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# Traffic Analysis Report Three Chopt Road

Henrico County Project No. 556126-701-245-00  
VDOT Project 9999-043-188, PE101

*Site:*

Three Chopt Road  
Barrington Hill Dr. to 1,000 ft east of Gaskins Rd.  
Henrico County, Virginia

*Prepared for:*

Henrico County  
Department of Public Works  
4301 East Parham Road  
P.O. Box 27032  
Richmond, Virginia 23273

*Prepared by:*

Earth Tech, Inc.  
7870 Villa Park Drive, Suite 400  
Richmond, Virginia 23228

*October 3, 2005*

Earth Tech Project No. 76154

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## 1.0 INTRODUCTION

The purpose of this report is to provide the results of a traffic analysis of Three Chopt Road between Barrington Hill Drive and Pemberton Road (State Route 157). Exhibit 1 depicts the project location. Included in the traffic analysis is an assessment of existing conditions, based upon Year 2005 traffic volumes, and an assessment of traffic operations in Project Completion Year 2013 and Future Year 2034, under No-Build and Build conditions.

**Exhibit 1: Project Location Map**



## 2.0 EXISTING CONDITIONS

The study segment of Three Chopt Road is 1.8 miles in length and has a posted speed of 45 MPH. Segments west of Cox Road have been posted for a maximum safe speed of 35 MPH due to existing substandard horizontal alignment. Photographs of existing conditions can be found in Appendix A. Three Chopt Road is generally a two-lane facility (see Photograph 1) except for the approaches to the Church Road Rd/Cox Road and Gaskins Road intersections. Here, short sections of a four-lane, divided roadway exist, which provides two through lanes in each direction with a median left-turn lane. As a result of recent development, some sections of Three Chopt Road have been widened in one or both directions and curb and gutter provided (see Photograph 2.)

Traffic volumes vary on Three Chopt Road within the study area, from an average of 8,500 vehicles per day (VPD) west of Cox/Church Road, 16,000 VPD between Cox/Church Road and Gaskins Road, and to 14,500 VPD east of Gaskins Road. Major cross streets such as Cox Road carry more than 15,000 VPD, while Gaskins Road carries 39,000 VPD.

The horizontal alignment of Three Chopt Road is generally satisfactory, except for the noted segment west of Cox Road, and the vertical alignment is deficient at many locations. Two signalized intersections and numerous unsignalized intersections exist within the study area, with additional intersections planned

for new developments in the foreseeable future. The signalized intersections are located at Cox/Church Road and at Gaskins Road, and have demand-actuated signal timings.

## 2.1 Traffic Operation Field Observations

The two signalized intersections noted above are the critical points for controlling traffic flow along Three Chopt Road within the study area. Because of high traffic volumes, traffic queues are common at these signalized intersections during peak periods. These traffic queues often prevent traffic from entering left- or right-turn lanes in the peak direction. During field visits, significant traffic queues (more than 15 vehicles per lane) were observed during peak periods at both intersections (see Section 2.3.3 for queuing observations under existing conditions.) However, each intersection has unique traffic operational problems, as discussed below:

### Cox/Church Road/Three Chopt Road intersection

**AM Peak:** During the AM peak hour the northbound, westbound, and eastbound approaches experience significant traffic queues. Queuing is most pronounced on the northbound approach where traffic queues normally block the left-turn bay. It should be noted that northbound through traffic generally avoids using the outside lane of Church Road since this lane ends a short distance north of Three Chopt Road on Cox Road and traffic must merge before crossing the I-64 bridge. Consequently, the outside lane essentially operates as a right-turn lane to eastbound Three Chopt Road or is used as right-turn access to the small shopping center in the northeast quadrant of the intersection (see Photograph 3). The outside lane of Three Chopt Road on the westbound approach serves as a *de facto* right-turn lane where twice as many vehicles turn right to Cox Road compared to the through volume on westbound Three Chopt Road (see Photograph 4). A major traffic movement in the eastbound direction is the left-turn from Three Chopt Road to northbound Cox Road where traffic queues were observed that often filled up the left-turn bay (see Photograph 5).

**PM Peak:** In the PM peak hour queuing is most prominent on the southbound approach of Cox Road where queues commonly extend to the I-64 overpass (see Photograph 6). Through traffic queues also commonly block the left-turn bay. Because of sight distance restrictions a "NO TURN ON RED" sign has been placed on the southbound intersection approach. This prohibition for right-turning traffic to westbound Three Chopt Road contributes to queuing in the southbound outside lane. Significant queues were observed in the inside eastbound through lane of Three Chopt Road, while in the westbound direction the most significant queue observed was for left-turning traffic destined for southbound Church Road, which exceeded the left-turn storage bay.

### Gaskins Road/Three Chopt Road intersection

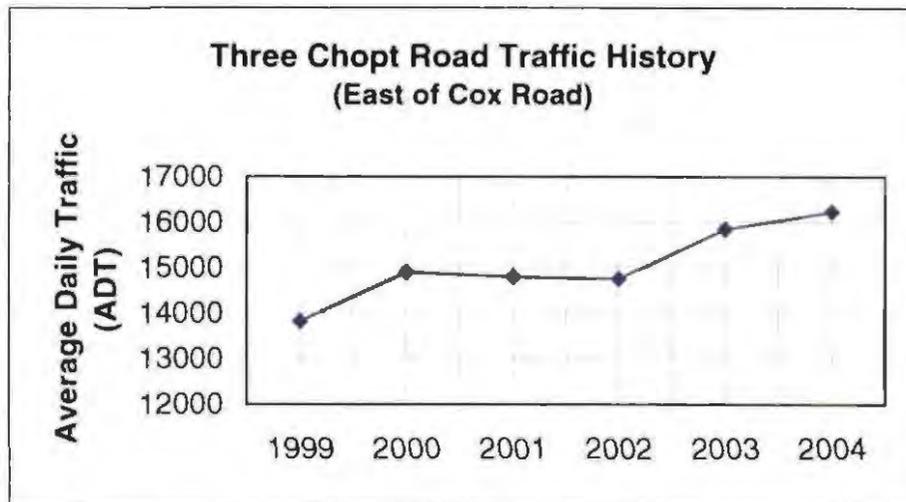
**AM Peak:** During the AM peak hour traffic queues are experienced on the northbound, westbound, and eastbound approaches. Traffic on northbound Gaskins Road is the most intense, with queues extending almost back to Ridgefield Parkway. On the westbound approach of Three Chopt Road, the traffic demand for the right turn to northbound Gaskins Road is almost equal to the westbound through traffic. This results in the outside lane serving as a *de facto* right-turn lane. Traffic queues extending east to the Winespring Court intersection were observed. On the eastbound approach of Three Chopt Road traffic queues were observed to extend westward to Pell Street. This commonly blocks access to the median left-turn lane for traffic wishing to turn left to northbound Gaskins Road (see Photograph 7).

