure 6).

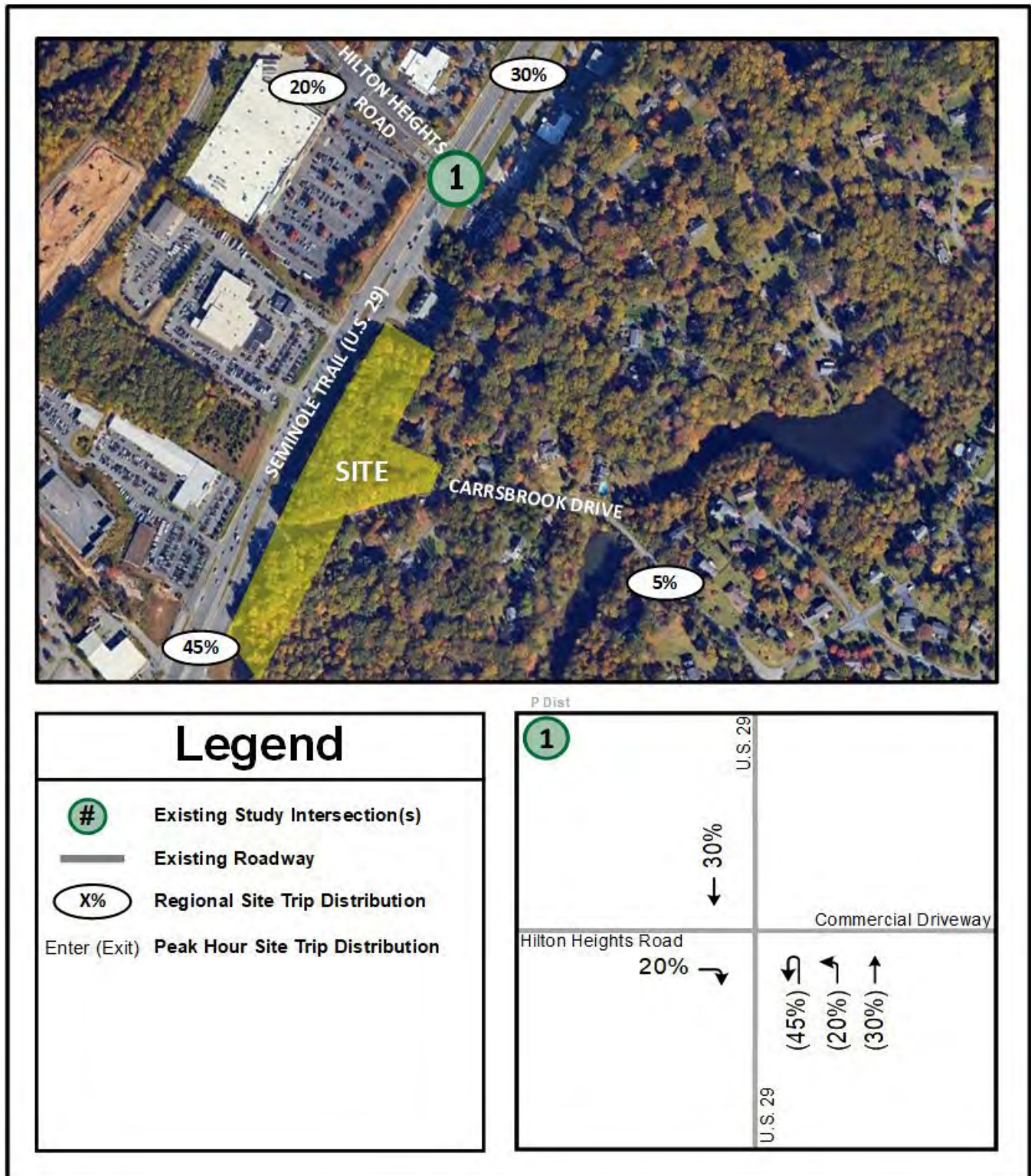


Figure 4: Site Trip Distribution



Figure 5: Site Trip Assignment

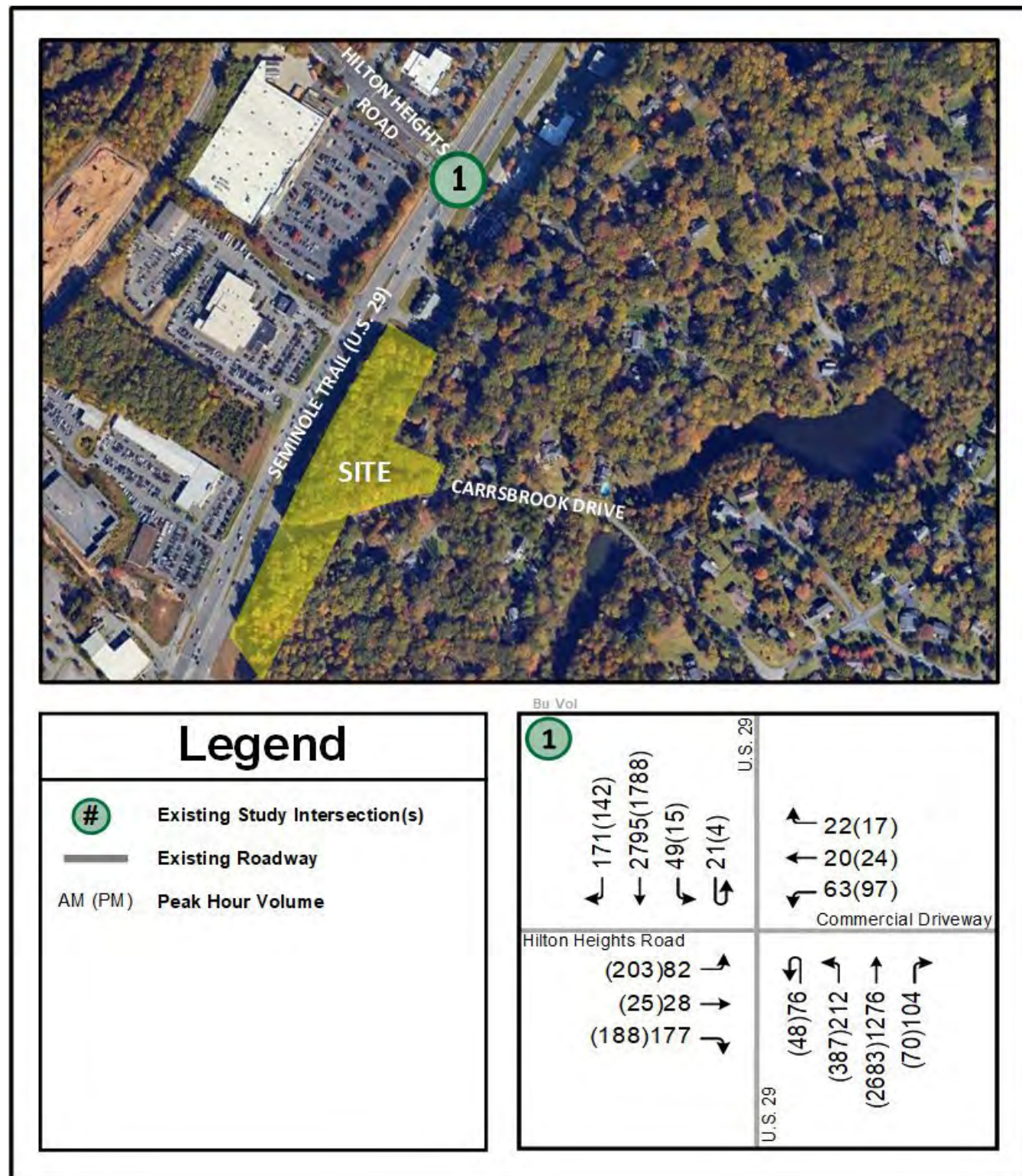


Figure 6: Build (2030) AM and PM Peak Hour Traffic Volumes

## Capacity Analysis

Capacity analysis was performed at the study intersection during the weekday AM and PM peak hours. Synchro, Version 11 was used to analyze the intersection based on the Highway Capacity Manual (HCM) methodology and includes level of service, delay, and queue length comparisons for the turning movements analyzed.

Table 3 shows the LOS, delay and queue lengths for the study intersection of U.S. 29 (Seminole Trail) at Hilton Heights Road / Seminole Lane.

**Table 3: Level of Service Summary – U.S. 29 (Seminole Trail) at Hilton Heights Road / Seminole Lane**

| Analysis Scenario                | Lane Group | Storage Length (ft.) | AM Peak Hour |                 |                    |                      |                       | PM Peak Hour |                 |                    |                      |                       |
|----------------------------------|------------|----------------------|--------------|-----------------|--------------------|----------------------|-----------------------|--------------|-----------------|--------------------|----------------------|-----------------------|
|                                  |            |                      | LOS          | Delay (sec/veh) | 95th % Queue (ft.) | Avg. Max Queue (ft.) | Overall LOS (sec/veh) | LOS          | Delay (sec/veh) | 95th % Queue (ft.) | Avg. Max Queue (ft.) | Overall LOS (sec/veh) |
|                                  |            |                      | Synchro      |                 | SimTraffic         |                      |                       | Synchro      |                 | SimTraffic         |                      |                       |
| Existing 2025 Traffic Conditions | EBL        | -                    | D            | 53.2            | 81                 | 122                  | C<br>25.4             | E            | 62.6            | 153                | 185                  | C<br>28.3             |
|                                  | EBL/T      | -                    | D            | 52.9            | 83                 | 91                   |                       | E            | 63.1            | 155                | 153                  |                       |
|                                  | EBR        | 175                  | D            | 49.9            | 40                 | 104                  |                       | D            | 53.4            | 56                 | 80                   |                       |
|                                  | WBL        | -                    | E            | 64.0            | 89                 | 113                  |                       | E            | 69.1            | #143               | 152                  |                       |
|                                  | WBT/R      | -                    | D            | 53.1            | 49                 | 80                   |                       | E            | 56.7            | 55                 | 79                   |                       |
|                                  | NBU/L      | 300/400              | D            | 53.2            | 126                | 215                  |                       | D            | 43.7            | 211                | 240                  |                       |
|                                  | NBT/R      | -/-/-                | C            | 22.5            | 226                | 301                  |                       | B            | 17.1            | 508                | 340                  |                       |
|                                  | SBU/L      | 200                  | D            | 37.5            | 82                 | 234                  |                       | E            | 70.5            | 42                 | 146                  |                       |
|                                  | SBT        | -/-/-                | C            | 21.1            | 512                | 367                  |                       | C            | 32.1            | 350                | 372                  |                       |
| SBR                              | 225        | B                    | 12.3         | 33              | 109                | C                    | 24.0                  | 39           | 100             |                    |                      |                       |
| No-Build 2030 Traffic Conditions | EBL        | -                    | D            | 53.4            | 87                 | 138                  | C<br>27.1             | E            | 64.4            | 167                | 197                  | C<br>29.8             |
|                                  | EBL/T      | -                    | D            | 52.9            | 88                 | 113                  |                       | E            | 64.2            | 168                | 162                  |                       |
|                                  | EBR        | 175                  | D            | 49.7            | 54                 | 151                  |                       | D            | 53.0            | 69                 | 81                   |                       |
|                                  | WBL        | -                    | E            | 68.4            | #97                | 122                  |                       | E            | 73.0            | #162               | 177                  |                       |
|                                  | WBT/R      | -                    | D            | 53.2            | 53                 | 93                   |                       | E            | 56.5            | 59                 | 98                   |                       |
|                                  | NBU/L      | 300/400              | D            | 53.5            | 137                | 230                  |                       | D            | 46.8            | 232                | 305                  |                       |
|                                  | NBT/R      | -/-/-                | C            | 20.4            | 228                | 316                  |                       | B            | 19.3            | 599                | 359                  |                       |
|                                  | SBU/L      | 200                  | D            | 41.5            | 96                 | 289                  |                       | E            | 71.3            | 42                 | 266                  |                       |
|                                  | SBT        | -/-/-                | C            | 24.8            | 621                | 415                  |                       | C            | 32.5            | 397                | 377                  |                       |
| SBR                              | 225        | B                    | 12.9         | 35              | 110                | C                    | 23.4                  | 40           | 96              |                    |                      |                       |
| Build 2030 Traffic Conditions    | EBL        | -                    | D            | 53.4            | 87                 | 130                  | C<br>28.0             | E            | 64.4            | 167                | 186                  | C<br>30.1             |
|                                  | EBL/T      | -                    | D            | 52.9            | 88                 | 129                  |                       | E            | 64.2            | 168                | 153                  |                       |
|                                  | EBR        | 175                  | D            | 49.8            | 59                 | 144                  |                       | D            | 53.0            | 72                 | 93                   |                       |
|                                  | WBL        | -                    | E            | 68.4            | #97                | 122                  |                       | E            | 73.0            | #162               | 188                  |                       |
|                                  | WBT/R      | -                    | D            | 53.2            | 53                 | 88                   |                       | E            | 56.5            | 59                 | 97                   |                       |
|                                  | NBU/L      | 300/400              | E            | 56.1            | 161                | 217                  |                       | D            | 47.5            | 245                | 310                  |                       |
|                                  | NBT/R      | -/-/-                | C            | 20.0            | 229                | 286                  |                       | B            | 19.4            | 603                | 359                  |                       |
|                                  | SBU/L      | 200                  | D            | 42.1            | 97                 | 289                  |                       | E            | 71.3            | 42                 | 114                  |                       |
|                                  | SBT        | -/-/-                | C            | 26.0            | 623                | 438                  |                       | C            | 32.6            | 403                | 385                  |                       |
| SBR                              | 225        | B                    | 13.3         | 36              | 106                | C                    | 23.3                  | 40           | 109             |                    |                      |                       |

Capacity analysis indicates that the intersection currently operates at LOS C during the AM and PM peak hours. Under no-build 2030 conditions, the intersection is projected to continue to operate at LOS C during the AM and PM peak hours.

Under build 2030 conditions, the intersection is projected to continue to operate at LOS C during the AM and PM peak hours, with all movements operating at LOS E or better.

The proposed site trips are expected to increase the total approach volume at this intersection by just 1.5% (Figure 5 divided by Figure 3), which is insignificant. The overall intersection delay is expected to increase by just 0.9 seconds in the AM peak hour and 0.3 seconds in PM peak hour, which is minimal. The queues in the U.S. 29 northbound U-turn / left-turn lanes are expected to increase slightly with the proposed multifamily trips, but will still be contained within the existing storage.

The traffic signals on the U.S. 29 corridor are coordinated to optimize progression in both directions throughout the day. The Synchro analysis for this project assumes this signal is operating without coordination, which is conservative. If the adjacent traffic signals on U.S. 29 were added to the Synchro model, the coordination of the northbound and southbound through movements would reduce the delays and queues reported in Table 3.

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## Conclusions

Under build 2030 conditions, the intersection of U.S. 29 (Seminole Trail) at Hilton Heights Road is projected to operate at LOS C during AM and PM peak hours.

- The proposed site trips are expected to increase the total approach volume at this intersection by just 1.5% (Figure 5 divided by Figure 3), which is insignificant
- The overall intersection delay is expected to increase by just 0.9 seconds in the AM peak hour and 0.3 seconds in PM peak hour, which is minimal
- The queues in the U.S. 29 northbound U-turn / left-turn lanes are expected to increase slightly with the proposed multifamily trips, but will still be contained within the existing storage
- The traffic signals on the U.S. 29 corridor are coordinated to optimize progression in both directions throughout the day. The Synchro analysis for this project assumes this signal is operating without coordination, which is conservative. If the adjacent traffic signals on U.S. 29 were added to the Synchro model, the coordination of the northbound and southbound through movements would reduce the delays and queues reported in Table 3.

Therefore, no improvements are warranted or recommended at this intersection at build-out of the proposed neighborhood.