**PM Peak:** Traffic congestion at this intersection has an adverse impact to traffic operations at the I-64 interchange. Queues were observed on the southbound approach of Gaskins Road that extended through the I-64 interchange; including the I-64 off-ramps (see Photograph 8). The most significant queue was observed at the exit ramp from westbound I-64; with traffic queues extending all the way back to the mainline ramp gore area. Traffic spillover was observed on Gaskins Road at the southbound left-turn lane to eastbound Three Chopt Road. Queuing in the northbound direction on Gaskins Road was also significant. Similar to the AM peak, traffic queues on westbound Three Chopt Road were observed extending to the Winespring Court intersection. However, unlike the AM peak, the approach carried a higher percentage of through vehicles during the PM peak compared to right-turning vehicles. In the eastbound direction traffic queues usually blocked access to the left-turn bay.

**2.2 Three Chopt Road Traffic History**

Since 1999 Henrico County Department of Public Works has posted traffic data on their website for certain segments of Three Chopt Road. Average daily traffic (ADT) traffic volumes have been posted each year for a location 300 feet east of Cox Road, so this location was used to determine traffic history for the project area. Exhibit 2 depicts traffic history at this location between 1999 and 2004. It should be noted that Route 288 was fully opened in 2005, and with the ongoing development in the Short Pump area and along Three Chopt Road, traffic growth shown in Exhibit 2 may not necessarily continue at the same rate.

**Exhibit 2: Three Chopt Road Traffic History**



**2.3 Existing Conditions Traffic Analysis**

**2.3.1 Existing Traffic Data**

To obtain Year 2005 ADT volumes, the Year 2004 ADT volumes from the County’s web site were extrapolated to Year 2005 using a 2% or 3% annual growth rate as applicable. (According to Henrico County’s Department of Public Works a traffic growth rate of 3% is anticipated along Three Chopt Road west of Cox Road and 2% east of Cox Road.) This methodology was applied to all approaches to the two major intersections except for two legs of the Three Chopt Road/Gaskins Road intersection. For the eastern leg Year 2005 traffic counts supplied by the County were used without adjustment. The latest

ADT counts for Gaskins Road north of Three Chopt Road were taken in 1999, so were considered outdated and not used. Instead, Year 2005 ADT volumes were derived for this leg by determining the ratio of ADT volumes to Year 2005 peak hour volume counts for the southern leg of this intersection and applying this ratio to the peak hour counts taken for the northern leg (See Figure 2). The base data used for existing and future traffic volumes is included in Appendix B.

In April 2005, turning movement traffic counts with vehicle classification, tabulated in 15-minute increments, were collected at the two major intersections on the project during two hours in the morning peak period and two hours during the afternoon peak period. A review of the turning movement traffic data indicates that the AM peak hour occurs between 7:30 and 8:30 AM, while the PM peak hour occurs between 5:00 and 6:00 PM for the two intersections. Accordingly, the traffic capacity analysis for the listed intersections is based upon these two peak periods.

### 2.3.2 Traffic Capacity Analysis

A highway capacity analysis to determine traffic operational Level of Service (LOS) was performed for the corridor using the Highway Capacity Manual (HCM) module of the SYNCHRO traffic simulation program. The existing peak hour traffic volumes for the two intersections (as shown in Figure 2) were analyzed using existing traffic signal timings provided by the County. Other factors used in the analysis, such as truck percentages and peak hour factors (PHF), were based upon traffic turning movement data noted under Section 2.3.1.

The LOS is a quality measurement of traffic flow in terms of speed and travel time, freedom to maneuver, comfort, and convenience. There are six LOS designations, represented by the letters A through F, with LOS A representing the best operating conditions and LOS F the worst. The criteria used to determine LOS at signalized intersections are shown below.

**Table 1 Level of Service (LOS) Criteria**

| Level of Service (LOS) | Signalized Intersections<br>Vehicle Delay (Secs.) |
|------------------------|---|
| A                      | Less than 10                                      |
| B                      | >10-20  |
| C                      | >20-35  |
| D                      | >35-55  |
| E                      | >55-80  |
| F                      | More than 80                                      |

A summary of LOS results for Existing Conditions is shown in Table 2 as well as in Figure 2. It should be noted that LOS results shown in this report represent the average delay for each intersection approach, as well as the average delay for the entire intersection. LOS C is the desired minimum for all intersections. However, since this is difficult to achieve in major urbanized areas such as Richmond, LOS D is commonly accepted. All LOS E and F results are shown in **bold**. HCM printouts of the LOS analysis for Existing Conditions are compiled in Appendix C.

Volume-to-capacity ratios ( $v/c$ ) are also shown in table 2 for the overall intersection. A  $v/c$  ratio is defined as the traffic flow rate of the intersection compared to the capacity of the intersection. Any  $v/c$  ratio above 1.00 indicates traffic operational problems.

**Table 2 Traffic Analysis Results: Existing Conditions (Year 2005)**

| Intersection of Three Chopt Road with: | Level of Service (LOS) AM (PM) | Delay in Seconds AM (PM) | Volume to Capacity (v/c) Ratio | Remarks              |
|--|--------------------------------|--------------------------|--------------------------------|----------------------|
| <b>Cox/Church Road</b>                 |                                |                          |                                |                      |
| EB Approach                            | D (D)                          | 53 (48)                  |                                |                      |
| WB Approach                            | D (D)                          | 51 (47)                  |                                |                      |
| NB Approach                            | D (D)                          | 37 (46)                  |                                |                      |
| SB Approach                            | C (D)                          | 31 (36)                  |                                | No Right Turn on Red |
| Overall Average                        | D (D)                          | 44 (43)                  | 0.82 (0.72)                    |                      |
| <b>Gaskins Road</b>                    |                                |                          |                                |                      |
| EB Approach                            | F (E)                          | 91 (77)                  |                                |                      |
| WB Approach                            | F (F)                          | 121 (103)                |                                |                      |
| NB Approach                            | F (D)                          | 83 (41)                  |                                |                      |
| SB Approach                            | D (D)                          | 46 (51)                  |                                |                      |
| Overall Average                        | F (E)                          | 80 (59)                  | 1.06 (0.89)                    |                      |

**2.3.3 Traffic Queuing Observations**

Field observations were made during AM and PM peak periods, with vehicle counts of standing queues taken at all approaches to the two signalized intersections to determine queuing problem areas. A tabulation of the observed is shown in Table 3.

**Table 3 Observed Queuing: Existing Conditions (Year 2005)**

| Intersection of Three Chopt Road with: | Storage Bay Length (ft) | No. Queued Vehicles AM (PM) | Remarks                                  |
|--|-------------------------|-----------------------------|--|
| <b>Cox/Church Road</b>                 |                         |                             |  |
| NB Left                                | 200                     | 3(3)                        | Two-way left-turn lane (TWLTL)           |
| NB Thru                                | N/A                     | 18(7)                       | Thru traffic blocks left-turn lane in AM |
| NB Thru/Right                          | N/A                     | 4(6)                        | Generally used as right-turn lane        |
| SB Left                                | 200                     | 3(22)                       | TWLTL exceeds storage length in PM       |
| SB Thru                                | N/A                     | 2(16)                       | Blocks left-turn lane in PM              |
| SB Thru/Right                          | N/A                     | 2(9)                        | RTOR prohibited                          |
| EB Left                                | 300                     | 10(16)                      | Left-turn bay filled in PM               |
| EB Thru                                | N/A                     | 9(24)                       | Thru traffic blocks left-turn lane in PM |
| EB Thru/Right                          | N/A                     | 3(7)                        |  |
| WB Left                                | 200                     | 2(11)                       | Exceeds storage length in PM             |
| WB Thru                                | N/A                     | 5(12)                       | Thru traffic blocks left-turn lane in PM |
| WB Thru/Right                          | N/A                     | 14(10)                      | Serves as de facto right-turn lane in AM |
| <b>Gaskins Road</b>                    |                         |                             |  |
| EB Left                                | 250                     | >30(12)                     | Exceeds storage length in AM & PM        |
| EB Thru                                | N/A                     | 13(25)                      | Blocks left-turn lane in AM & PM         |
| EB Right                               | N/A                     | 4(14)                       | Exceeds storage length in PM             |
| WB Left                                | 200                     | 5(4)                        |  |

| Intersection of Three Chopt Road with: | Storage Bay Length (ft) | No. Queued Vehicles AM (PM) | Remarks  |
|--|-------------------------|-----------------------------|--|
| WB Thru                                | N/A                     | 14(19)                      | Blocks left-turn lane in AM & PM                                     |
| WB Right                               | N/A                     | 12(10)                      | Serves as de facto right-turn lane in AM                             |
| NB Left                                | 260                     | 4(6)                        |  |
| NB Thru                                | N/A                     | >30(>30)                    | Queues extend to Ridgefield Pkwy in AM; blocks turn lanes in AM & PM |
| NB right                               | 200                     | 2(4)                        |  |
| SB Left                                | 500                     | 5(13)                       | Exceeds storage length in PM   |
| SB Thru                                | N/A                     | 6(>30)                      | Queues extend thru I-64 Intg. In PM                                  |
| SB Right                               | 600                     | 3(13)                       | Right-turn only lane from I-64 Ramp                                  |

As can be seen, significant queuing occurs at the two intersections, especially at the Gaskins Road intersection.

### 3.0 PROJECT COMPLETION YEAR 2013 CONDITIONS

#### 3.1 Future Short-Range Planning in the Three Chopt Road Corridor

VDOT's current Six Year Improvement Program includes funding for Preliminary Engineering, Right-of-Way, and Construction to widen Three Chopt Road to four lanes between Barrington Hill Drive and Cox Road. Construction is anticipated to begin in 2009. Funds for Preliminary Engineering and Right-of-Way only have been allocated for the future widening of Three Chopt Road to four lanes between Cox Road and Gaskins Road. Construction for this segment is estimated to begin in 2011. Assuming a two-year construction program for the latter section of Three Chopt Road, a Project Completion Year of 2013 was selected for traffic projection purposes.

#### 3.2 Future Planning in the Three Chopt Road Corridor

The Richmond Regional 2026 Long-Range Transportation Plan Transportation (LRTP) Financially Constrained Projects List: Existing and Committed (E + C), also includes the widening of Three Chopt Road to four lanes. In addition, an interchange modification of the I-64/Gaskins Road interchange and widening I-64 to eight lanes between I-295 and Broad Street are both included in the Vision Plan List for the Richmond Regional LRTP. See Appendix E for the LRTP financially constrained project list.

#### 3.3 Project Completion Year 2013 Traffic Projections

As noted previously, Henrico County's Department of Public Works projects a traffic growth rate of 3% along Three Chopt Road west of Cox Road and 2% east of Cox Road. These growth rates were used to extrapolate Year 2005 ADT volumes to Year 2013 ADT volumes. Using Year 2013 ADT volumes as a base, the following methodology has been used to determine Project Completion Year 2013 traffic turning movements at the Cox/Church Road and Gaskins Road intersections with Three Chopt Road.

AM and PM Peak Hour volumes for each intersection approach were derived using existing peak hour-to-ADT ratios based upon turning movement counts noted under Section 2.3.1. Likewise, AM and PM Peak Hour turning movements were assigned based upon the traffic splits obtained from these same counts (see Figure 3 for the resulting Year 2013 traffic data).

### 3.4 Project Completion Year 2013 Traffic Analysis

Three Chopt Road has been analyzed under a No-Build and Build scenario for Year 2013. Using the HCM module of the SYNCHRO program, an intersection traffic analysis was performed for No-Build conditions, assuming existing lane configurations and signal timings. The Build scenario assumes Three Chopt Road will be widened to four lanes with improvements to the two intersections as noted in Section 3.4.

### 3.5 Project Completion Year 2013 Intersection Improvements

In order for the two major intersections to perform properly under the recommended design, two improvements outside of the scope of this project must be in place. These are:

- Widening of Cox Road across I-64 to four lanes
- Providing a two-lane on-ramp from northbound Gaskins Road to eastbound I-64

While not specifically identified, both of these improvements would likely be accomplished under the projects listed in the Vision Plan List for the Richmond Regional LRTP noted under Section 3.2. The traffic analysis assumes that the following recommended intersection improvements would be in place by Year 2013.