## **APPENDIX**

APPENDIX A: Traffic Count Data And Signal Timings

APPENDIX B: Synchro Output – Existing (2024) Conditions

APPENDIX C: Synchro Output – No-Build (2030) Conditions

APPENDIX D: Synchro Output – Build (2030) Conditions

## **APPENDIX A: TRAFFIC COUNT DATA AND SIGNAL TIMINGS**



TRAFFIC DATA COLLECTION

File Name : Charlottesville (US 29 and Hilton)  
 Site Code :  
 Start Date : 10/8/2025  
 Page No : 1

Groups Printed- Cars + - Trucks

|             | US 29<br>Southbound |      |      |       |      |            | Seminole Lane<br>Westbound |      |      |       |      |            | US 29<br>Northbound |      |      |       |      |            | Hilton Heights Road<br>Eastbound |      |      |       |      |            |            |
|-------------|---------------------|------|------|-------|------|------------|----------------------------|------|------|-------|------|------------|---------------------|------|------|-------|------|------------|----------------------------------|------|------|-------|------|------------|------------|
| Start Time  | UTrn                | Left | Thru | Right | Peds | App. Total | UTrn                       | Left | Thru | Right | Peds | App. Total | UTrn                | Left | Thru | Right | Peds | App. Total | UTrn                             | Left | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 1                   | 8    | 427  | 18    | 0    | 454        | 0                          | 5    | 4    | 4     | 0    | 13         | 11                  | 28   | 202  | 13    | 0    | 254        | 0                                | 15   | 4    | 33    | 0    | 52         | 773        |
| 07:15 AM    | 1                   | 12   | 532  | 31    | 0    | 576        | 0                          | 8    | 6    | 6     | 0    | 20         | 8                   | 22   | 244  | 17    | 0    | 291        | 0                                | 13   | 7    | 46    | 0    | 66         | 953        |
| 07:30 AM    | 2                   | 13   | 662  | 29    | 1    | 707        | 0                          | 12   | 1    | 3     | 1    | 17         | 9                   | 32   | 240  | 11    | 0    | 292        | 0                                | 15   | 7    | 40    | 0    | 62         | 1078       |
| 07:45 AM    | 9                   | 12   | 682  | 42    | 0    | 745        | 0                          | 11   | 3    | 8     | 2    | 24         | 13                  | 37   | 291  | 31    | 0    | 372        | 0                                | 17   | 5    | 32    | 0    | 54         | 1195       |
| Total       | 13                  | 45   | 2303 | 120   | 1    | 2482       | 0                          | 36   | 14   | 21    | 3    | 74         | 41                  | 119  | 977  | 72    | 0    | 1209       | 0                                | 60   | 23   | 151   | 0    | 234        | 3999       |
| 08:00 AM    | 6                   | 10   | 599  | 45    | 0    | 660        | 0                          | 15   | 4    | 4     | 0    | 23         | 8                   | 42   | 279  | 16    | 1    | 346        | 0                                | 16   | 7    | 35    | 0    | 58         | 1087       |
| 08:15 AM    | 2                   | 9    | 630  | 44    | 0    | 685        | 0                          | 12   | 3    | 3     | 0    | 18         | 6                   | 45   | 287  | 24    | 0    | 362        | 0                                | 20   | 7    | 36    | 0    | 63         | 1128       |
| 08:30 AM    | 2                   | 13   | 615  | 24    | 0    | 654        | 0                          | 19   | 8    | 5     | 0    | 32         | 13                  | 55   | 279  | 23    | 0    | 370        | 0                                | 21   | 6    | 54    | 0    | 81         | 1137       |
| 08:45 AM    | 1                   | 11   | 536  | 31    | 0    | 579        | 0                          | 13   | 3    | 6     | 0    | 22         | 10                  | 55   | 301  | 20    | 0    | 386        | 0                                | 24   | 4    | 48    | 0    | 76         | 1063       |
| Total       | 11                  | 43   | 2380 | 144   | 0    | 2578       | 0                          | 59   | 18   | 18    | 0    | 95         | 37                  | 197  | 1146 | 83    | 1    | 1464       | 0                                | 81   | 24   | 173   | 0    | 278        | 4415       |
| Grand Total | 24                  | 88   | 4683 | 264   | 1    | 5060       | 0                          | 95   | 32   | 39    | 3    | 169        | 78                  | 316  | 2123 | 155   | 1    | 2673       | 0                                | 141  | 47   | 324   | 0    | 512        | 8414       |
| Apprch %    | 0.5                 | 1.7  | 92.5 | 5.2   | 0    |            | 0                          | 56.2 | 18.9 | 23.1  | 1.8  |            | 2.9                 | 11.8 | 79.4 | 5.8   | 0    |            | 0                                | 27.5 | 9.2  | 63.3  | 0    |            |            |
| Total %     | 0.3                 | 1    | 55.7 | 3.1   | 0    | 60.1       | 0                          | 1.1  | 0.4  | 0.5   | 0    | 2          | 0.9                 | 3.8  | 25.2 | 1.8   | 0    | 31.8       | 0                                | 1.7  | 0.6  | 3.9   | 0    | 6.1        |            |
| Cars +      | 24                  | 88   | 4530 | 261   | 1    | 4904       | 0                          | 94   | 31   | 39    | 3    | 167        | 78                  | 309  | 2003 | 154   | 1    | 2545       | 0                                | 134  | 46   | 314   | 0    | 494        | 8110       |
| % Cars +    | 100                 | 100  | 96.7 | 98.9  | 100  | 96.9       | 0                          | 98.9 | 96.9 | 100   | 100  | 98.8       | 100                 | 97.8 | 94.3 | 99.4  | 100  | 95.2       | 0                                | 95   | 97.9 | 96.9  | 0    | 96.5       | 96.4       |
| Trucks      | 0                   | 0    | 153  | 3     | 0    | 156        | 0                          | 1    | 1    | 0     | 0    | 2          | 0                   | 7    | 120  | 1     | 0    | 128        | 0                                | 7    | 1    | 10    | 0    | 18         | 304        |
| % Trucks    | 0                   | 0    | 3.3  | 1.1   | 0    | 3.1        | 0                          | 1.1  | 3.1  | 0     | 0    | 1.2        | 0                   | 2.2  | 5.7  | 0.6   | 0    | 4.8        | 0                                | 5    | 2.1  | 3.1   | 0    | 3.5        | 3.6        |



# TRAFFIC DATA COLLECTION

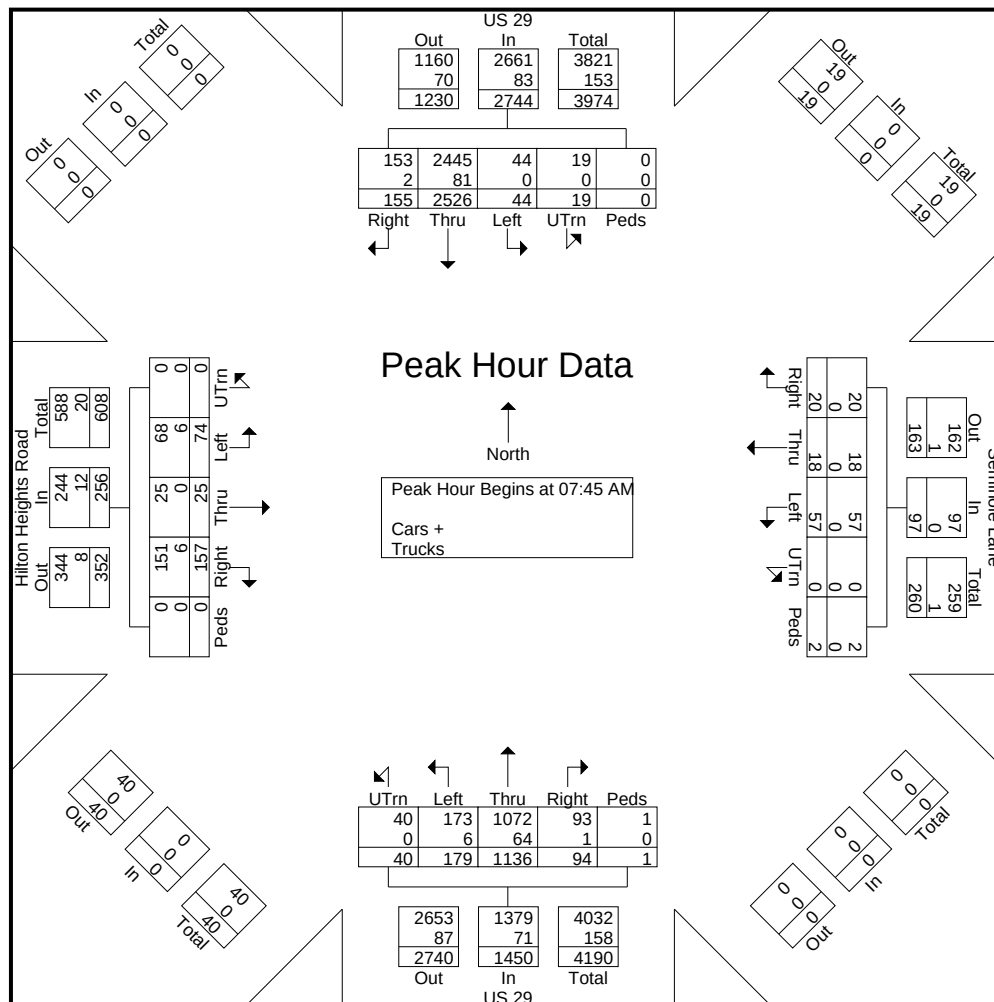
File Name : Charlottesville (US 29 and Hilton)

Site Code :

Start Date : 10/8/2025

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|                                                            | US 29<br>Southbound |      |      |       |      |            | Seminole Lane<br>Westbound |      |      |       |      |            | US 29<br>Northbound |      |      |       |      |            | Hilton Heights Road<br>Eastbound |      |      |       |      |            |            |  |
|------------------------------------------------------------|---------------------|------|------|-------|------|------------|----------------------------|------|------|-------|------|------------|---------------------|------|------|-------|------|------------|----------------------------------|------|------|-------|------|------------|------------|--|
| Start Time                                                 | UTrn                | Left | Thru | Right | Peds | App. Total | UTrn                       | Left | Thru | Right | Peds | App. Total | UTrn                | Left | Thru | Right | Peds | App. Total | UTrn                             | Left | Thru | Right | Peds | App. Total | Int. Total |  |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |                     |      |      |       |      |            |                            |      |      |       |      |            |                     |      |      |       |      |            |                                  |      |      |       |      |            |            |  |
| Peak Hour for Entire Intersection Begins at 07:45 AM       |                     |      |      |       |      |            |                            |      |      |       |      |            |                     |      |      |       |      |            |                                  |      |      |       |      |            |            |  |
| 07:45 AM                                                   | 9                   | 12   | 682  | 42    | 0    | 745        | 0                          | 11   | 3    | 8     | 2    | 24         | 13                  | 37   | 291  | 31    | 0    | 372        | 0                                | 17   | 5    | 32    | 0    | 54         | 1195       |  |
| 08:00 AM                                                   | 6                   | 10   | 599  | 45    | 0    | 660        | 0                          | 15   | 4    | 4     | 0    | 23         | 8                   | 42   | 279  | 16    | 1    | 346        | 0                                | 16   | 7    | 35    | 0    | 58         | 1087       |  |
| 08:15 AM                                                   | 2                   | 9    | 630  | 44    | 0    | 685        | 0                          | 12   | 3    | 3     | 0    | 18         | 6                   | 45   | 287  | 24    | 0    | 362        | 0                                | 20   | 7    | 36    | 0    | 63         | 1128       |  |
| 08:30 AM                                                   | 2                   | 13   | 615  | 24    | 0    | 654        | 0                          | 19   | 8    | 5     | 0    | 32         | 13                  | 55   | 279  | 23    | 0    | 370        | 0                                | 21   | 6    | 54    | 0    | 81         | 1137       |  |
| Total Volume                                               | 19                  | 44   | 2526 | 155   | 0    | 2744       | 0                          | 57   | 18   | 20    | 2    | 97         | 40                  | 179  | 1136 | 94    | 1    | 1450       | 0                                | 74   | 25   | 157   | 0    | 256        | 4547       |  |
| % App. Total                                               | 0.7                 | 1.6  | 92.1 | 5.6   | 0    |            | 0                          | 58.8 | 18.6 | 20.6  | 2.1  |            | 2.8                 | 12.3 | 78.3 | 6.5   | 0.1  |            | 0                                | 28.9 | 9.8  | 61.3  | 0    |            |            |  |
| PHF                                                        | .528                | .846 | .926 | .861  | .000 | .921       | .000                       | .750 | .563 | .625  | .250 | .758       | .769                | .814 | .976 | .758  | .250 | .974       | .000                             | .881 | .893 | .727  | .000 | .790       | .951       |  |
| Cars +                                                     | 19                  | 44   | 2445 | 153   | 0    | 2661       | 0                          | 57   | 18   | 20    | 2    | 97         | 40                  | 173  | 1072 | 93    | 1    | 1379       | 0                                | 68   | 25   | 151   | 0    | 244        | 4381       |  |
| % Cars +                                                   | 100                 | 100  | 96.8 | 98.7  | 0    | 97.0       | 0                          | 100  | 100  | 100   | 100  | 100        | 100                 | 96.6 | 94.4 | 98.9  | 100  | 95.1       | 0                                | 91.9 | 100  | 96.2  | 0    | 95.3       | 96.3       |  |
| Trucks                                                     | 0                   | 0    | 81   | 2     | 0    | 83         | 0                          | 0    | 0    | 0     | 0    | 0          | 0                   | 6    | 64   | 1     | 0    | 71         | 0                                | 6    | 0    | 6     | 0    | 12         | 166        |  |
| % Trucks                                                   | 0                   | 0    | 3.2  | 1.3   | 0    | 3.0        | 0                          | 0    | 0    | 0     | 0    | 0          | 0                   | 3.4  | 5.6  | 1.1   | 0    | 4.9        | 0                                | 8.1  | 0    | 3.8   | 0    | 4.7        | 3.7        |  |





TRAFFIC DATA COLLECTION

File Name : Charlottesville (US 29 and Hilton)  
 Site Code :  
 Start Date : 10/8/2025  
 Page No : 1