#### Cox/Church Road Intersection

#1 - Right-turn lane from westbound Three Chopt Road to northbound Cox Road

#2 - Right-turn lane from southbound Cox Road to westbound Three Chopt Road

#### Gaskins Road Intersection

#3 - Dual left-turn lane from southbound Gaskins Road to eastbound Three Chopt Road

#4 - Dual left-turn lane from northbound Gaskins Road to westbound Three Chopt Road

#5 - Dual left-turn lane from eastbound Three Chopt Road to northbound Gaskins Road

#6 - Dual left-turn lane from westbound Three Chopt Road to southbound Gaskins Road

#7 - Right-turn lane from eastbound Three Chopt Road to southbound Gaskins Road

#8 - Right-turn lane from westbound Three Chopt Road to northbound Gaskins Road

#9 - Third northbound lane from a point south of Three Chopt Road to I-64 on-ramp and third southbound lane from I-64 off-ramp to a point south of Three Chopt Road

A summary of results of an operational analysis for Project Completion Year 2013 under No-Build and Build conditions is shown in Table 4 and Figures 3 and 4. It should be noted that even with one or more of the recommended improvements, the Gaskins Road intersection will still experience an unsatisfactory LOS by Year 2013. (LOS E and F results are shown in **bold**.) HCM printouts of these results are included in Appendix D.

**Table 4 Traffic Analysis Results: Project Completion Year 2013**

| Intersection of Three Chopt Road with: |    | Level of Service (LOS)<br>Delay in Seconds<br>v/c Ratio - Overall Only<br>AM (PM) |                                 |                                 |                                |                                 |                                 |                                |                                | Remarks                        |
|--|----|---|---------------------------------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------------------|
|  |    | No-Build  | Build                           |                                 |                                |                                 |                                 |                                |                                |                                |
| <i>Cox/Church Rd</i>                   |    |   | <b>Rec. #1</b>                  | <b>Rec. #2</b>                  |                                |                                 | <b>All Rec.</b>                 |                                |                                |                                |
| Approach                               | EB | D (D)<br>50 (51)  | D (D)<br>40 (53)                | D (D)<br>41 (51)                |                                |                                 | D (D)<br>38 (44)                |                                |                                |                                |
|  | WB | D (D)<br>49 (45)  | D (D)<br>46 (37)                | D (D)<br>48 (39)                |                                |                                 | D (D)<br>41 (37)                |                                |                                |                                |
|  | NB | D (D)<br>33 (48)  | D (D)<br>40 (48)                | D (D)<br>41 (52)                |                                |                                 | C (D)<br>34 (46)                |                                |                                |                                |
|  | SB | C (D)<br>31 (40)  | C (D)<br>31 (43)                | C (C)<br>32 (34)                |                                |                                 | C (C)<br>30 (31)                |                                | Existing No Right Turn on Red  |                                |
| Overall Average                        |    | D (D)<br>41 (44)<br>0.69(0.75)  | D (D)<br>40 (44)<br>0.85 (0.73) | D (D)<br>41 (41)<br>0.79 (0.73) |                                |                                 | D (D)<br>36 (37)<br>0.86(0.77)  |                                |                                |                                |
| <i>Gaskins Rd</i>                      |    |   | <b>Rec. #3</b>                  | <b>Rec. #4</b>                  | <b>Rec. #5</b>                 | <b>Rec. #6</b>                  | <b>Rec. #7</b>                  | <b>Rec. #8</b>                 | <b>Rec.#9</b>                  | <b>All Rec.</b>                |
| Approach                               | EB | F (F)<br>125 (81)   | F (F)<br>94 (90)                | F (F)<br>107 (81)               | F (F)<br>84 (97)               | F (F)<br>106 (85)               | F (F)<br>111 (83)               | F (F)<br>92 (96)               | E (E)<br>76 (79)               | D (D)<br>41 (46)               |
|  | WB | F (F)<br>158 (113)  | F (F)<br>125 (104)              | F (F)<br>152 (92)               | F (F)<br>96 (91)               | F (F)<br>152 (100)              | F (F)<br>141 (102)              | F (F)<br>115 (94)              | F (F)<br>86 (90)               | D (D)<br>45 (48)               |
|  | NB | F (D)<br>144 (43)   | F (D)<br>117 (41)               | F (D)<br>128 (50)               | E (D)<br>74 (42)               | F (D)<br>129 (48)               | F (D)<br>129 (48)               | F (D)<br>109 (42)              | F (D)<br>97 (45)               | D (C)<br>37 (24)               |
|  | SB | D (E)<br>50 (69)  | E (E)<br>71 (58)                | E (D)<br>59 (49)                | D (D)<br>50 (49)               | E (E)<br>65 (59)                | E (E)<br>65 (59)                | E (D)<br>63 (50)               | E (D)<br>69 (53)               | C (C)<br>35 (28)               |
| Overall Average                        |    | F (E)<br>117 (70)<br>1.21(0.99)   | F (E)<br>101 (64)<br>1.15(0.98) | F (E)<br>109 (60)<br>1.23(0.92) | E (E)<br>72 (60)<br>1.05(0.90) | F (E)<br>111 (65)<br>1.21(0.95) | F (E)<br>110 (65)<br>1.21(0.95) | F (E)<br>94 (60)<br>1.18(0.90) | F (E)<br>84 (60)<br>1.04(1.88) | D (C)<br>38 (32)<br>0.92(0.74) |

### 3.6 Project Completion Year 2013 Conditions Queuing Analysis

A Queuing Analysis for the AM and PM peak hours was also performed for Build Year 2013 (all recommendations combined) for the two signalized intersections using the SYNCHRO traffic simulation model. The queuing analysis produces 50th Percentile and 95th Percentile Maximum Queue lengths, where the 50th percentile maximum queue is the maximum back of queue on a typical cycle, while the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. Table 5 shows 95th percentile (the worst case) traffic queues only. This analysis indicates deficient storage lengths for one or more approaches of the intersections listed in Table 5. Build storage bay lengths are shown to be the same as existing lengths for analysis purposes. These lengths will be further evaluated during the design phase based upon queuing analysis and field conditions.

**Table 5 Queuing Analysis Results: No-Build vs. Build Year 2013**

| Intersection of Three Chopt Road with: | Storage Bay Length (ft) |                  | Queuing (Q) Length (ft) <sup>2</sup> |               | Remarks   |
|--|-------------------------|------------------|--------------------------------------|---------------|---|
|  | No-Build                | Build            | No-Build AM (PM)                     | Build AM (PM) |   |
| <b>Cox/Church Road</b>                 |                         |                  |                                      |               |   |
| EB Left                                | 300                     | 300              | 484(188)                             | 384(162)      | Left-turn bay fills in AM                                   |
| EB Thru                                | N/A                     | N/A              | 214(238)                             | 189(210)      | Thru traffic blocks left-turn lane in PM                    |
| EB Thru/Right                          | N/A                     | N/A              | -                                    | -             |   |
| WB Left                                | 200                     | 200              | 163(490)                             | 162(349)      | Exceeds storage length in PM                                |
| WB Thru                                | N/A                     | N/A              | 104(372)                             | 83(223)       | Thru traffic blocks left-turn lane in PM                    |
| WB Right                               | N/A                     | 200              | -                                    | 81(52)        | De facto right-turn lane in AM (Exist.)                     |
| NB Left                                | 200 <sup>3</sup>        | 200              | 43(90)                               | 40(76)        | Exist. TWLTL  |
| NB Thru                                | N/A                     | N/A              | 470(167)                             | 433(148)      | Thru traffic blocks left-turn lane in AM                    |
| NB Thru/Right                          | N/A                     | N/A              | -                                    | -             |   |
| SB Left                                | 200 <sup>3</sup>        | 200 <sup>4</sup> | 144(544)                             | 140(389)      | Exceeds storage length in PM                                |
| SB Thru                                | N/A                     | N/A              | 75(530)                              | 56(312)       | Blocks left-turn lane in PM                                 |
| SB Right                               | N/A                     | 200              | -                                    | 53(250)       | Right-turn on red prohibited (Existing)                     |
| <b>Gaskins Road</b>                    |                         |                  |                                      |               |   |
| EB Left                                | 250                     | 400              | >975(333)                            | 289(114)      | Prop. dual left-turn lanes                                  |
| EB Thru                                | N/A                     | N/A              | 272(440)                             | 147(192)      | Blocks left-turn lane in AM & PM                            |
| EB Right                               | N/A                     | 200              | -                                    | 36(91)        | Prop. right-turn lane                                       |
| WB Left                                | 200                     | 200              | 103(225)                             | 41(79)        | Prop. Dual left-turn lane                                   |
| WB Thru                                | N/A                     | N/A              | 574(574)                             | 178(226)      | Blocks left-turn lane in AM & PM                            |
| WB Right                               | N/A                     | 200              | -                                    | 269(58)       | Prop. right-turn lane                                       |
| NB Left                                | 260                     | 260              | 262(292)                             | 94(100)       | Prop. Dual Lt. turn Lane                                    |
| NB Thru                                | N/A                     | N/A              | 1334(683)                            | 537(286)      | NB queues block turn lanes in AM & PM                       |
| NB right                               | 200                     | 200              | 76(96)                               | -             | Rt. Lane serves Thru/Rt. Turns (Prop.)                      |
| SB Left                                | 500                     | 500              | 315(412)                             | 119(117)      | Prop. Dual left-turn lane                                   |
| SB Thru                                | N/A                     | N/A              | 575(1467)                            | 322(583)      | Queues extend thru I-64 Intg. in PM; could block turn lanes |
| SB Right                               | 600 <sup>4</sup>        | N/A              | 106(286)                             | -             | Rt. Lane serves Thru/Rt. Turns (Prop.)                      |

<sup>2</sup>Q lengths based upon SYNCHRO analysis.

<sup>3</sup>Adjacent to a Two-way Lt. Turn Lane (TWLTL) – length is indeterminate.

<sup>4</sup>Exist. is right turn lane from I-64 off-ramp.

## 4.0 FUTURE YEAR 2034 CONDITIONS

### 4.1 Future Planning in the Three Chopt Road Corridor

See Section 3.1 for a discussion of this topic.

### 4.2 Future Year 2034 Traffic Projections

Similar to Project Completion Year traffic projection methodology, a growth rate of 3% was used along Three Chopt Road west of Cox Road and 2% east of Cox Road to extrapolate Future Year 2034 ADTs and peak hour turning movements were derived using the ratios used for the Project Completion Year 2013. These data are shown in Figure 5.

### 4.3 Future Year 2034 Traffic Analysis

No-Build and Build scenarios for Year 2034 were also analyzed for the Three Chopt Road intersections. Results of the analysis are shown in Table 6 and in Figures 5 and 6. All LOS E and F results are shown in **bold**. HCM printouts of these results are compiled in Appendix E.

### 4.4 Future Year 2034 Intersection Analysis

The improvements recommended for Project Completion Year 2013, served as the basis for the future Year 2034 intersection analysis and are repeated in Section 4.4.1. As can be seen in Table 6, projected traffic growth will result in LOS F for the two intersections. Because of existing development in the corridor an acceptable LOS D or better is not practical without major right of way impacts. The recommended design seeks to provide the best LOS possible given the right of way constraints.

#### 4.4.1 Recommended Design Elements (Same as Project Completion Design)

##### Cox/Church Road Intersection

- #1 - Right-turn lane from westbound Three Chopt Road to northbound Cox Road
- #2 - Right-turn lane from southbound Cox Road to westbound Three Chopt Road

##### Gaskins Road Intersection

- #3 - Dual left-turn lane from southbound Gaskins Road to eastbound Three Chopt Road
- #4 - Dual left-turn lane from northbound Gaskins Road to westbound Three Chopt Road
- #5 - Dual left-turn lane from eastbound Three Chopt Road to northbound Gaskins Road
- #6 - Dual left-turn lane from westbound Three Chopt Road to southbound Gaskins Road
- #7 - Right-turn lane from eastbound Three Chopt Road to southbound Gaskins Road
- #8 - Right-turn lane from westbound Three Chopt Road to northbound Gaskins Road
- #9 - Third northbound lane from a point south of Three Chopt Road to I-64 on-ramp and third southbound lane from I-64 off-ramp to a point south of Three Chopt Road

Future traffic operations at the Cox/Church Road Intersection could be enhanced by the use of dual shared left-turn lanes on all approaches of the intersection. This will require split signal phasing, which is discussed in more detail under Section 5.1.