Groups Printed- Cars + - Trucks

|             | US 29<br>Southbound |      |      |       |      |            | Seminole Lane<br>Westbound |      |      |       |      |            | US 29<br>Northbound |      |      |       |      |            | Hilton Heights Road<br>Eastbound |      |      |       |      |            |            |
|-------------|---------------------|------|------|-------|------|------------|----------------------------|------|------|-------|------|------------|---------------------|------|------|-------|------|------------|----------------------------------|------|------|-------|------|------------|------------|
| Start Time  | UTrn                | Left | Thru | Right | Peds | App. Total | UTrn                       | Left | Thru | Right | Peds | App. Total | UTrn                | Left | Thru | Right | Peds | App. Total | UTrn                             | Left | Thru | Right | Peds | App. Total | Int. Total |
| 04:00 PM    | 2                   | 4    | 393  | 33    | 0    | 432        | 0                          | 14   | 11   | 3     | 0    | 28         | 13                  | 84   | 572  | 17    | 0    | 686        | 0                                | 36   | 4    | 56    | 0    | 96         | 1242       |
| 04:15 PM    | 2                   | 1    | 383  | 37    | 1    | 424        | 0                          | 16   | 2    | 2     | 0    | 20         | 3                   | 93   | 626  | 13    | 0    | 735        | 0                                | 38   | 5    | 41    | 0    | 84         | 1263       |
| 04:30 PM    | 1                   | 4    | 408  | 31    | 0    | 444        | 0                          | 13   | 6    | 5     | 1    | 25         | 8                   | 80   | 565  | 16    | 1    | 670        | 1                                | 45   | 5    | 35    | 0    | 86         | 1225       |
| 04:45 PM    | 0                   | 4    | 413  | 32    | 0    | 449        | 0                          | 31   | 2    | 6     | 0    | 39         | 10                  | 80   | 604  | 14    | 0    | 708        | 1                                | 51   | 9    | 37    | 0    | 98         | 1294       |
| Total       | 5                   | 13   | 1597 | 133   | 1    | 1749       | 0                          | 74   | 21   | 16    | 1    | 112        | 34                  | 337  | 2367 | 60    | 1    | 2799       | 2                                | 170  | 23   | 169   | 0    | 364        | 5024       |
| 05:00 PM    | 1                   | 5    | 400  | 29    | 0    | 435        | 0                          | 28   | 12   | 2     | 0    | 42         | 8                   | 91   | 625  | 20    | 0    | 744        | 0                                | 48   | 4    | 47    | 0    | 99         | 1320       |
| 05:15 PM    | 2                   | 2    | 365  | 30    | 0    | 399        | 0                          | 14   | 3    | 3     | 0    | 20         | 10                  | 72   | 626  | 11    | 0    | 719        | 0                                | 38   | 5    | 43    | 1    | 87         | 1225       |
| 05:30 PM    | 0                   | 1    | 372  | 31    | 0    | 404        | 0                          | 11   | 6    | 0     | 1    | 18         | 4                   | 76   | 526  | 15    | 0    | 621        | 0                                | 44   | 1    | 35    | 0    | 80         | 1123       |
| 05:45 PM    | 0                   | 1    | 411  | 34    | 0    | 446        | 0                          | 7    | 4    | 4     | 0    | 15         | 11                  | 84   | 540  | 16    | 1    | 652        | 0                                | 47   | 3    | 36    | 1    | 87         | 1200       |
| Total       | 3                   | 9    | 1548 | 124   | 0    | 1684       | 0                          | 60   | 25   | 9     | 1    | 95         | 33                  | 323  | 2317 | 62    | 1    | 2736       | 0                                | 177  | 13   | 161   | 2    | 353        | 4868       |
| Grand Total | 8                   | 22   | 3145 | 257   | 1    | 3433       | 0                          | 134  | 46   | 25    | 2    | 207        | 67                  | 660  | 4684 | 122   | 2    | 5535       | 2                                | 347  | 36   | 330   | 2    | 717        | 9892       |
| Apprch %    | 0.2                 | 0.6  | 91.6 | 7.5   | 0    |            | 0                          | 64.7 | 22.2 | 12.1  | 1    |            | 1.2                 | 11.9 | 84.6 | 2.2   | 0    |            | 0.3                              | 48.4 | 5    | 46    | 0.3  |            |            |
| Total %     | 0.1                 | 0.2  | 31.8 | 2.6   | 0    | 34.7       | 0                          | 1.4  | 0.5  | 0.3   | 0    | 2.1        | 0.7                 | 6.7  | 47.4 | 1.2   | 0    | 56         | 0                                | 3.5  | 0.4  | 3.3   | 0    | 7.2        |            |
| Cars +      | 7                   | 22   | 3087 | 253   | 1    | 3370       | 0                          | 133  | 45   | 25    | 1    | 204        | 67                  | 656  | 4603 | 122   | 1    | 5449       | 2                                | 344  | 35   | 329   | 1    | 711        | 9734       |
| % Cars +    | 87.5                | 100  | 98.2 | 98.4  | 100  | 98.2       | 0                          | 99.3 | 97.8 | 100   | 50   | 98.6       | 100                 | 99.4 | 98.3 | 100   | 50   | 98.4       | 100                              | 99.1 | 97.2 | 99.7  | 50   | 99.2       | 98.4       |
| Trucks      | 1                   | 0    | 58   | 4     | 0    | 63         | 0                          | 1    | 1    | 0     | 1    | 3          | 0                   | 4    | 81   | 0     | 1    | 86         | 0                                | 3    | 1    | 1     | 1    | 6          | 158        |
| % Trucks    | 12.5                | 0    | 1.8  | 1.6   | 0    | 1.8        | 0                          | 0.7  | 2.2  | 0     | 50   | 1.4        | 0                   | 0.6  | 1.7  | 0     | 50   | 1.6        | 0                                | 0.9  | 2.8  | 0.3   | 50   | 0.8        | 1.6        |



# TRAFFIC DATA COLLECTION

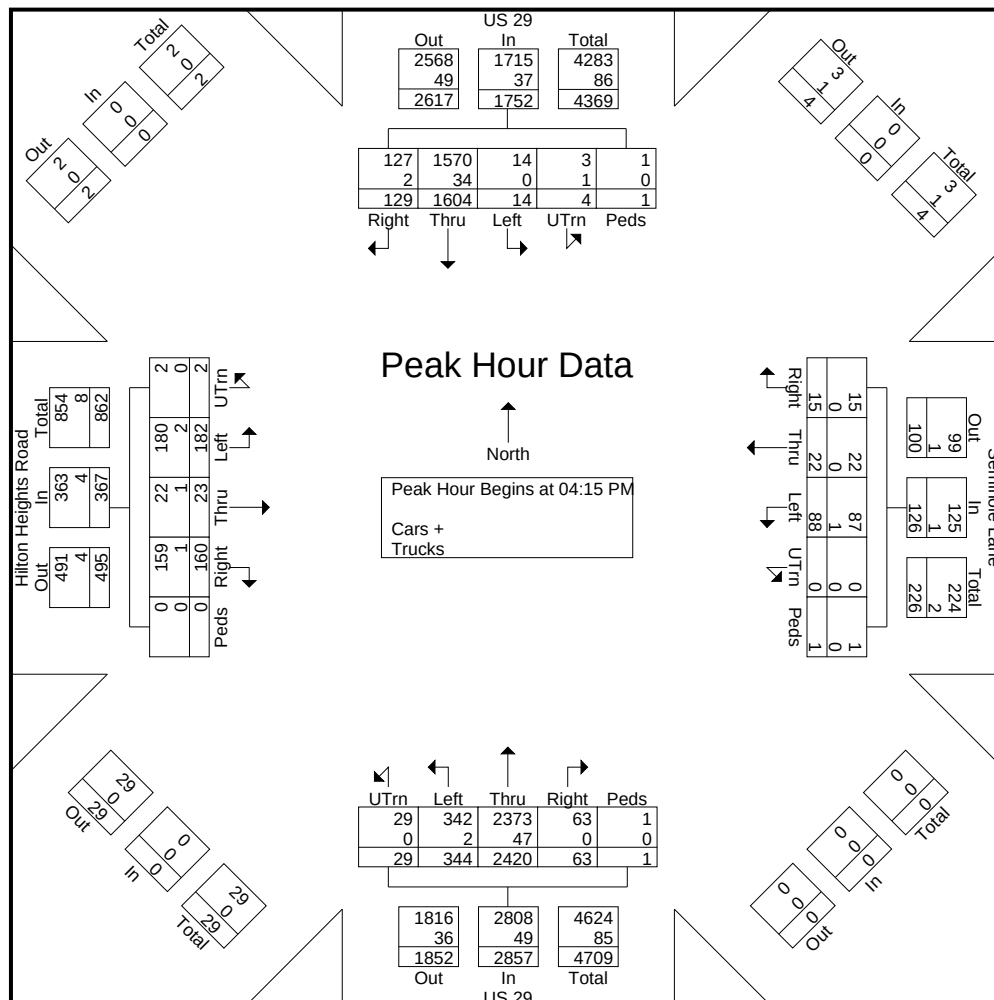
File Name : Charlottesville (US 29 and Hilton)

Site Code :

Start Date : 10/8/2025

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|                                                            | US 29<br>Southbound |      |      |       |      |            | Seminole Lane<br>Westbound |      |      |       |      |            | US 29<br>Northbound |      |      |       |      |            | Hilton Heights Road<br>Eastbound |      |      |       |      |            |            |  |
|------------------------------------------------------------|---------------------|------|------|-------|------|------------|----------------------------|------|------|-------|------|------------|---------------------|------|------|-------|------|------------|----------------------------------|------|------|-------|------|------------|------------|--|
| Start Time                                                 | UTrn                | Left | Thru | Right | Peds | App. Total | UTrn                       | Left | Thru | Right | Peds | App. Total | UTrn                | Left | Thru | Right | Peds | App. Total | UTrn                             | Left | Thru | Right | Peds | App. Total | Int. Total |  |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                     |      |      |       |      |            |                            |      |      |       |      |            |                     |      |      |       |      |            |                                  |      |      |       |      |            |            |  |
| Peak Hour for Entire Intersection Begins at 04:15 PM       |                     |      |      |       |      |            |                            |      |      |       |      |            |                     |      |      |       |      |            |                                  |      |      |       |      |            |            |  |
| 04:15 PM                                                   | 2                   | 1    | 383  | 37    | 1    | 424        | 0                          | 16   | 2    | 2     | 0    | 20         | 3                   | 93   | 626  | 13    | 0    | 735        | 0                                | 38   | 5    | 41    | 0    | 84         | 1263       |  |
| 04:30 PM                                                   | 1                   | 4    | 408  | 31    | 0    | 444        | 0                          | 13   | 6    | 5     | 1    | 25         | 8                   | 80   | 565  | 16    | 1    | 670        | 1                                | 45   | 5    | 35    | 0    | 86         | 1225       |  |
| 04:45 PM                                                   | 0                   | 4    | 413  | 32    | 0    | 449        | 0                          | 31   | 2    | 6     | 0    | 39         | 10                  | 80   | 604  | 14    | 0    | 708        | 1                                | 51   | 9    | 37    | 0    | 98         | 1294       |  |
| 05:00 PM                                                   | 1                   | 5    | 400  | 29    | 0    | 435        | 0                          | 28   | 12   | 2     | 0    | 42         | 8                   | 91   | 625  | 20    | 0    | 744        | 0                                | 48   | 4    | 47    | 0    | 99         | 1320       |  |
| Total Volume                                               | 4                   | 14   | 1604 | 129   | 1    | 1752       | 0                          | 88   | 22   | 15    | 1    | 126        | 29                  | 344  | 2420 | 63    | 1    | 2857       | 2                                | 182  | 23   | 160   | 0    | 367        | 5102       |  |
| % App. Total                                               | 0.2                 | 0.8  | 91.6 | 7.4   | 0.1  |            | 0                          | 69.8 | 17.5 | 11.9  | 0.8  |            | 1                   | 12   | 84.7 | 2.2   | 0    |            | 0.5                              | 49.6 | 6.3  | 43.6  | 0    |            |            |  |
| PHF                                                        | .500                | .700 | .971 | .872  | .250 | .976       | .000                       | .710 | .458 | .625  | .250 | .750       | .725                | .925 | .966 | .788  | .250 | .960       | .500                             | .892 | .639 | .851  | .000 | .927       | .966       |  |
| Cars +                                                     | 3                   | 14   | 1570 | 127   | 1    | 1715       | 0                          | 87   | 22   | 15    | 1    | 125        | 29                  | 342  | 2373 | 63    | 1    | 2808       | 2                                | 180  | 22   | 159   | 0    | 363        | 5011       |  |
| % Cars +                                                   | 75.0                | 100  | 97.9 | 98.4  | 100  | 97.9       | 0                          | 98.9 | 100  | 100   | 100  | 99.2       | 100                 | 99.4 | 98.1 | 100   | 100  | 98.3       | 100                              | 98.9 | 95.7 | 99.4  | 0    | 98.9       | 98.2       |  |
| Trucks                                                     | 1                   | 0    | 34   | 2     | 0    | 37         | 0                          | 1    | 0    | 0     | 0    | 1          | 0                   | 2    | 47   | 0     | 0    | 49         | 0                                | 2    | 1    | 1     | 0    | 4          | 91         |  |
| % Trucks                                                   | 25.0                | 0    | 2.1  | 1.6   | 0    | 2.1        | 0                          | 1.1  | 0    | 0     | 0    | 0.8        | 0                   | 0.6  | 1.9  | 0     | 0    | 1.7        | 0                                | 1.1  | 4.3  | 0.6   | 0    | 1.1        | 1.8        |  |



## US29SeminoleTrl&amp;1438HiltonHeights&amp;Sem.Ln

## Phase Timing

10/30/2025 7:34:17 AM

[illegible]



## US29SeminoleTrl&amp;1438HiltonHeights&amp;Sem.Ln

## Coordination Pattern 1

10/30/2025 7:34:17 AM

[illegible]



10/30/2025 7:34:17 AM

[illegible]

10/30/2025 7:34:17 AM

[illegible]

10/30/2025 7:34:17 AM

10/30/2025 7:34:17 AM

[illegible]

10/30/2025 7:34:17 AM

## TOD Pattern Events

10/30/2025 7:34:17 AM

|          | Time  | DOW           | Holidays | Mode  | Pattern | Offset |
|----------|-------|---------------|----------|-------|---------|--------|
| Event 1  | 00:00 | S M T W T F S |          | Free  | 0       | 0      |
| Event 2  | 06:00 | S M T W T F S |          | Sched | 1       | 0      |
| Event 3  | 10:00 | S M T W T F S |          | Sched | 11      | 0      |
| Event 4  | 14:00 | S M T W T F S |          | Sched | 21      | 0      |
| Event 5  | 19:00 | S M T W T F S |          | Sched | 12      | 0      |
| Event 6  | 23:00 | S M T W T F S |          | Free  | 0       | 0      |
| Event 7  | 00:00 |               |          | Sched | 0       | 0      |
| Event 8  | 00:00 |               |          | Sched | 0       | 0      |
| Event 9  | 00:00 |               |          | Sched | 0       | 0      |
| Event 10 | 00:00 |               |          | Sched | 0       | 0      |
| Event 11 | 00:00 |               |          | Sched | 0       | 0      |
| Event 12 | 00:00 |               |          | Sched | 0       | 0      |
| Event 13 | 00:00 |               |          | Sched | 0       | 0      |
| Event 14 | 00:00 |               |          | Sched | 0       | 0      |
| Event 15 | 00:00 |               |          | Sched | 0       | 0      |
| Event 16 | 00:00 |               |          | Sched | 0       | 0      |
| Event 17 | 00:00 |               |          | Sched | 0       | 0      |
| Event 18 | 00:00 |               |          | Sched | 0       | 0      |
| Event 19 | 00:00 |               |          | Sched | 0       | 0      |
| Event 20 | 00:00 |               |          | Sched | 0       | 0      |
| Event 21 | 00:00 |               |          | Sched | 0       | 0      |
| Event 22 | 00:00 |               |          | Sched | 0       | 0      |
| Event 23 | 00:00 |               |          | Sched | 0       | 0      |
| Event 24 | 00:00 |               |          | Sched | 0       | 0      |
| Event 25 | 00:00 |               |          | Sched | 0       | 0      |
| Event 26 | 00:00 |               |          | Sched | 0       | 0      |
| Event 27 | 00:00 |               |          | Sched | 0       | 0      |
| Event 28 | 00:00 |               |          | Sched | 0       | 0      |
| Event 29 | 00:00 |               |          | Sched | 0       | 0      |
| Event 30 | 00:00 |               |          | Sched | 0       | 0      |
| Event 31 | 00:00 |               |          | Sched | 0       | 0      |
| Event 32 | 00:00 |               |          | Sched | 0       | 0      |

all cabinet foundation shall be in accordance with S'd.CF-1.  
 arm poles shall be in accordance with S'd.MP-1.  
 signs on most arms shall be mounted in accordance with S'd.SM-3.  
 signal service shall be in accordance with SE-3.  
 x 6' loop detectors shall be in accordance with S'd.TD-1B.  
 and at 285' behind the stop bar or as shown, modified to allow  
 or drilling only, and operated in the lock mode.  
 denotes shielded.  
 denotes metal.  
 junction boxes shall be in accordance with S'd.IB-1A,IB, or IC unless otherwise noted.  
 and controller placements shall be verified by the Engineer.  
 Bonding Wire (SBW) shown on the plans is required only if the conduit is non-metallic.  
 x 40' and 8'x30' loop detectors shall be in accordance with S'd.TD-1C.  
 to allow corner drilling only, placed 5' in front of the stop bar.  
 operated in the non-lock mode.  
 signs mounted on most arms shall be in accordance with S'd.SMD-2, except the  
 and placement of clamps for the street name signs shall be in accordance  
 the manufacturer's recommendations to provide a mounting conforming to  
 TO Standard Specifications for Structural Supports for Traffic Signs.  
 sheets 13(31-315) for system detectors and Interconnect cable routing.