**Table 6 Traffic Analysis Results: Future Year 2034**

| Intersection of Three Chopt Road with: |    | Level of Service (LOS)<br>Delay in Seconds<br>v/c Ratio - Overall Only<br>AM (PM) |                                  |                                  |                                  |                                  |                                 |                                  |                                  |                                 | Remarks                                |
|--|----|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|---------------------------------|----------------------------------|----------------------------------|---------------------------------|--|
|  |    | No-Build  |                                  | Build                            |                                  |                                  |                                 |                                  |                                  |                                 |  |
| <i>Cox/Church Rd</i>                   |    |   | Rec. #1                          |                                  |                                  | Rec. #2                          |                                 |                                  | All Rec.                         |                                 |  |
| Approach                               | EB | F (E)<br>224(63)  | F (F)<br>109(123)                |                                  |                                  | F (F)<br>116(108)                |                                 |                                  | F (F)<br>112(95)                 |                                 |  |
|  | WB | D (F)<br>50(179)  | F (F)<br>133(93)                 |                                  |                                  | F (F)<br>122(84)                 |                                 |                                  | F (E)<br>130(78)                 |                                 |  |
|  | NB | F (E)<br>231(60)  | F (F)<br>168(101)                |                                  |                                  | F (F)<br>159(145)                |                                 |                                  | F (F)<br>169(147)                |                                 |  |
|  | SB | D (F)<br>39(161)  | D (F)<br>55(133)                 |                                  |                                  | D (E)<br>54(77)                  |                                 |                                  | D (E)<br>47(70)                  |                                 | Existing<br>No Right<br>Turn on<br>Red |
| Overall Average                        |    | F (F)<br>172 (136)<br>1.25(1.19)  | F (F)<br>129 (116)<br>1.31(1.15) |                                  |                                  | F (F)<br>125 (93)<br>1.21(1.11)  |                                 |                                  | F (F)<br>129 (86)<br>1.30( 1.12) |                                 |  |
| <i>Gaskins Rd</i>                      |    |   | Rec. #3                          | Rec. #4                          | Rec. #5                          | Rec. #6                          | Rec. #7                         | Rec. #8                          | Rec.#9                           | All Rec.                        |  |
| Approach                               | EB | F (F)<br>284(206)   | F (F)<br>259(185)                | F (F)<br>272(165)                | F (F)<br>211(247)                | F (F)<br>270(167)                | F (F)<br>270(145)               | F (F)<br>262(247)                | F (F)<br>191(148)                | F (F)<br>119(93)                |  |
|  | WB | F (F)<br>469(330)   | F (F)<br>356(279)                | F (F)<br>424(244)                | F (F)<br>308(244)                | F (F)<br>424(247)                | F (F)<br>424(244)               | F (F)<br>278(219)                | F (F)<br>288(232)                | F (F)<br>120(88)                |  |
|  | NB | F (F)<br>397(90)  | F (F)<br>358(80)                 | F (F)<br>345(95)                 | F (F)<br>264(93)                 | F (F)<br>348(114)                | F (F)<br>384(114)               | F (F)<br>329(93)                 | F (F)<br>261(86)                 | F (D)<br>160(48)                |  |
|  | SB | F (F)<br>87(285)  | F (F)<br>118(212)                | F (F)<br>103(201)                | F (F)<br>90(183)                 | F (F)<br>130(215)                | F (F)<br>130(215)               | F (F)<br>122(183)                | F (F)<br>111(200)                | E (F)<br>58(104)                |  |
| Overall Average                        |    | F (F)<br>304 (227)<br>1.82(1.53)  | F (F)<br>275 (181)<br>1.73(1.46) | F (F)<br>279 (173)<br>1.82(1.39) | F (F)<br>214 (176)<br>1.58(1.36) | F (F)<br>287 (185)<br>1.82(1.46) | F (F)<br>287(181)<br>1.82(1.46) | F (F)<br>253 (173)<br>1.83(1.37) | F (F)<br>211 (166)<br>1.54(1.35) | F (F)<br>119 (85)<br>1.35(1.15) |  |

#### **4.4.2 Alternative Design Elements**

In an effort to provide an acceptable LOS for Future Year 2034, various alternatives shown below were analyzed. (See Figure 6 for intersection lane diagrams.) These improvements are in addition to the design element listed under Section 4.4.1. Although such improvements would provide a better LOS, these alternative designs are not recommended due to major impacts to existing developments in the corridor, especially at the intersection areas.

##### Cox/Church Road Intersection

Dual left-turn lane from westbound Three Chopt Road to southbound Church Road

Dual left-turn lane from eastbound Three Chopt Road to northbound Cox Road

Right-turn lane from eastbound Three Chopt Road southbound Church Road

Right-turn lane from northbound Church Road to eastbound Three Chopt Road

Dual left-turn lane from southbound Cox Road to eastbound Three Chopt Road

Six through lanes on Three Chopt Road

The Cox/Church Road intersection has commercial development in three of the four quadrants. A service station is located in the southwest quadrant, while a shopping center occupies the northeast quadrant. In the southeast quadrant is the site of a restaurant which has high retaining walls adjacent to three Chopt Road and Church Road. Any of the improvements noted above will severely impact these commercial developments.

##### Gaskins Road Intersection

Six through lanes on Three Chopt Road

Eight through lanes on Gaskins Road

Widening Three Chopt Road to six lanes will impact existing and ongoing development along this corridor. Significant sections of Three Chopt Road are currently being widened, or have recently been widened to accommodate four lanes of traffic. These improvements will be lost under a six lane proposal. The environmental impacts of six-laning would include an old cemetery and a historic church.

Widening Gaskins Road to eight lanes would be very difficult due to the I-64 interchange constraints and the existing development along Gaskins Road, such as an existing subdivision and Deep Run County Park.

#### **4.5 Future Year 2034 Queuing Analysis**

A Queuing Analysis for No-Build and Recommended Build scenario for Year 2034 was performed, with the results shown in Table 7.

**Table 7 Queuing Analysis Results: No-Build vs. Recommended Build Year 2034**

| Intersection of Three Chopt Road with: | Storage Bay Length (ft) |                  | Queuing (Q) Length (ft) <sup>2</sup> |                    | Remarks   |
|--|-------------------------|------------------|--------------------------------------|--------------------|---|
|  | No-Build                | Build            | No-Build AM (PM) Peak                | Build AM (PM) Peak |   |
| <b>Cox/Church Road</b>                 |                         |                  |                                      |                    |   |
| EB Left                                | 300                     | 300              | 1243(337)                            | 1074(369)          | Left-turn bay fills in AM & PM                              |
| EB Thru                                | N/A                     | N/A              | 443(464)                             | 436(541)           | Thru traffic blocks left-turn lane in AM/ PM                |
| EB Thru/Right                          | N/A                     | N/A              | -                                    | -                  |   |
| WB Left                                | 200                     | 200              | 270(1022)                            | 319(819)           | Exceeds storage length in AM/PM                             |
| WB Thru                                | N/A                     | N/A              | 222(776)                             | 149(429)           | Thru traffic blocks left-turn lane in PM                    |
| WB Thru/Right                          | N/A                     | 200              | -                                    | 535(81)            | Prop. right-turn lane                                       |
| NB Left                                | 200 <sup>3</sup>        | 200              | 63(119)                              | 64(118)            |   |
| NB Thru                                | N/A                     | N/A              | 1205(283)                            | 1048(395)          | Thru traffic blocks left-turn lane in AM                    |
| NB Thru/Right                          | N/A                     | N/A              | -                                    | -                  |   |
| SB Left                                | 200 <sup>3</sup>        | 200 <sup>4</sup> | 219(1054)                            | 287(896)           | Exceeds storage length in AM/PM                             |
| SB Thru                                | N/A                     | N/A              | 139(1147)                            | 100(690)           | Blocks left-turn lane in PM                                 |
| SB Thru/Right                          | N/A                     | 200              | -                                    | 93(484)            | Prop. right-turn lane                                       |
| <b>Gaskins Road</b>                    |                         |                  |                                      |                    |   |
| EB Left                                | 250                     | 400              | 1636(615)                            | 547(259)           | Prop. Dual left-turn lane                                   |
| EB Thru                                | N/A                     | N/A              | 441(945)                             | 232(350)           | Blocks left-turn lane in AM & PM                            |
| EB Right                               | N/A                     | 200              | -                                    | 44(309)            | Prop. right-turn lane                                       |
| WB Left                                | 200                     | 200              | 133(316)                             | 53(160)            | Prop. Dual left-turn lane                                   |
| WB Thru                                | N/A                     | N/A              | 1031(1016)                           | 278(476)           | Blocks left-turn lane in AM & PM                            |
| WB Right                               | N/A                     | 200              | -                                    | 657(82)            | Prop. right-turn lane                                       |
| NB Left                                | 260                     | 260              | 473(530)                             | 155(227)           | Prop. Dual left-turn lane                                   |
| NB Thru                                | N/A                     | N/A              | 2369(1398)                           | 1061(589)          | Mainline queues blocks turn lanes in AM & PM                |
| NB right                               | 200                     | N/A              | 116(168)                             | -                  | Right lane proposed as thru/right lane                      |
| SB Left                                | 500                     | 500              | 498(705)                             | 201(186)           | Prop. dual Left-turn lane                                   |
| SB Thru                                | N/A                     | N/A              | 1024(2716)                           | 516(1370)          | Queues extend thru I-64 Intg. in PM; could block turn lanes |
| SB Right                               | 600                     | N/A              | 213(597)                             | -                  | Right lane proposed as thru/right lane                      |

<sup>2</sup>Q lengths based upon SYNCHRO analysis.

<sup>3</sup>Adjacent to a Two-way Lt. Turn Lane (TWLTL) – length is indeterminate.

<sup>4</sup>Length to be evaluated during design phase.

As indicated by the queuing analysis for Year 2034, the recommended improvements would reduce traffic queues on most approaches at both intersections.

## 5.0 DESIGN CONSIDERATIONS USED IN THE ANALYSIS

### 5.1 Overview of Major Intersections

The capacity analysis of the two major intersections on Three Chopt Road indicates that an acceptable LOS will be difficult to attain without major impacts to existing development along the Three Chopt Road corridor. The following is an overview of the two intersections with the potential design issues and recommended improvements of each:

#### Cox Road/Church Road Intersection

A major design constraint at this intersection is the retaining wall in the southeast quadrant. While it would be desirable to provide a separate right-turn lane at this location to serve the heavy right-turn traffic flow from northbound Church Road to eastbound Three Chopt Road, this action would require reconstruction of the wall approximately 12 feet to the east. This would destroy access to the commercial property at this location and eliminate much of the existing parking. In view of the above, this design feature is not recommended.

As noted under Section 2.1, the existing lane drop on Cox Road prior to the I-64 overpass effectively renders the right lane of the northbound approach to the intersection useless as a through lane. To correct this situation, four lanes must be carried across I-64 to connect with the existing four-lane section on the other side. All the analysis for future No-Build and Build conditions assumes four lanes to be in place across I-64.

#### Recommendation #1: Provide westbound right-turn lane to Cox Road

To serve traffic turning from westbound Three Chopt Road to northbound Cox Road, a separate right-turn lane appears possible by constructing a short retaining wall on the north side of Three Chopt Road. This right-turn lane is a critical need, as this is the major traffic movement on westbound Three Chopt Road during the AM peak period.

#### Recommendation #2: Provide southbound right-turn lane to Three Chopt Road

During the PM peak the major traffic movements occur on southbound Cox Road, with most traffic destined for southbound Church Road, but with significant left and right-turning volumes to Three Chopt Road. Because of sight distance problems, right-turns on red currently are prohibited for southbound traffic, which causes significant delays for traffic turning to westbound Three Chopt Road. A separate turn lane appears possible at this location by widening on the west side of Cox Road.

#### Additional Recommendation (Future): Consider split phasing and optional dual left-turn lanes for the eastbound, westbound, and southbound approaches of the Cox/Church Road intersection

Another major turning movement in the AM peak is for eastbound Three Chopt Road traffic turning north to Cox Road. While it may be desirable to provide a dual left-turn lane to serve this traffic, the retaining wall mentioned above and other commercial development at this intersection would appear to prohibit such an improvement. A possible alternative is to provide dual left-turns for this movement by allowing the center lane of eastbound Three Chopt Road to serve as a shared lane for through and left-turn traffic. This would require split signal phasing for this intersection, which will be discussed in more detail later.

A dual left-turn lane would also be desirable to accommodate heavy PM peak left-turning traffic from southbound Cox Road to eastbound Three Chopt Road. While existing development may preclude this

possibility, the inside lane through lane on southbound Cox Road could be used as a shared lane for left or through traffic. As noted previously, this will require split signal phasing.

Split phasing on all approaches of this intersection may be appropriate to address situations where left-turning volumes are similar in magnitude to through volumes, and where existing development would preclude major widening for the intersection approaches. (See Figure 6 for traffic flow diagram.) A comparison of traffic operations for standard signal phasing versus split phasing is shown in Table 8.