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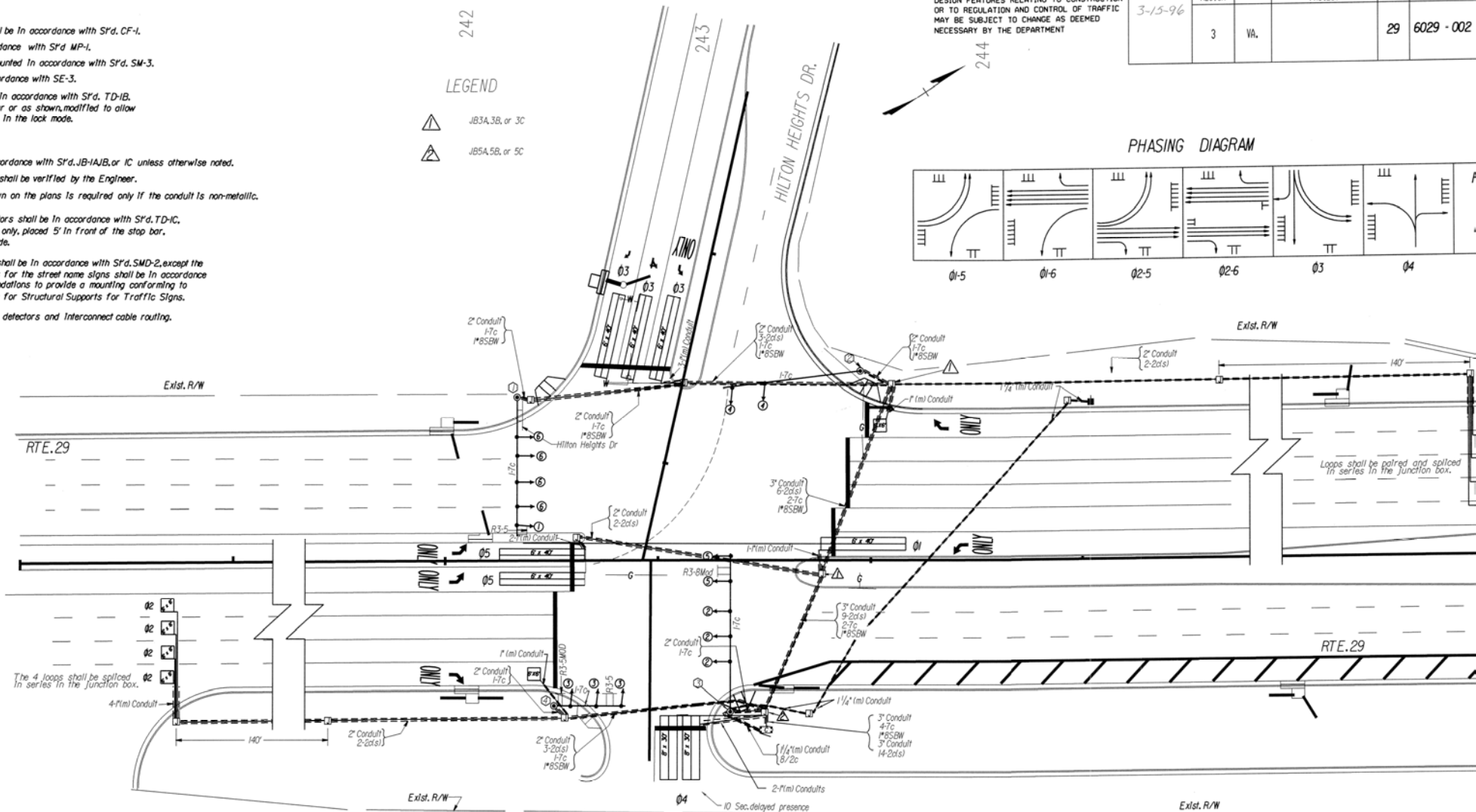
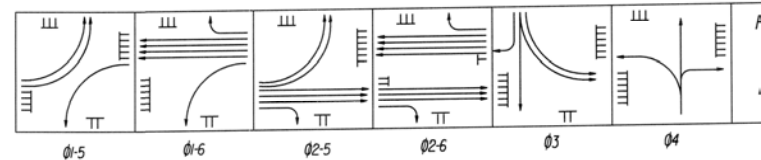
# LEGEND

- JB3A,3B, or 3C
- JB5A,5B, or 5C

DESIGN FEATURES RELATING TO CONSTRUCTION  
 OR TO REGULATION AND CONTROL OF TRAFFIC  
 MAY BE SUBJECT TO CHANGE AS DEEMED  
 NECESSARY BY THE DEPARTMENT

| REVISED | FHWA REGION | STATE | FEDERAL AID PROJECT | ROUTE | STATE PR   |
|---------|-------------|-------|---------------------|-------|------------|
| 3-15-96 | 3           | VA    |                     | 29    | 6029 - 002 |

## PHASING DIAGRAM



## Signal Pole Legend

7' Lt. of Rte.29 Constr. @ Sta.242+34  
 14' Arm, 90° Angle to Rte.29 Constr. @  
 Signal Placement: 13,26,39,50,59  
 19' Lt. of Rte.29 Constr. @ Sta.243+96  
 14' Arm, 174° Angle to Rte.29 Constr. @  
 Signal Placement: 45,60  
 17' Rt. of Rte.29 Constr. @ Sta.243+34  
 2' Arm, 270° Angle to Rte.29 Constr. @  
 Signal Placement: 23,35,47,61,72  
 18' Rt. of Rte.29 Constr. @ Sta.242+51  
 12' Arm, 0° Angle to Rte.29 Constr. @  
 Signal Placement: 6,18,30

## COLOR SEQUENCE CHART

| SIGNAL | Phases |    |    |    |    |    | Combination Phases |      |      |      | F L A S H |
|--------|--------|----|----|----|----|----|--------------------|------|------|------|-----------|
|        | 01     | 02 | 03 | 04 | 05 | 06 | 01-5               | 01-6 | 02-5 | 02-6 |           |
| 1      | →      |    |    |    |    |    | →                  | →    |      |      |           |
| 2      |        | G  |    |    |    |    |                    |      | G    | G    | A         |
| 2A     | →      |    |    |    |    |    |                    |      |      |      | →         |
| 3      |        |    | G  |    |    |    |                    |      |      |      |           |
| 4      |        |    |    | G  |    |    |                    |      |      |      |           |
| 5      |        |    |    |    | →  |    | →                  | →    |      |      |           |
| 6      |        |    |    |    |    | G  |                    | G    |      | G    | A         |
| 6A     |        |    |    |    |    | →  | →                  | →    |      |      | →         |

Empty boxes denote RED Indications.

## CLEARANCE CHART

| R/W | CLEARANCE | NE | SE |
|-----|-----------|----|----|
| #1  | #2        | #1 | #2 |
| →   | →         | →  | →  |
| →   | A         | R  | R  |
| G   | G         | G  | G  |
| G   | A         | R  | R  |
| →   | →         | →  | →  |
| →   | A         | →  | →  |

## PROPOSED SIGNS & SIGNAL HEADS

Hilton Heights Dr  
 168" x 24"



R3-8 MOD  
 30" x 30"



R3-5



R3-5 MOD



1.5



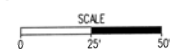
2A,6A



2,3,4,6,8

All signs to be mounted on mast arms shall be furnished by VDOT and installed by the Contractor.

TRAFFIC SIGNAL PLAN  
 INT. of RTE.29 and HILTON  
 HEIGHTS DR. (WALMART ENT.)  
 CITY OF CHARLOTTESVILLE



## **APPENDIX B: SYNCHRO OUTPUT – EXISTING (2024) CONDITIONS**

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## Queues

Existing 2025 Conditions AM

|                         |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Group Flow (vph)   | 51                                                                                | 53                                                                                | 165                                                                               | 60                                                                                | 40                                                                                | 230                                                                               | 1295                                                                                | 66                                                                                  | 2659                                                                                | 163                                                                                 |
| v/c Ratio               | 0.42                                                                              | 0.41                                                                              | 0.55                                                                              | 0.51                                                                              | 0.30                                                                              | 0.64                                                                              | 0.45                                                                                | 0.17                                                                                | 0.74                                                                                | 0.17                                                                                |
| Control Delay           | 60.9                                                                              | 59.8                                                                              | 10.7                                                                              | 67.5                                                                              | 35.9                                                                              | 57.9                                                                              | 24.1                                                                                | 36.1                                                                                | 21.7                                                                                | 2.7                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 60.9                                                                              | 59.8                                                                              | 10.7                                                                              | 67.5                                                                              | 35.9                                                                              | 57.9                                                                              | 24.1                                                                                | 36.1                                                                                | 21.7                                                                                | 2.7                                                                                 |
| Queue Length 50th (ft)  | 38                                                                                | 40                                                                                | 0                                                                                 | 44                                                                                | 14                                                                                | 84                                                                                | 219                                                                                 | 36                                                                                  | 444                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 81                                                                                | 83                                                                                | 40                                                                                | 89                                                                                | 49                                                                                | 126                                                                               | 226                                                                                 | 82                                                                                  | 512                                                                                 | 33                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 394                                                                               |                                                                                   |                                                                                   | 245                                                                               |                                                                                   | 1513                                                                                |                                                                                     | 1827                                                                                |                                                                                     |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 225                                                                               |                                                                                   |                                                                                   | 425                                                                               |                                                                                     | 290                                                                                 |                                                                                     | 310                                                                                 |
| Base Capacity (vph)     | 151                                                                               | 161                                                                               | 328                                                                               | 125                                                                               | 141                                                                               | 389                                                                               | 3772                                                                                | 403                                                                                 | 3588                                                                                | 975                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.34                                                                              | 0.33                                                                              | 0.50                                                                              | 0.48                                                                              | 0.28                                                                              | 0.59                                                                              | 0.34                                                                                | 0.16                                                                                | 0.74                                                                                | 0.17                                                                                |
| Intersection Summary    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

Existing 2025 Conditions AM

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBU                                                                                | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBU                                                                                 | SBL                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |                                                                                    |  |  |  |                                                                                     |  |
| Traffic Volume (vph)              | 74                                                                                | 25                                                                                | 157                                                                               | 57                                                                                | 18                                                                                | 20                                                                                | 40                                                                                 | 179                                                                                 | 1136                                                                                | 94                                                                                  | 19                                                                                  | 44                                                                                  |
| Future Volume (vph)               | 74                                                                                | 25                                                                                | 157                                                                               | 57                                                                                | 18                                                                                | 20                                                                                | 40                                                                                 | 179                                                                                 | 1136                                                                                | 94                                                                                  | 19                                                                                  | 44                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 | 0.95                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.97                                                                                | 0.86                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.92                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 0.99                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Flt Protected                     | 0.95                                                                              | 0.98                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (prot)                 | 1588                                                                              | 1691                                                                              | 1553                                                                              | 1805                                                                              | 1750                                                                              |                                                                                   |                                                                                    | 3418                                                                                | 6117                                                                                |                                                                                     |                                                                                     | 1805                                                                                |
| Flt Permitted                     | 0.95                                                                              | 0.98                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (perm)                 | 1588                                                                              | 1691                                                                              | 1553                                                                              | 1805                                                                              | 1750                                                                              |                                                                                   |                                                                                    | 3418                                                                                | 6117                                                                                |                                                                                     |                                                                                     | 1805                                                                                |
| Peak-hour factor, PHF             | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                               | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Adj. Flow (vph)                   | 78                                                                                | 26                                                                                | 165                                                                               | 60                                                                                | 19                                                                                | 21                                                                                | 42                                                                                 | 188                                                                                 | 1196                                                                                | 99                                                                                  | 20                                                                                  | 46                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 153                                                                               | 0                                                                                 | 20                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 14                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 51                                                                                | 53                                                                                | 12                                                                                | 60                                                                                | 20                                                                                | 0                                                                                 | 0                                                                                  | 230                                                                                 | 1281                                                                                | 0                                                                                   | 0                                                                                   | 66                                                                                  |
| Heavy Vehicles (%)                | 8%                                                                                | 0%                                                                                | 4%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                 | 3%                                                                                  | 6%                                                                                  | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Split                                                                             | NA                                                                                | Perm                                                                              | Split                                                                             | NA                                                                                |                                                                                   | Prot                                                                               | Prot                                                                                | NA                                                                                  |                                                                                     | Prot                                                                                | Prot                                                                                |
| Protected Phases                  | 3                                                                                 | 3                                                                                 |                                                                                   | 4                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                  | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 1                                                                                   |
| Permitted Phases                  |                                                                                   |                                                                                   | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 8.7                                                                               | 8.7                                                                               | 8.7                                                                               | 6.3                                                                               | 6.3                                                                               |                                                                                   |                                                                                    | 12.1                                                                                | 51.9                                                                                |                                                                                     |                                                                                     | 24.1                                                                                |
| Effective Green, g (s)            | 8.7                                                                               | 8.7                                                                               | 8.7                                                                               | 6.3                                                                               | 6.3                                                                               |                                                                                   |                                                                                    | 12.1                                                                                | 51.9                                                                                |                                                                                     |                                                                                     | 24.1                                                                                |
| Actuated g/C Ratio                | 0.08                                                                              | 0.08                                                                              | 0.08                                                                              | 0.05                                                                              | 0.05                                                                              |                                                                                   |                                                                                    | 0.11                                                                                | 0.45                                                                                |                                                                                     |                                                                                     | 0.21                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   |                                                                                    | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                | 120                                                                               | 127                                                                               | 117                                                                               | 98                                                                                | 95                                                                                |                                                                                   |                                                                                    | 359                                                                                 | 2760                                                                                |                                                                                     |                                                                                     | 378                                                                                 |
| v/s Ratio Prot                    | c0.03                                                                             | 0.03                                                                              |                                                                                   | c0.03                                                                             | 0.01                                                                              |                                                                                   |                                                                                    | c0.07                                                                               | 0.21                                                                                |                                                                                     |                                                                                     | 0.04                                                                                |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.42                                                                              | 0.42                                                                              | 0.11                                                                              | 0.61                                                                              | 0.21                                                                              |                                                                                   |                                                                                    | 0.64                                                                                | 0.46                                                                                |                                                                                     |                                                                                     | 0.17                                                                                |
| Uniform Delay, d1                 | 50.8                                                                              | 50.7                                                                              | 49.5                                                                              | 53.2                                                                              | 52.0                                                                              |                                                                                   |                                                                                    | 49.4                                                                                | 21.9                                                                                |                                                                                     |                                                                                     | 37.3                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             | 2.4                                                                               | 2.2                                                                               | 0.4                                                                               | 10.8                                                                              | 1.1                                                                               |                                                                                   |                                                                                    | 3.9                                                                                 | 0.6                                                                                 |                                                                                     |                                                                                     | 0.2                                                                                 |
| Delay (s)                         | 53.2                                                                              | 52.9                                                                              | 49.9                                                                              | 64.0                                                                              | 53.1                                                                              |                                                                                   |                                                                                    | 53.2                                                                                | 22.5                                                                                |                                                                                     |                                                                                     | 37.5                                                                                |
| Level of Service                  | D                                                                                 | D                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 |                                                                                   |                                                                                    | D                                                                                   | C                                                                                   |                                                                                     |                                                                                     | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 51.1                                                                              |                                                                                   |                                                                                   | 59.6                                                                              |                                                                                   |                                                                                    |                                                                                     | 27.1                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 25.4                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.70                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 115.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 76.7%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

1: US 29 & Hilton Heights Road/Commercial Driveway  
 HCM Signalized Intersection Capacity Analysis

Existing 2025 Conditions AM

|                        | ↓     | ↙    |
|------------------------|-------|------|
| Movement               | SBT   | SBR  |
| Lane Configurations    | ↑↑↑↑  | ↗    |
| Traffic Volume (vph)   | 2526  | 155  |
| Future Volume (vph)    | 2526  | 155  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0  |
| Lane Util. Factor      | 0.86  | 1.00 |
| Frt                    | 1.00  | 0.85 |
| Flt Protected          | 1.00  | 1.00 |
| Satd. Flow (prot)      | 6346  | 1599 |
| Flt Permitted          | 1.00  | 1.00 |
| Satd. Flow (perm)      | 6346  | 1599 |
| Peak-hour factor, PHF  | 0.95  | 0.95 |
| Adj. Flow (vph)        | 2659  | 163  |
| RTOR Reduction (vph)   | 0     | 72   |
| Lane Group Flow (vph)  | 2659  | 91   |
| Heavy Vehicles (%)     | 3%    | 1%   |
| Turn Type              | NA    | Perm |
| Protected Phases       | 6     |      |
| Permitted Phases       |       | 6    |
| Actuated Green, G (s)  | 63.9  | 63.9 |
| Effective Green, g (s) | 63.9  | 63.9 |
| Actuated g/C Ratio     | 0.56  | 0.56 |
| Clearance Time (s)     | 6.0   | 6.0  |
| Vehicle Extension (s)  | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 3526  | 888  |
| v/s Ratio Prot         | c0.42 |      |
| v/s Ratio Perm         |       | 0.06 |
| v/c Ratio              | 0.75  | 0.10 |
| Uniform Delay, d1      | 19.5  | 12.0 |
| Progression Factor     | 1.00  | 1.00 |
| Incremental Delay, d2  | 1.5   | 0.2  |
| Delay (s)              | 21.1  | 12.3 |
| Level of Service       | C     | B    |
| Approach Delay (s)     | 21.0  |      |
| Approach LOS           | C     |      |
| Intersection Summary   |       |      |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | EB  | EB  | EB  | WB  | WB  | NB  | NB  | NB   | NB   | NB   | NB   | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Directions Served     | L   | LT  | R   | L   | TR  | UL  | L   | T    | T    | T    | TR   | UL  |
| Maximum Queue (ft)    | 122 | 91  | 104 | 113 | 80  | 138 | 215 | 301  | 279  | 225  | 166  | 234 |
| Average Queue (ft)    | 50  | 18  | 38  | 52  | 29  | 63  | 100 | 153  | 142  | 96   | 40   | 45  |
| 95th Queue (ft)       | 103 | 58  | 82  | 97  | 63  | 125 | 169 | 266  | 253  | 204  | 118  | 137 |
| Link Distance (ft)    | 368 | 368 |     | 246 | 246 |     |     | 1553 | 1553 | 1553 | 1553 |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 225 |     |     | 425 | 425 |      |      |      |      | 290 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | SB   | SB   | SB   | SB   | SB  |
|-----------------------|------|------|------|------|-----|
| Directions Served     | T    | T    | T    | T    | R   |
| Maximum Queue (ft)    | 367  | 356  | 327  | 280  | 109 |
| Average Queue (ft)    | 257  | 252  | 214  | 150  | 35  |
| 95th Queue (ft)       | 341  | 341  | 308  | 253  | 80  |
| Link Distance (ft)    | 1830 | 1830 | 1830 | 1830 |     |
| Upstream Blk Time (%) |      |      |      |      |     |
| Queuing Penalty (veh) |      |      |      |      |     |
| Storage Bay Dist (ft) |      |      |      | 310  |     |
| Storage Blk Time (%)  | 2    |      |      | 0    | 0   |
| Queuing Penalty (veh) | 1    |      |      | 0    | 0   |

Network Summary

Network wide Queuing Penalty: 2

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## Queues

Existing 2025 Conditions PM

|                         |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Group Flow (vph)   | 106                                                                               | 108                                                                               | 165                                                                               | 91                                                                                | 38                                                                                | 385                                                                               | 2560                                                                                | 18                                                                                  | 1654                                                                                | 133                                                                                 |
| v/c Ratio               | 0.62                                                                              | 0.63                                                                              | 0.52                                                                              | 0.66                                                                              | 0.25                                                                              | 0.55                                                                              | 0.63                                                                                | 0.20                                                                                | 0.60                                                                                | 0.17                                                                                |
| Control Delay           | 71.1                                                                              | 71.5                                                                              | 12.1                                                                              | 80.2                                                                              | 42.5                                                                              | 50.8                                                                              | 16.5                                                                                | 63.9                                                                                | 29.3                                                                                | 4.2                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 71.1                                                                              | 71.5                                                                              | 12.1                                                                              | 80.2                                                                              | 42.5                                                                              | 50.8                                                                              | 16.5                                                                                | 63.9                                                                                | 29.3                                                                                | 4.2                                                                                 |
| Queue Length 50th (ft)  | 91                                                                                | 92                                                                                | 0                                                                                 | 75                                                                                | 18                                                                                | 156                                                                               | 313                                                                                 | 15                                                                                  | 294                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 153                                                                               | 155                                                                               | 56                                                                                | #143                                                                              | 55                                                                                | 211                                                                               | 508                                                                                 | 42                                                                                  | 350                                                                                 | 39                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 394                                                                               |                                                                                   |                                                                                   | 245                                                                               |                                                                                   | 1513                                                                                |                                                                                     | 1827                                                                                |                                                                                     |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 225                                                                               |                                                                                   |                                                                                   | 425                                                                               |                                                                                     | 290                                                                                 |                                                                                     | 310                                                                                 |
| Base Capacity (vph)     | 222                                                                               | 223                                                                               | 362                                                                               | 151                                                                               | 165                                                                               | 706                                                                               | 4089                                                                                | 105                                                                                 | 2783                                                                                | 762                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.48                                                                              | 0.48                                                                              | 0.46                                                                              | 0.60                                                                              | 0.23                                                                              | 0.55                                                                              | 0.63                                                                                | 0.17                                                                                | 0.59                                                                                | 0.17                                                                                |

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

Existing 2025 Conditions PM

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBU                                                                                | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBU                                                                                 | SBL                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |                                                                                    |  |  |  |                                                                                     |  |
| Traffic Volume (vph)              | 184                                                                               | 23                                                                                | 160                                                                               | 88                                                                                | 22                                                                                | 15                                                                                | 29                                                                                 | 344                                                                                 | 2420                                                                                | 63                                                                                  | 4                                                                                   | 14                                                                                  |
| Future Volume (vph)               | 184                                                                               | 23                                                                                | 160                                                                               | 88                                                                                | 22                                                                                | 15                                                                                | 29                                                                                 | 344                                                                                 | 2420                                                                                | 63                                                                                  | 4                                                                                   | 14                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 | 0.95                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.97                                                                                | 0.86                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.94                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Flt Protected                     | 0.95                                                                              | 0.96                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (prot)                 | 1698                                                                              | 1709                                                                              | 1599                                                                              | 1787                                                                              | 1788                                                                              |                                                                                   |                                                                                    | 3470                                                                                | 6387                                                                                |                                                                                     |                                                                                     | 1710                                                                                |
| Flt Permitted                     | 0.95                                                                              | 0.96                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (perm)                 | 1698                                                                              | 1709                                                                              | 1599                                                                              | 1787                                                                              | 1788                                                                              |                                                                                   |                                                                                    | 3470                                                                                | 6387                                                                                |                                                                                     |                                                                                     | 1710                                                                                |
| Peak-hour factor, PHF             | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                               | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Adj. Flow (vph)                   | 190                                                                               | 24                                                                                | 165                                                                               | 91                                                                                | 23                                                                                | 15                                                                                | 30                                                                                 | 355                                                                                 | 2495                                                                                | 65                                                                                  | 4                                                                                   | 14                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 148                                                                               | 0                                                                                 | 14                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 2                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 106                                                                               | 108                                                                               | 17                                                                                | 91                                                                                | 24                                                                                | 0                                                                                 | 0                                                                                  | 385                                                                                 | 2558                                                                                | 0                                                                                   | 0                                                                                   | 18                                                                                  |
| Heavy Vehicles (%)                | 1%                                                                                | 4%                                                                                | 1%                                                                                | 1%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                 | 1%                                                                                  | 2%                                                                                  | 0%                                                                                  | 25%                                                                                 | 0%                                                                                  |
| Turn Type                         | Split                                                                             | NA                                                                                | Perm                                                                              | Split                                                                             | NA                                                                                |                                                                                   | Prot                                                                               | Prot                                                                                | NA                                                                                  |                                                                                     | Prot                                                                                | Prot                                                                                |
| Protected Phases                  | 3                                                                                 | 3                                                                                 |                                                                                   | 4                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                  | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 1                                                                                   |
| Permitted Phases                  |                                                                                   |                                                                                   | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 13.1                                                                              | 13.1                                                                              | 13.1                                                                              | 10.1                                                                              | 10.1                                                                              |                                                                                   |                                                                                    | 30.0                                                                                | 79.7                                                                                |                                                                                     |                                                                                     | 3.1                                                                                 |
| Effective Green, g (s)            | 13.1                                                                              | 13.1                                                                              | 13.1                                                                              | 10.1                                                                              | 10.1                                                                              |                                                                                   |                                                                                    | 30.0                                                                                | 79.7                                                                                |                                                                                     |                                                                                     | 3.1                                                                                 |
| Actuated g/C Ratio                | 0.10                                                                              | 0.10                                                                              | 0.10                                                                              | 0.08                                                                              | 0.08                                                                              |                                                                                   |                                                                                    | 0.23                                                                                | 0.61                                                                                |                                                                                     |                                                                                     | 0.02                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   |                                                                                    | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                | 171                                                                               | 172                                                                               | 161                                                                               | 138                                                                               | 138                                                                               |                                                                                   |                                                                                    | 800                                                                                 | 3915                                                                                |                                                                                     |                                                                                     | 40                                                                                  |
| v/s Ratio Prot                    | 0.06                                                                              | c0.06                                                                             |                                                                                   | c0.05                                                                             | 0.01                                                                              |                                                                                   |                                                                                    | 0.11                                                                                | c0.40                                                                               |                                                                                     |                                                                                     | 0.01                                                                                |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.62                                                                              | 0.63                                                                              | 0.10                                                                              | 0.66                                                                              | 0.18                                                                              |                                                                                   |                                                                                    | 0.48                                                                                | 0.65                                                                                |                                                                                     |                                                                                     | 0.45                                                                                |
| Uniform Delay, d1                 | 56.1                                                                              | 56.1                                                                              | 53.1                                                                              | 58.3                                                                              | 56.1                                                                              |                                                                                   |                                                                                    | 43.3                                                                                | 16.2                                                                                |                                                                                     |                                                                                     | 62.6                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             | 6.5                                                                               | 7.0                                                                               | 0.3                                                                               | 10.8                                                                              | 0.6                                                                               |                                                                                   |                                                                                    | 0.5                                                                                 | 0.9                                                                                 |                                                                                     |                                                                                     | 7.9                                                                                 |
| Delay (s)                         | 62.6                                                                              | 63.1                                                                              | 53.4                                                                              | 69.1                                                                              | 56.7                                                                              |                                                                                   |                                                                                    | 43.7                                                                                | 17.1                                                                                |                                                                                     |                                                                                     | 70.5                                                                                |
| Level of Service                  | E                                                                                 | E                                                                                 | D                                                                                 | E                                                                                 | E                                                                                 |                                                                                   |                                                                                    | D                                                                                   | B                                                                                   |                                                                                     |                                                                                     | E                                                                                   |
| Approach Delay (s)                |                                                                                   | 58.7                                                                              |                                                                                   |                                                                                   | 65.5                                                                              |                                                                                   |                                                                                    |                                                                                     | 20.6                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 28.3                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.67                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 130.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 68.7%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>c Critical Lane Group</b>      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

Existing 2025 Conditions PM



| Movement               | SBT   | SBR  |
|------------------------|-------|------|
| Lane Configurations    | ↑↑↑↑  | ↑    |
| Traffic Volume (vph)   | 1604  | 129  |
| Future Volume (vph)    | 1604  | 129  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0  |
| Lane Util. Factor      | 0.86  | 1.00 |
| Frt                    | 1.00  | 0.85 |
| Flt Protected          | 1.00  | 1.00 |
| Satd. Flow (prot)      | 6408  | 1583 |
| Flt Permitted          | 1.00  | 1.00 |
| Satd. Flow (perm)      | 6408  | 1583 |
| Peak-hour factor, PHF  | 0.97  | 0.97 |
| Adj. Flow (vph)        | 1654  | 133  |
| RTOR Reduction (vph)   | 0     | 79   |
| Lane Group Flow (vph)  | 1654  | 54   |
| Heavy Vehicles (%)     | 2%    | 2%   |
| Turn Type              | NA    | Perm |
| Protected Phases       | 6     |      |
| Permitted Phases       |       | 6    |
| Actuated Green, G (s)  | 52.8  | 52.8 |
| Effective Green, g (s) | 52.8  | 52.8 |
| Actuated g/C Ratio     | 0.41  | 0.41 |
| Clearance Time (s)     | 6.0   | 6.0  |
| Vehicle Extension (s)  | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 2602  | 642  |
| v/s Ratio Prot         | c0.26 |      |
| v/s Ratio Perm         |       | 0.03 |
| v/c Ratio              | 0.64  | 0.08 |
| Uniform Delay, d1      | 30.9  | 23.7 |
| Progression Factor     | 1.00  | 1.00 |
| Incremental Delay, d2  | 1.2   | 0.3  |
| Delay (s)              | 32.1  | 24.0 |
| Level of Service       | C     | C    |
| Approach Delay (s)     | 31.9  |      |
| Approach LOS           | C     |      |
| Intersection Summary   |       |      |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | EB  | EB  | EB  | WB  | WB  | NB  | NB  | NB   | NB   | NB   | NB   | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Directions Served     | L   | LT  | R   | L   | TR  | UL  | L   | T    | T    | T    | TR   | UL  |
| Maximum Queue (ft)    | 185 | 153 | 80  | 152 | 79  | 191 | 240 | 335  | 340  | 308  | 250  | 146 |
| Average Queue (ft)    | 110 | 58  | 27  | 79  | 31  | 110 | 146 | 211  | 215  | 182  | 120  | 20  |
| 95th Queue (ft)       | 175 | 141 | 57  | 139 | 67  | 180 | 216 | 319  | 313  | 282  | 225  | 97  |
| Link Distance (ft)    | 368 | 368 |     | 246 | 246 |     |     | 1553 | 1553 | 1553 | 1553 |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 225 |     |     | 425 | 425 |      |      |      |      | 290 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | SB   | SB   | SB   | SB   | SB  |
|-----------------------|------|------|------|------|-----|
| Directions Served     | T    | T    | T    | T    | R   |
| Maximum Queue (ft)    | 372  | 358  | 310  | 229  | 100 |
| Average Queue (ft)    | 257  | 245  | 202  | 121  | 36  |
| 95th Queue (ft)       | 336  | 323  | 282  | 230  | 74  |
| Link Distance (ft)    | 1830 | 1830 | 1830 | 1830 |     |
| Upstream Blk Time (%) |      |      |      |      |     |
| Queuing Penalty (veh) |      |      |      |      |     |
| Storage Bay Dist (ft) | 310  |      |      |      |     |
| Storage Blk Time (%)  | 3    |      |      |      |     |
| Queuing Penalty (veh) | 0    |      |      |      |     |

Network Summary

|                                 |
|---------------------------------|
| Network wide Queuing Penalty: 1 |
|---------------------------------|

## **APPENDIX C: SYNCHRO OUTPUT – NO-BUILD (2030) CONDITIONS**

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## Queues

No-Build 2030 Conditions AM

|                         |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Group Flow (vph)   | 57                                                                                | 58                                                                                | 182                                                                               | 66                                                                                | 44                                                                                | 254                                                                               | 1429                                                                               | 74                                                                                  | 2936                                                                                | 180                                                                                 |
| v/c Ratio               | 0.46                                                                              | 0.44                                                                              | 0.60                                                                              | 0.56                                                                              | 0.32                                                                              | 0.67                                                                              | 0.46                                                                               | 0.22                                                                                | 0.83                                                                                | 0.19                                                                                |
| Control Delay           | 62.0                                                                              | 60.3                                                                              | 14.0                                                                              | 70.0                                                                              | 36.4                                                                              | 58.0                                                                              | 21.5                                                                               | 41.5                                                                                | 25.3                                                                                | 2.7                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 62.0                                                                              | 60.3                                                                              | 14.0                                                                              | 70.0                                                                              | 36.4                                                                              | 58.0                                                                              | 21.5                                                                               | 41.5                                                                                | 25.3                                                                                | 2.7                                                                                 |
| Queue Length 50th (ft)  | 43                                                                                | 44                                                                                | 0                                                                                 | 48                                                                                | 15                                                                                | 93                                                                                | 233                                                                                | 44                                                                                  | 544                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 87                                                                                | 88                                                                                | 54                                                                                | #97                                                                               | 53                                                                                | 137                                                                               | 228                                                                                | 96                                                                                  | 621                                                                                 | 35                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 394                                                                               |                                                                                   |                                                                                   | 245                                                                               |                                                                                   | 1513                                                                               |                                                                                     | 1827                                                                                |                                                                                     |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 225                                                                               |                                                                                   |                                                                                   | 425                                                                               |                                                                                    | 290                                                                                 |                                                                                     | 310                                                                                 |
| Base Capacity (vph)     | 151                                                                               | 162                                                                               | 328                                                                               | 125                                                                               | 143                                                                               | 416                                                                               | 3770                                                                               | 335                                                                                 | 3530                                                                                | 969                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.38                                                                              | 0.36                                                                              | 0.55                                                                              | 0.53                                                                              | 0.31                                                                              | 0.61                                                                              | 0.38                                                                               | 0.22                                                                                | 0.83                                                                                | 0.19                                                                                |

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

No-Build 2030 Conditions AM

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBU                                                                                | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBU                                                                                 | SBL                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |                                                                                    |  |  |  |                                                                                     |  |
| Traffic Volume (vph)              | 82                                                                                | 28                                                                                | 173                                                                               | 63                                                                                | 20                                                                                | 22                                                                                | 44                                                                                 | 198                                                                                 | 1254                                                                                | 104                                                                                 | 21                                                                                  | 49                                                                                  |
| Future Volume (vph)               | 82                                                                                | 28                                                                                | 173                                                                               | 63                                                                                | 20                                                                                | 22                                                                                | 44                                                                                 | 198                                                                                 | 1254                                                                                | 104                                                                                 | 21                                                                                  | 49                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 | 0.95                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.97                                                                                | 0.86                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.92                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 0.99                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Flt Protected                     | 0.95                                                                              | 0.98                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (prot)                 | 1588                                                                              | 1693                                                                              | 1553                                                                              | 1805                                                                              | 1751                                                                              |                                                                                   |                                                                                    | 3418                                                                                | 6117                                                                                |                                                                                     |                                                                                     | 1805                                                                                |
| Flt Permitted                     | 0.95                                                                              | 0.98                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (perm)                 | 1588                                                                              | 1693                                                                              | 1553                                                                              | 1805                                                                              | 1751                                                                              |                                                                                   |                                                                                    | 3418                                                                                | 6117                                                                                |                                                                                     |                                                                                     | 1805                                                                                |
| Peak-hour factor, PHF             | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                               | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Adj. Flow (vph)                   | 86                                                                                | 29                                                                                | 182                                                                               | 66                                                                                | 21                                                                                | 23                                                                                | 46                                                                                 | 208                                                                                 | 1320                                                                                | 109                                                                                 | 22                                                                                  | 52                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 168                                                                               | 0                                                                                 | 22                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 13                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 57                                                                                | 58                                                                                | 14                                                                                | 66                                                                                | 22                                                                                | 0                                                                                 | 0                                                                                  | 254                                                                                 | 1416                                                                                | 0                                                                                   | 0                                                                                   | 74                                                                                  |
| Heavy Vehicles (%)                | 8%                                                                                | 0%                                                                                | 4%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                 | 3%                                                                                  | 6%                                                                                  | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Split                                                                             | NA                                                                                | Perm                                                                              | Split                                                                             | NA                                                                                |                                                                                   | Prot                                                                               | Prot                                                                                | NA                                                                                  |                                                                                     | Prot                                                                                | Prot                                                                                |
| Protected Phases                  | 3                                                                                 | 3                                                                                 |                                                                                   | 4                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                  | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 1                                                                                   |
| Permitted Phases                  |                                                                                   |                                                                                   | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 9.0                                                                               | 9.0                                                                               | 9.0                                                                               | 6.4                                                                               | 6.4                                                                               |                                                                                   |                                                                                    | 12.8                                                                                | 55.8                                                                                |                                                                                     |                                                                                     | 19.8                                                                                |
| Effective Green, g (s)            | 9.0                                                                               | 9.0                                                                               | 9.0                                                                               | 6.4                                                                               | 6.4                                                                               |                                                                                   |                                                                                    | 12.8                                                                                | 55.8                                                                                |                                                                                     |                                                                                     | 19.8                                                                                |
| Actuated g/C Ratio                | 0.08                                                                              | 0.08                                                                              | 0.08                                                                              | 0.06                                                                              | 0.06                                                                              |                                                                                   |                                                                                    | 0.11                                                                                | 0.49                                                                                |                                                                                     |                                                                                     | 0.17                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   |                                                                                    | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                | 124                                                                               | 132                                                                               | 121                                                                               | 100                                                                               | 97                                                                                |                                                                                   |                                                                                    | 380                                                                                 | 2968                                                                                |                                                                                     |                                                                                     | 310                                                                                 |
| v/s Ratio Prot                    | c0.04                                                                             | 0.03                                                                              |                                                                                   | c0.04                                                                             | 0.01                                                                              |                                                                                   |                                                                                    | c0.07                                                                               | 0.23                                                                                |                                                                                     |                                                                                     | 0.04                                                                                |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.46                                                                              | 0.44                                                                              | 0.12                                                                              | 0.66                                                                              | 0.23                                                                              |                                                                                   |                                                                                    | 0.67                                                                                | 0.48                                                                                |                                                                                     |                                                                                     | 0.24                                                                                |
| Uniform Delay, d1                 | 50.7                                                                              | 50.6                                                                              | 49.3                                                                              | 53.2                                                                              | 51.9                                                                              |                                                                                   |                                                                                    | 49.1                                                                                | 19.8                                                                                |                                                                                     |                                                                                     | 41.1                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             | 2.7                                                                               | 2.3                                                                               | 0.4                                                                               | 15.1                                                                              | 1.2                                                                               |                                                                                   |                                                                                    | 4.4                                                                                 | 0.6                                                                                 |                                                                                     |                                                                                     | 0.4                                                                                 |
| Delay (s)                         | 53.4                                                                              | 52.9                                                                              | 49.7                                                                              | 68.4                                                                              | 53.2                                                                              |                                                                                   |                                                                                    | 53.5                                                                                | 20.4                                                                                |                                                                                     |                                                                                     | 41.5                                                                                |
| Level of Service                  | D                                                                                 | D                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 |                                                                                   |                                                                                    | D                                                                                   | C                                                                                   |                                                                                     |                                                                                     | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 51.1                                                                              |                                                                                   |                                                                                   | 62.3                                                                              |                                                                                   |                                                                                    |                                                                                     | 25.4                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 27.1                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.77                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 115.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 82.2%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>c Critical Lane Group</b>      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

No-Build 2030 Conditions AM



| Movement               | SBT   | SBR  |
|------------------------|-------|------|
| Lane Configurations    | ↑↑↑↑  | ↗    |
| Traffic Volume (vph)   | 2789  | 171  |
| Future Volume (vph)    | 2789  | 171  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0  |
| Lane Util. Factor      | 0.86  | 1.00 |
| Frt                    | 1.00  | 0.85 |
| Flt Protected          | 1.00  | 1.00 |
| Satd. Flow (prot)      | 6346  | 1599 |
| Flt Permitted          | 1.00  | 1.00 |
| Satd. Flow (perm)      | 6346  | 1599 |
| Peak-hour factor, PHF  | 0.95  | 0.95 |
| Adj. Flow (vph)        | 2936  | 180  |
| RTOR Reduction (vph)   | 0     | 81   |
| Lane Group Flow (vph)  | 2936  | 99   |
| Heavy Vehicles (%)     | 3%    | 1%   |
| Turn Type              | NA    | Perm |
| Protected Phases       | 6     |      |
| Permitted Phases       |       | 6    |
| Actuated Green, G (s)  | 62.8  | 62.8 |
| Effective Green, g (s) | 62.8  | 62.8 |
| Actuated g/C Ratio     | 0.55  | 0.55 |
| Clearance Time (s)     | 6.0   | 6.0  |
| Vehicle Extension (s)  | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 3465  | 873  |
| v/s Ratio Prot         | c0.46 |      |
| v/s Ratio Perm         |       | 0.06 |
| v/c Ratio              | 0.85  | 0.11 |
| Uniform Delay, d1      | 22.1  | 12.6 |
| Progression Factor     | 1.00  | 1.00 |
| Incremental Delay, d2  | 2.8   | 0.3  |
| Delay (s)              | 24.8  | 12.9 |
| Level of Service       | C     | B    |
| Approach Delay (s)     | 24.5  |      |
| Approach LOS           | C     |      |
| Intersection Summary   |       |      |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | EB  | EB  | EB  | WB  | WB  | NB  | NB  | NB   | NB   | NB   | NB   | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Directions Served     | L   | LT  | R   | L   | TR  | UL  | L   | T    | T    | T    | TR   | UL  |
| Maximum Queue (ft)    | 138 | 113 | 151 | 122 | 93  | 167 | 230 | 316  | 298  | 254  | 179  | 289 |
| Average Queue (ft)    | 55  | 21  | 55  | 55  | 34  | 74  | 108 | 167  | 155  | 108  | 50   | 71  |
| 95th Queue (ft)       | 111 | 64  | 118 | 101 | 71  | 144 | 183 | 272  | 258  | 224  | 137  | 213 |
| Link Distance (ft)    | 368 | 368 |     | 246 | 246 |     |     | 1553 | 1553 | 1553 | 1553 |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 225 |     |     | 425 | 425 |      |      |      |      | 290 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | SB   | SB   | SB   | SB   | SB  |
|-----------------------|------|------|------|------|-----|
| Directions Served     | T    | T    | T    | T    | R   |
| Maximum Queue (ft)    | 415  | 403  | 376  | 312  | 110 |
| Average Queue (ft)    | 295  | 289  | 257  | 196  | 39  |
| 95th Queue (ft)       | 391  | 384  | 359  | 301  | 90  |
| Link Distance (ft)    | 1830 | 1830 | 1830 | 1830 |     |
| Upstream Blk Time (%) |      |      |      |      |     |
| Queuing Penalty (veh) |      |      |      |      |     |
| Storage Bay Dist (ft) |      |      |      | 310  |     |
| Storage Blk Time (%)  | 7    |      |      | 0    | 0   |
| Queuing Penalty (veh) | 5    |      |      | 0    | 0   |

Network Summary

Network wide Queuing Penalty: 5

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## Queues

No-Build 2030 Conditions PM

|                         |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Group Flow (vph)   | 117                                                                               | 118                                                                               | 182                                                                               | 100                                                                               | 43                                                                                | 425                                                                               | 2827                                                                               | 19                                                                                  | 1826                                                                                | 146                                                                                 |
| v/c Ratio               | 0.66                                                                              | 0.66                                                                              | 0.55                                                                              | 0.70                                                                              | 0.27                                                                              | 0.66                                                                              | 0.70                                                                               | 0.21                                                                                | 0.64                                                                                | 0.19                                                                                |
| Control Delay           | 72.7                                                                              | 72.7                                                                              | 13.8                                                                              | 83.4                                                                              | 41.5                                                                              | 55.0                                                                              | 18.5                                                                               | 64.2                                                                                | 29.7                                                                                | 4.1                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 72.7                                                                              | 72.7                                                                              | 13.8                                                                              | 83.4                                                                              | 41.5                                                                              | 55.0                                                                              | 18.5                                                                               | 64.2                                                                                | 29.7                                                                                | 4.1                                                                                 |
| Queue Length 50th (ft)  | 101                                                                               | 102                                                                               | 0                                                                                 | 83                                                                                | 20                                                                                | 175                                                                               | 380                                                                                | 16                                                                                  | 341                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 167                                                                               | 168                                                                               | 69                                                                                | #162                                                                              | 59                                                                                | 232                                                                               | 599                                                                                | 42                                                                                  | 397                                                                                 | 40                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 394                                                                               |                                                                                   |                                                                                   | 245                                                                               |                                                                                   | 1513                                                                               |                                                                                     | 1827                                                                                |                                                                                     |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 225                                                                               |                                                                                   |                                                                                   | 425                                                                               |                                                                                    | 290                                                                                 |                                                                                     | 310                                                                                 |
| Base Capacity (vph)     | 222                                                                               | 223                                                                               | 367                                                                               | 151                                                                               | 167                                                                               | 647                                                                               | 4047                                                                               | 105                                                                                 | 2840                                                                                | 782                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.53                                                                              | 0.53                                                                              | 0.50                                                                              | 0.66                                                                              | 0.26                                                                              | 0.66                                                                              | 0.70                                                                               | 0.18                                                                                | 0.64                                                                                | 0.19                                                                                |

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

No-Build 2030 Conditions PM

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBU                                                                                | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBU                                                                                 | SBL                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |                                                                                    |  |  |  |                                                                                     |  |
| Traffic Volume (vph)              | 203                                                                               | 25                                                                                | 177                                                                               | 97                                                                                | 24                                                                                | 17                                                                                | 32                                                                                 | 380                                                                                 | 2672                                                                                | 70                                                                                  | 4                                                                                   | 15                                                                                  |
| Future Volume (vph)               | 203                                                                               | 25                                                                                | 177                                                                               | 97                                                                                | 24                                                                                | 17                                                                                | 32                                                                                 | 380                                                                                 | 2672                                                                                | 70                                                                                  | 4                                                                                   | 15                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 | 0.95                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.97                                                                                | 0.86                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.94                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Flt Protected                     | 0.95                                                                              | 0.96                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (prot)                 | 1698                                                                              | 1709                                                                              | 1599                                                                              | 1787                                                                              | 1781                                                                              |                                                                                   |                                                                                    | 3470                                                                                | 6387                                                                                |                                                                                     |                                                                                     | 1715                                                                                |
| Flt Permitted                     | 0.95                                                                              | 0.96                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (perm)                 | 1698                                                                              | 1709                                                                              | 1599                                                                              | 1787                                                                              | 1781                                                                              |                                                                                   |                                                                                    | 3470                                                                                | 6387                                                                                |                                                                                     |                                                                                     | 1715                                                                                |
| Peak-hour factor, PHF             | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                               | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Adj. Flow (vph)                   | 209                                                                               | 26                                                                                | 182                                                                               | 100                                                                               | 25                                                                                | 18                                                                                | 33                                                                                 | 392                                                                                 | 2755                                                                                | 72                                                                                  | 4                                                                                   | 15                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 163                                                                               | 0                                                                                 | 17                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 2                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 117                                                                               | 118                                                                               | 19                                                                                | 100                                                                               | 26                                                                                | 0                                                                                 | 0                                                                                  | 425                                                                                 | 2825                                                                                | 0                                                                                   | 0                                                                                   | 19                                                                                  |
| Heavy Vehicles (%)                | 1%                                                                                | 4%                                                                                | 1%                                                                                | 1%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                 | 1%                                                                                  | 2%                                                                                  | 0%                                                                                  | 25%                                                                                 | 0%                                                                                  |
| Turn Type                         | Split                                                                             | NA                                                                                | Perm                                                                              | Split                                                                             | NA                                                                                |                                                                                   | Prot                                                                               | Prot                                                                                | NA                                                                                  |                                                                                     | Prot                                                                                | Prot                                                                                |
| Protected Phases                  | 3                                                                                 | 3                                                                                 |                                                                                   | 4                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                  | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 1                                                                                   |
| Permitted Phases                  |                                                                                   |                                                                                   | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 13.7                                                                              | 13.7                                                                              | 13.7                                                                              | 10.4                                                                              | 10.4                                                                              |                                                                                   |                                                                                    | 27.9                                                                                | 78.8                                                                                |                                                                                     |                                                                                     | 3.1                                                                                 |
| Effective Green, g (s)            | 13.7                                                                              | 13.7                                                                              | 13.7                                                                              | 10.4                                                                              | 10.4                                                                              |                                                                                   |                                                                                    | 27.9                                                                                | 78.8                                                                                |                                                                                     |                                                                                     | 3.1                                                                                 |
| Actuated g/C Ratio                | 0.11                                                                              | 0.11                                                                              | 0.11                                                                              | 0.08                                                                              | 0.08                                                                              |                                                                                   |                                                                                    | 0.21                                                                                | 0.61                                                                                |                                                                                     |                                                                                     | 0.02                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   |                                                                                    | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                | 178                                                                               | 180                                                                               | 168                                                                               | 142                                                                               | 142                                                                               |                                                                                   |                                                                                    | 744                                                                                 | 3871                                                                                |                                                                                     |                                                                                     | 40                                                                                  |
| v/s Ratio Prot                    | 0.07                                                                              | c0.07                                                                             |                                                                                   | c0.06                                                                             | 0.01                                                                              |                                                                                   |                                                                                    | 0.12                                                                                | c0.44                                                                               |                                                                                     |                                                                                     | 0.01                                                                                |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.66                                                                              | 0.66                                                                              | 0.11                                                                              | 0.70                                                                              | 0.19                                                                              |                                                                                   |                                                                                    | 0.57                                                                                | 0.73                                                                                |                                                                                     |                                                                                     | 0.47                                                                                |
| Uniform Delay, d1                 | 55.9                                                                              | 55.9                                                                              | 52.7                                                                              | 58.3                                                                              | 55.8                                                                              |                                                                                   |                                                                                    | 45.7                                                                                | 18.1                                                                                |                                                                                     |                                                                                     | 62.6                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             | 8.5                                                                               | 8.3                                                                               | 0.3                                                                               | 14.7                                                                              | 0.6                                                                               |                                                                                   |                                                                                    | 1.1                                                                                 | 1.2                                                                                 |                                                                                     |                                                                                     | 8.6                                                                                 |
| Delay (s)                         | 64.4                                                                              | 64.2                                                                              | 53.0                                                                              | 73.0                                                                              | 56.5                                                                              |                                                                                   |                                                                                    | 46.8                                                                                | 19.3                                                                                |                                                                                     |                                                                                     | 71.3                                                                                |
| Level of Service                  | E                                                                                 | E                                                                                 | D                                                                                 | E                                                                                 | E                                                                                 |                                                                                   |                                                                                    | D                                                                                   | B                                                                                   |                                                                                     |                                                                                     | E                                                                                   |
| Approach Delay (s)                |                                                                                   | 59.3                                                                              |                                                                                   |                                                                                   | 68.0                                                                              |                                                                                   |                                                                                    |                                                                                     | 22.9                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 29.8                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.74                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 130.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 73.8%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>c Critical Lane Group</b>      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

No-Build 2030 Conditions PM



| Movement               | SBT   | SBR  |
|------------------------|-------|------|
| Lane Configurations    | ↑↑↑↑  | ↑    |
| Traffic Volume (vph)   | 1771  | 142  |
| Future Volume (vph)    | 1771  | 142  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0  |
| Lane Util. Factor      | 0.86  | 1.00 |
| Frt                    | 1.00  | 0.85 |
| Flt Protected          | 1.00  | 1.00 |
| Satd. Flow (prot)      | 6408  | 1583 |
| Flt Permitted          | 1.00  | 1.00 |
| Satd. Flow (perm)      | 6408  | 1583 |
| Peak-hour factor, PHF  | 0.97  | 0.97 |
| Adj. Flow (vph)        | 1826  | 146  |
| RTOR Reduction (vph)   | 0     | 85   |
| Lane Group Flow (vph)  | 1826  | 61   |
| Heavy Vehicles (%)     | 2%    | 2%   |
| Turn Type              | NA    | Perm |
| Protected Phases       | 6     |      |
| Permitted Phases       |       | 6    |
| Actuated Green, G (s)  | 54.0  | 54.0 |
| Effective Green, g (s) | 54.0  | 54.0 |
| Actuated g/C Ratio     | 0.42  | 0.42 |
| Clearance Time (s)     | 6.0   | 6.0  |
| Vehicle Extension (s)  | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 2661  | 657  |
| v/s Ratio Prot         | c0.28 |      |
| v/s Ratio Perm         |       | 0.04 |
| v/c Ratio              | 0.69  | 0.09 |
| Uniform Delay, d1      | 31.1  | 23.1 |
| Progression Factor     | 1.00  | 1.00 |
| Incremental Delay, d2  | 1.5   | 0.3  |
| Delay (s)              | 32.5  | 23.4 |
| Level of Service       | C     | C    |
| Approach Delay (s)     | 32.2  |      |
| Approach LOS           | C     |      |
| Intersection Summary   |       |      |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | EB  | EB  | EB  | WB  | WB  | NB  | NB  | NB   | NB   | NB   | NB   | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Directions Served     | L   | LT  | R   | L   | TR  | UL  | L   | T    | T    | T    | TR   | UL  |
| Maximum Queue (ft)    | 197 | 162 | 81  | 177 | 98  | 250 | 308 | 359  | 351  | 319  | 277  | 266 |
| Average Queue (ft)    | 117 | 62  | 31  | 89  | 37  | 136 | 171 | 231  | 237  | 204  | 154  | 26  |
| 95th Queue (ft)       | 178 | 152 | 61  | 154 | 82  | 213 | 254 | 334  | 329  | 298  | 263  | 127 |
| Link Distance (ft)    | 368 | 368 |     | 246 | 246 |     |     | 1553 | 1553 | 1553 | 1553 |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 225 |     |     | 425 | 425 |      |      |      |      | 290 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | SB   | SB   | SB   | SB   | SB |
|-----------------------|------|------|------|------|----|
| Directions Served     | T    | T    | T    | T    | R  |
| Maximum Queue (ft)    | 377  | 368  | 336  | 276  | 96 |
| Average Queue (ft)    | 273  | 264  | 221  | 142  | 36 |
| 95th Queue (ft)       | 351  | 346  | 305  | 251  | 72 |
| Link Distance (ft)    | 1830 | 1830 | 1830 | 1830 |    |
| Upstream Blk Time (%) |      |      |      |      |    |
| Queuing Penalty (veh) |      |      |      |      |    |
| Storage Bay Dist (ft) |      |      |      | 310  |    |
| Storage Blk Time (%)  | 4    |      |      | 0    |    |
| Queuing Penalty (veh) | 1    |      |      | 0    |    |

Network Summary

Network wide Queuing Penalty: 1

## **APPENDIX D: SYNCHRO OUTPUT – BUILD (2030) CONDITIONS**

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## Queues

Build 2030 Conditions AM

|                         |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Group Flow (vph)   | 57                                                                                | 58                                                                                | 186                                                                               | 66                                                                                | 44                                                                                | 303                                                                               | 1452                                                                                | 74                                                                                  | 2942                                                                                | 180                                                                                 |
| v/c Ratio               | 0.46                                                                              | 0.44                                                                              | 0.61                                                                              | 0.56                                                                              | 0.32                                                                              | 0.74                                                                              | 0.46                                                                                | 0.23                                                                                | 0.85                                                                                | 0.19                                                                                |
| Control Delay           | 62.0                                                                              | 60.3                                                                              | 14.8                                                                              | 70.0                                                                              | 36.4                                                                              | 60.6                                                                              | 21.1                                                                                | 42.4                                                                                | 26.3                                                                                | 2.8                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 62.0                                                                              | 60.3                                                                              | 14.8                                                                              | 70.0                                                                              | 36.4                                                                              | 60.6                                                                              | 21.1                                                                                | 42.4                                                                                | 26.3                                                                                | 2.8                                                                                 |
| Queue Length 50th (ft)  | 43                                                                                | 44                                                                                | 0                                                                                 | 48                                                                                | 15                                                                                | 111                                                                               | 234                                                                                 | 44                                                                                  | 563                                                                                 | 1                                                                                   |
| Queue Length 95th (ft)  | 87                                                                                | 88                                                                                | 59                                                                                | #97                                                                               | 53                                                                                | 161                                                                               | 229                                                                                 | 97                                                                                  | 623                                                                                 | 36                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 394                                                                               |                                                                                   |                                                                                   | 245                                                                               |                                                                                   | 1513                                                                                |                                                                                     | 1827                                                                                |                                                                                     |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 225                                                                               |                                                                                   |                                                                                   | 425                                                                               |                                                                                     | 290                                                                                 |                                                                                     | 310                                                                                 |
| Base Capacity (vph)     | 151                                                                               | 162                                                                               | 328                                                                               | 125                                                                               | 143                                                                               | 425                                                                               | 3770                                                                                | 324                                                                                 | 3479                                                                                | 957                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.38                                                                              | 0.36                                                                              | 0.57                                                                              | 0.53                                                                              | 0.31                                                                              | 0.71                                                                              | 0.39                                                                                | 0.23                                                                                | 0.85                                                                                | 0.19                                                                                |

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

Build 2030 Conditions AM

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBU                                                                                | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBU                                                                                 | SBL                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |                                                                                    |  |  |  |                                                                                     |  |
| Traffic Volume (vph)              | 82                                                                                | 28                                                                                | 177                                                                               | 63                                                                                | 20                                                                                | 22                                                                                | 76                                                                                 | 212                                                                                 | 1276                                                                                | 104                                                                                 | 21                                                                                  | 49                                                                                  |
| Future Volume (vph)               | 82                                                                                | 28                                                                                | 177                                                                               | 63                                                                                | 20                                                                                | 22                                                                                | 76                                                                                 | 212                                                                                 | 1276                                                                                | 104                                                                                 | 21                                                                                  | 49                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 | 0.95                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.97                                                                                | 0.86                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.92                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 0.99                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Flt Protected                     | 0.95                                                                              | 0.98                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (prot)                 | 1588                                                                              | 1693                                                                              | 1553                                                                              | 1805                                                                              | 1751                                                                              |                                                                                   |                                                                                    | 3426                                                                                | 6118                                                                                |                                                                                     |                                                                                     | 1805                                                                                |
| Flt Permitted                     | 0.95                                                                              | 0.98                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (perm)                 | 1588                                                                              | 1693                                                                              | 1553                                                                              | 1805                                                                              | 1751                                                                              |                                                                                   |                                                                                    | 3426                                                                                | 6118                                                                                |                                                                                     |                                                                                     | 1805                                                                                |
| Peak-hour factor, PHF             | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                               | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Adj. Flow (vph)                   | 86                                                                                | 29                                                                                | 186                                                                               | 66                                                                                | 21                                                                                | 23                                                                                | 80                                                                                 | 223                                                                                 | 1343                                                                                | 109                                                                                 | 22                                                                                  | 52                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 171                                                                               | 0                                                                                 | 22                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 13                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 57                                                                                | 58                                                                                | 15                                                                                | 66                                                                                | 22                                                                                | 0                                                                                 | 0                                                                                  | 303                                                                                 | 1439                                                                                | 0                                                                                   | 0                                                                                   | 74                                                                                  |
| Heavy Vehicles (%)                | 8%                                                                                | 0%                                                                                | 4%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                 | 3%                                                                                  | 6%                                                                                  | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Split                                                                             | NA                                                                                | Perm                                                                              | Split                                                                             | NA                                                                                |                                                                                   | Prot                                                                               | Prot                                                                                | NA                                                                                  |                                                                                     | Prot                                                                                | Prot                                                                                |
| Protected Phases                  | 3                                                                                 | 3                                                                                 |                                                                                   | 4                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                  | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 1                                                                                   |
| Permitted Phases                  |                                                                                   |                                                                                   | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 9.0                                                                               | 9.0                                                                               | 9.0                                                                               | 6.4                                                                               | 6.4                                                                               |                                                                                   |                                                                                    | 13.7                                                                                | 56.5                                                                                |                                                                                     |                                                                                     | 19.1                                                                                |
| Effective Green, g (s)            | 9.0                                                                               | 9.0                                                                               | 9.0                                                                               | 6.4                                                                               | 6.4                                                                               |                                                                                   |                                                                                    | 13.7                                                                                | 56.5                                                                                |                                                                                     |                                                                                     | 19.1                                                                                |
| Actuated g/C Ratio                | 0.08                                                                              | 0.08                                                                              | 0.08                                                                              | 0.06                                                                              | 0.06                                                                              |                                                                                   |                                                                                    | 0.12                                                                                | 0.49                                                                                |                                                                                     |                                                                                     | 0.17                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   |                                                                                    | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                | 124                                                                               | 132                                                                               | 121                                                                               | 100                                                                               | 97                                                                                |                                                                                   |                                                                                    | 408                                                                                 | 3005                                                                                |                                                                                     |                                                                                     | 299                                                                                 |
| v/s Ratio Prot                    | c0.04                                                                             | 0.03                                                                              |                                                                                   | c0.04                                                                             | 0.01                                                                              |                                                                                   |                                                                                    | c0.09                                                                               | 0.24                                                                                |                                                                                     |                                                                                     | 0.04                                                                                |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.46                                                                              | 0.44                                                                              | 0.12                                                                              | 0.66                                                                              | 0.23                                                                              |                                                                                   |                                                                                    | 0.74                                                                                | 0.48                                                                                |                                                                                     |                                                                                     | 0.25                                                                                |
| Uniform Delay, d1                 | 50.7                                                                              | 50.6                                                                              | 49.3                                                                              | 53.2                                                                              | 51.9                                                                              |                                                                                   |                                                                                    | 48.9                                                                                | 19.5                                                                                |                                                                                     |                                                                                     | 41.7                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             | 2.7                                                                               | 2.3                                                                               | 0.4                                                                               | 15.1                                                                              | 1.2                                                                               |                                                                                   |                                                                                    | 7.1                                                                                 | 0.5                                                                                 |                                                                                     |                                                                                     | 0.4                                                                                 |
| Delay (s)                         | 53.4                                                                              | 52.9                                                                              | 49.8                                                                              | 68.4                                                                              | 53.2                                                                              |                                                                                   |                                                                                    | 56.1                                                                                | 20.0                                                                                |                                                                                     |                                                                                     | 42.1                                                                                |
| Level of Service                  | D                                                                                 | D                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 |                                                                                   |                                                                                    | E                                                                                   | C                                                                                   |                                                                                     |                                                                                     | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 51.1                                                                              |                                                                                   |                                                                                   | 62.3                                                                              |                                                                                   |                                                                                    |                                                                                     | 26.2                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 28.0                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.79                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 115.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 83.8%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

Build 2030 Conditions AM



| Movement               | SBT   | SBR  |
|------------------------|-------|------|
| Lane Configurations    | ↑↑↑↑  | ↑    |
| Traffic Volume (vph)   | 2795  | 171  |
| Future Volume (vph)    | 2795  | 171  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0  |
| Lane Util. Factor      | 0.86  | 1.00 |
| Frt                    | 1.00  | 0.85 |
| Flt Protected          | 1.00  | 1.00 |
| Satd. Flow (prot)      | 6346  | 1599 |
| Flt Permitted          | 1.00  | 1.00 |
| Satd. Flow (perm)      | 6346  | 1599 |
| Peak-hour factor, PHF  | 0.95  | 0.95 |
| Adj. Flow (vph)        | 2942  | 180  |
| RTOR Reduction (vph)   | 0     | 82   |
| Lane Group Flow (vph)  | 2942  | 98   |
| Heavy Vehicles (%)     | 3%    | 1%   |
| Turn Type              | NA    | Perm |
| Protected Phases       | 6     |      |
| Permitted Phases       |       | 6    |
| Actuated Green, G (s)  | 61.9  | 61.9 |
| Effective Green, g (s) | 61.9  | 61.9 |
| Actuated g/C Ratio     | 0.54  | 0.54 |
| Clearance Time (s)     | 6.0   | 6.0  |
| Vehicle Extension (s)  | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 3415  | 860  |
| v/s Ratio Prot         | c0.46 |      |
| v/s Ratio Perm         |       | 0.06 |
| v/c Ratio              | 0.86  | 0.11 |
| Uniform Delay, d1      | 22.9  | 13.1 |
| Progression Factor     | 1.00  | 1.00 |
| Incremental Delay, d2  | 3.1   | 0.3  |
| Delay (s)              | 26.0  | 13.3 |
| Level of Service       | C     | B    |
| Approach Delay (s)     | 25.6  |      |
| Approach LOS           | C     |      |
| Intersection Summary   |       |      |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | EB  | EB  | EB  | WB  | WB  | NB  | NB  | NB   | NB   | NB   | NB   | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Directions Served     | L   | LT  | R   | L   | TR  | UL  | L   | T    | T    | T    | TR   | UL  |
| Maximum Queue (ft)    | 130 | 129 | 144 | 122 | 88  | 182 | 217 | 286  | 273  | 238  | 186  | 289 |
| Average Queue (ft)    | 54  | 21  | 55  | 54  | 33  | 93  | 112 | 155  | 148  | 108  | 52   | 77  |
| 95th Queue (ft)       | 109 | 72  | 111 | 107 | 70  | 160 | 182 | 259  | 248  | 222  | 141  | 231 |
| Link Distance (ft)    | 368 | 368 |     | 246 | 246 |     |     | 1553 | 1553 | 1553 | 1553 |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 225 |     |     | 425 | 425 |      |      |      |      | 290 |
| Storage Blk Time (%)  |     | 0   | 0   |     |     |     |     |      |      |      |      | 0   |
| Queuing Penalty (veh) |     | 0   | 0   |     |     |     |     |      |      |      |      | 0   |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | SB   | SB   | SB   | SB   | SB  |
|-----------------------|------|------|------|------|-----|
| Directions Served     | T    | T    | T    | T    | R   |
| Maximum Queue (ft)    | 438  | 418  | 387  | 323  | 106 |
| Average Queue (ft)    | 303  | 295  | 261  | 196  | 37  |
| 95th Queue (ft)       | 399  | 387  | 357  | 301  | 71  |
| Link Distance (ft)    | 1830 | 1830 | 1830 | 1830 |     |
| Upstream Blk Time (%) |      |      |      |      |     |
| Queuing Penalty (veh) |      |      |      |      |     |
| Storage Bay Dist (ft) |      |      |      | 310  |     |
| Storage Blk Time (%)  | 8    |      |      | 0    | 0   |
| Queuing Penalty (veh) | 6    |      |      | 0    | 0   |

Network Summary

Network wide Queuing Penalty: 6

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## Queues

Build 2030 Conditions PM

|                         |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Group Flow (vph)   | 117                                                                               | 118                                                                               | 194                                                                               | 100                                                                               | 43                                                                                | 448                                                                               | 2838                                                                               | 19                                                                                  | 1843                                                                                | 146                                                                                 |
| v/c Ratio               | 0.66                                                                              | 0.66                                                                              | 0.57                                                                              | 0.70                                                                              | 0.27                                                                              | 0.69                                                                              | 0.70                                                                               | 0.21                                                                                | 0.65                                                                                | 0.19                                                                                |
| Control Delay           | 72.7                                                                              | 72.7                                                                              | 13.8                                                                              | 83.4                                                                              | 41.5                                                                              | 56.2                                                                              | 18.6                                                                               | 64.2                                                                                | 29.8                                                                                | 4.1                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 72.7                                                                              | 72.7                                                                              | 13.8                                                                              | 83.4                                                                              | 41.5                                                                              | 56.2                                                                              | 18.6                                                                               | 64.2                                                                                | 29.8                                                                                | 4.1                                                                                 |
| Queue Length 50th (ft)  | 101                                                                               | 102                                                                               | 0                                                                                 | 83                                                                                | 20                                                                                | 186                                                                               | 382                                                                                | 16                                                                                  | 345                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 167                                                                               | 168                                                                               | 72                                                                                | #162                                                                              | 59                                                                                | 245                                                                               | 603                                                                                | 42                                                                                  | 403                                                                                 | 40                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 394                                                                               |                                                                                   |                                                                                   | 245                                                                               |                                                                                   | 1513                                                                               |                                                                                     | 1827                                                                                |                                                                                     |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 225                                                                               |                                                                                   |                                                                                   | 425                                                                               |                                                                                    | 290                                                                                 |                                                                                     | 310                                                                                 |
| Base Capacity (vph)     | 222                                                                               | 223                                                                               | 377                                                                               | 151                                                                               | 167                                                                               | 647                                                                               | 4047                                                                               | 105                                                                                 | 2842                                                                                | 783                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.53                                                                              | 0.53                                                                              | 0.51                                                                              | 0.66                                                                              | 0.26                                                                              | 0.69                                                                              | 0.70                                                                               | 0.18                                                                                | 0.65                                                                                | 0.19                                                                                |

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

Build 2030 Conditions PM

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBU                                                                                | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBU                                                                                 | SBL                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |                                                                                    |  |  |  |                                                                                     |  |
| Traffic Volume (vph)              | 203                                                                               | 25                                                                                | 188                                                                               | 97                                                                                | 24                                                                                | 17                                                                                | 48                                                                                 | 387                                                                                 | 2683                                                                                | 70                                                                                  | 4                                                                                   | 15                                                                                  |
| Future Volume (vph)               | 203                                                                               | 25                                                                                | 188                                                                               | 97                                                                                | 24                                                                                | 17                                                                                | 48                                                                                 | 387                                                                                 | 2683                                                                                | 70                                                                                  | 4                                                                                   | 15                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 | 0.95                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.97                                                                                | 0.86                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.94                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Flt Protected                     | 0.95                                                                              | 0.96                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (prot)                 | 1698                                                                              | 1709                                                                              | 1599                                                                              | 1787                                                                              | 1781                                                                              |                                                                                   |                                                                                    | 3471                                                                                | 6387                                                                                |                                                                                     |                                                                                     | 1715                                                                                |
| Flt Permitted                     | 0.95                                                                              | 0.96                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 0.95                                                                                |
| Satd. Flow (perm)                 | 1698                                                                              | 1709                                                                              | 1599                                                                              | 1787                                                                              | 1781                                                                              |                                                                                   |                                                                                    | 3471                                                                                | 6387                                                                                |                                                                                     |                                                                                     | 1715                                                                                |
| Peak-hour factor, PHF             | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                               | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Adj. Flow (vph)                   | 209                                                                               | 26                                                                                | 194                                                                               | 100                                                                               | 25                                                                                | 18                                                                                | 49                                                                                 | 399                                                                                 | 2766                                                                                | 72                                                                                  | 4                                                                                   | 15                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 174                                                                               | 0                                                                                 | 17                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 2                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 117                                                                               | 118                                                                               | 20                                                                                | 100                                                                               | 26                                                                                | 0                                                                                 | 0                                                                                  | 448                                                                                 | 2836                                                                                | 0                                                                                   | 0                                                                                   | 19                                                                                  |
| Heavy Vehicles (%)                | 1%                                                                                | 4%                                                                                | 1%                                                                                | 1%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                 | 1%                                                                                  | 2%                                                                                  | 0%                                                                                  | 25%                                                                                 | 0%                                                                                  |
| Turn Type                         | Split                                                                             | NA                                                                                | Perm                                                                              | Split                                                                             | NA                                                                                |                                                                                   | Prot                                                                               | Prot                                                                                | NA                                                                                  |                                                                                     | Prot                                                                                | Prot                                                                                |
| Protected Phases                  | 3                                                                                 | 3                                                                                 |                                                                                   | 4                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                  | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 1                                                                                   |
| Permitted Phases                  |                                                                                   |                                                                                   | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 13.7                                                                              | 13.7                                                                              | 13.7                                                                              | 10.4                                                                              | 10.4                                                                              |                                                                                   |                                                                                    | 27.8                                                                                | 78.8                                                                                |                                                                                     |                                                                                     | 3.1                                                                                 |
| Effective Green, g (s)            | 13.7                                                                              | 13.7                                                                              | 13.7                                                                              | 10.4                                                                              | 10.4                                                                              |                                                                                   |                                                                                    | 27.8                                                                                | 78.8                                                                                |                                                                                     |                                                                                     | 3.1                                                                                 |
| Actuated g/C Ratio                | 0.11                                                                              | 0.11                                                                              | 0.11                                                                              | 0.08                                                                              | 0.08                                                                              |                                                                                   |                                                                                    | 0.21                                                                                | 0.61                                                                                |                                                                                     |                                                                                     | 0.02                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   |                                                                                    | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                | 178                                                                               | 180                                                                               | 168                                                                               | 142                                                                               | 142                                                                               |                                                                                   |                                                                                    | 742                                                                                 | 3871                                                                                |                                                                                     |                                                                                     | 40                                                                                  |
| v/s Ratio Prot                    | 0.07                                                                              | c0.07                                                                             |                                                                                   | c0.06                                                                             | 0.01                                                                              |                                                                                   |                                                                                    | 0.13                                                                                | c0.44                                                                               |                                                                                     |                                                                                     | 0.01                                                                                |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.66                                                                              | 0.66                                                                              | 0.12                                                                              | 0.70                                                                              | 0.19                                                                              |                                                                                   |                                                                                    | 0.60                                                                                | 0.73                                                                                |                                                                                     |                                                                                     | 0.47                                                                                |
| Uniform Delay, d1                 | 55.9                                                                              | 55.9                                                                              | 52.7                                                                              | 58.3                                                                              | 55.8                                                                              |                                                                                   |                                                                                    | 46.1                                                                                | 18.1                                                                                |                                                                                     |                                                                                     | 62.6                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             | 8.5                                                                               | 8.3                                                                               | 0.3                                                                               | 14.7                                                                              | 0.6                                                                               |                                                                                   |                                                                                    | 1.4                                                                                 | 1.3                                                                                 |                                                                                     |                                                                                     | 8.6                                                                                 |
| Delay (s)                         | 64.4                                                                              | 64.2                                                                              | 53.0                                                                              | 73.0                                                                              | 56.5                                                                              |                                                                                   |                                                                                    | 47.5                                                                                | 19.4                                                                                |                                                                                     |                                                                                     | 71.3                                                                                |
| Level of Service                  | E                                                                                 | E                                                                                 | D                                                                                 | E                                                                                 | E                                                                                 |                                                                                   |                                                                                    | D                                                                                   | B                                                                                   |                                                                                     |                                                                                     | E                                                                                   |
| Approach Delay (s)                |                                                                                   | 59.2                                                                              |                                                                                   |                                                                                   | 68.0                                                                              |                                                                                   |                                                                                    |                                                                                     | 23.2                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 30.1                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.74                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 130.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 75.3%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>c Critical Lane Group</b>      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# 1: US 29 & Hilton Heights Road/Commercial Driveway

## HCM Signalized Intersection Capacity Analysis

Build 2030 Conditions PM



| Movement               | SBT   | SBR  |
|------------------------|-------|------|
| Lane Configurations    | ↑↑↑↑  | ↑    |
| Traffic Volume (vph)   | 1788  | 142  |
| Future Volume (vph)    | 1788  | 142  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 6.0   | 6.0  |
| Lane Util. Factor      | 0.86  | 1.00 |
| Frt                    | 1.00  | 0.85 |
| Flt Protected          | 1.00  | 1.00 |
| Satd. Flow (prot)      | 6408  | 1583 |
| Flt Permitted          | 1.00  | 1.00 |
| Satd. Flow (perm)      | 6408  | 1583 |
| Peak-hour factor, PHF  | 0.97  | 0.97 |
| Adj. Flow (vph)        | 1843  | 146  |
| RTOR Reduction (vph)   | 0     | 85   |
| Lane Group Flow (vph)  | 1843  | 61   |
| Heavy Vehicles (%)     | 2%    | 2%   |
| Turn Type              | NA    | Perm |
| Protected Phases       | 6     |      |
| Permitted Phases       |       | 6    |
| Actuated Green, G (s)  | 54.1  | 54.1 |
| Effective Green, g (s) | 54.1  | 54.1 |
| Actuated g/C Ratio     | 0.42  | 0.42 |
| Clearance Time (s)     | 6.0   | 6.0  |
| Vehicle Extension (s)  | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 2666  | 658  |
| v/s Ratio Prot         | c0.29 |      |
| v/s Ratio Perm         |       | 0.04 |
| v/c Ratio              | 0.69  | 0.09 |
| Uniform Delay, d1      | 31.1  | 23.0 |
| Progression Factor     | 1.00  | 1.00 |
| Incremental Delay, d2  | 1.5   | 0.3  |
| Delay (s)              | 32.6  | 23.3 |
| Level of Service       | C     | C    |
| Approach Delay (s)     | 32.3  |      |
| Approach LOS           | C     |      |
| Intersection Summary   |       |      |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | EB  | EB  | EB  | WB  | WB  | NB  | NB  | NB   | NB   | NB   | NB   | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|
| Directions Served     | L   | LT  | R   | L   | TR  | UL  | L   | T    | T    | T    | TR   | UL  |
| Maximum Queue (ft)    | 186 | 153 | 93  | 188 | 97  | 246 | 310 | 350  | 359  | 318  | 290  | 114 |
| Average Queue (ft)    | 117 | 62  | 36  | 94  | 36  | 143 | 171 | 225  | 234  | 207  | 156  | 13  |
| 95th Queue (ft)       | 178 | 146 | 73  | 162 | 78  | 218 | 253 | 330  | 331  | 307  | 273  | 64  |
| Link Distance (ft)    | 368 | 368 |     | 246 | 246 |     |     | 1553 | 1553 | 1553 | 1553 |     |
| Upstream Blk Time (%) |     |     |     | 0   |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     | 0   |     |     |     |      |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 225 |     |     | 425 | 425 |      |      |      |      | 290 |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |      |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |      |      |     |

Intersection: 1: US 29 & Hilton Heights Road/Commercial Driveway

| Movement              | SB   | SB   | SB   | SB   | SB  |
|-----------------------|------|------|------|------|-----|
| Directions Served     | T    | T    | T    | T    | R   |
| Maximum Queue (ft)    | 385  | 366  | 325  | 280  | 109 |
| Average Queue (ft)    | 276  | 266  | 227  | 148  | 42  |
| 95th Queue (ft)       | 352  | 342  | 308  | 254  | 85  |
| Link Distance (ft)    | 1830 | 1830 | 1830 | 1830 |     |
| Upstream Blk Time (%) |      |      |      |      |     |
| Queuing Penalty (veh) |      |      |      |      |     |
| Storage Bay Dist (ft) |      |      |      | 310  |     |
| Storage Blk Time (%)  | 4    |      |      | 0    | 0   |
| Queuing Penalty (veh) | 1    |      |      | 0    | 0   |

Network Summary

Network wide Queuing Penalty: 1