**Table 8 Traffic Analysis Results: Future Year 2034 Cox/Church Intersection  
Standard Signal Phasing vs. Split Phase Signal**

| Intersection of Three Chopt Road with Cox/Church Road | Level of Service (LOS) AM (PM) | Delay in Seconds AM (PM) | Volume to Capacity (v/c) Ratio | Remarks |
|---|--------------------------------|--------------------------|--------------------------------|---------|
| <b>Standard Signal</b>                                |                                |                          |                                |         |
| EB Approach   | F (F)                          | 112 (95)                 |                                |         |
| WB Approach   | F (E)                          | 130 (78)                 |                                |         |
| NB Approach   | F (F)                          | 169 (147)                |                                |         |
| SB Approach   | D (E)                          | 47 (70)                  |                                |         |
| Overall Average                                       | F (F)                          | 129 (86)                 | 1.30 (1.12)                    |         |
| <b>Split Phase Signal</b>                             |                                |                          |                                |         |
| EB Approach   | F (F)                          | 107 (104)                |                                |         |
| WB Approach   | F (F)                          | 104 (83)                 |                                |         |
| NB Approach   | F (F)                          | 96 (131)                 |                                |         |
| SB Approach   | E (F)                          | 59 (89)                  |                                |         |
| Overall Average                                       | F (F)                          | 98 (95)                  | 1.08 (1.08)                    |         |

As can be seen, while still not providing an acceptable LOS, split phasing can reduce delay on certain approaches and reduce v/c ratios for the overall intersection, especially in the AM peak hour. This option is not included in the recommendations for the road design project, but may be considered as an option if justified by future conditions.

**Gaskins Road Intersection**

The most significant issue at the Gaskins Road intersection is its closeness to the I-64 interchange. The diverge point of the northbound on-ramp to eastbound I-64 lies only 600 feet north of Three Chopt Road. Field observations indicate that a large portion of northbound traffic passing through the Gaskins Road intersection is destined for eastbound I-64, so widening the I-64 on-ramp to two lanes is needed to accommodate this traffic. This improvement would likely be part of the I-64 interchange upgrade in the long-range plan, and all analysis assumes this will be in place.

**Recommendation #3: Provide dual left-turn lanes on southbound Gaskins Road**

The maneuver for traffic from the EB I-64 off-ramp desiring to access eastbound Three Chopt Road is very difficult, as two traffic lanes on Gaskins Road must be crossed before entering the left-turn lane to complete this movement. Traffic attempting this movement must not only must wait for gaps in Gaskins Road through traffic, but also wait for queuing traffic in the left-turn lane to dissipate, which contributes to queues on the I-64 off-ramp. Dual left-turn lanes on southbound Gaskins Road would improve this situation by providing additional capacity and more storage area. This would also reallocate more green

time for the heavy through traffic movements. There is sufficient width in the existing median to accommodate the additional turn lane.

**Recommendation #4: Provide dual left-turn lanes on northbound Gaskins Road**

While this is not a major movement, a wide median exists that could accommodate this improvement without further widening to Gaskins Road. This could reduce the green time for this movement, thereby allocating more green time to other movements.

**Recommendation #5: Provide dual left-turn lanes on eastbound Three Chopt Road**

An analysis shows that dual left-turn movements should desirably be provided from eastbound Three Chopt Road to northbound Gaskins Road. Field observations indicate that a majority of this traffic movement is destined for the eastbound I-64 on-ramp. With the addition of dual left-turn lanes noted above, advance signing on westbound Three Chopt Road would also be helpful to direct traffic destined for Gaskins Road north to stay in the left lane.

**Recommendation #6: Provide dual left-turn lanes on westbound Three Chopt Road**

Widening Three Chopt Road to accommodate eastbound dual left turn will create a wide median on the westbound approach that will accommodate dual left turn lanes. While not a critical need, such an improvement will reduce green time for this movement which can be reallocated to other intersection movements.

**Recommendation #7: Provide a right-turn lane on eastbound Three Chopt Road**

A right turn lane is desirable at this location to remove right turning traffic from the through lanes. This will allow the optimum traffic flow for the critical through volumes on Three Chopt Road.

**Recommendation #8: Provide a right-turn lane on westbound Three Chopt Road**

During the AM peak right-turning traffic on westbound Three Chopt Road is almost equal to the through traffic. Therefore, a right-turn lane would be desirable at this location. Such an improvement would likely require acquiring a small business in the northeast quadrant of the intersection.

**Recommendation #9: Provide three southbound and three northbound lanes through the Gaskins Road intersection**

The I-64 interchange has a major influence on traffic operations at the Gaskins Road/Three Chopt Road intersection. The design of the I-64 interchange, particularly the closeness of the on- and off-ramps to Gaskins Road, restricts the options at the intersection. During peak periods the interchange can feed more traffic into the intersection than the intersection can accommodate. Conversely, the intersection restricts northbound traffic flow to the interchange. During the AM peak extensive traffic queues are common on northbound Gaskins Road, while during the PM peak traffic queues north of Gaskins Road are commonly observed extending back to the I-64 mainline. The six-laning of Gaskins Road should ideally extend from I-64 to Ridgefield Parkway. While existing development would make such an improvement difficult, providing three lanes for a significant length for the northbound approach of Gaskins Road would greatly increase the capacity of this movement. Likewise, providing three lanes for a significant distance on southbound Gaskins Road beyond Three Chopt Road would also increase the southbound through lane capacity.

## 6.0 SUMMARY AND CONCLUSIONS

The proposed project was analyzed assuming the widening of Three Chopt Road to four through lanes, plus dual left-turn lanes at strategic locations to provide optimum traffic flow. While these improvements would dramatically improve traffic flow throughout the project area, the two major intersections of Three Chopt Road with Cox/Church Road and Gaskins Road would still operate at LOS F in the Design Year 2034. However, the recommended Build improvements would result in significantly lower delays which indicate major improvements to traffic flow through the intersections compared to a No-Build option. Other alternatives were tested as detailed under Section 3.3, but found to be not feasible due to heavy property impacts. The Recommended design seeks to balance traffic service with property damage. To produce an acceptable LOS (LOS D or better), both Three Chopt Road and Gaskins Road would require widening to more than six lanes. This does not seem practical given the existing development in these corridors and the constraints of the I-64 interchange.

It should be noted that an analysis of the Recommended Design includes three major improvements outside the scope of this project. The first, widening Cox Road to four lanes over I-64 would likely be concurrent with widening I-64 to eight lanes. This project is included in the Richmond Regional LRTP Vision Plan. The second, widening the I-64 on-ramp at Gaskins Road, is also in the LRTP Vision Plan. The third, widening Gaskins Road to six lanes between Three Chopt Road and Ridgefield Parkway, is not included in any future plan. With an existing traffic count of 39,000 VPD, and an anticipated traffic growth to more than 61,000 VPD, six lanes will be required on Gaskins Road up to Ridgefield Parkway in the foreseeable future.

During the design phase a more in-depth evaluation will be made as to whether the improvements recommended in this traffic study are viable from a right-of-way and construction cost standpoint. Should these improvements not be viable, traffic operations would be less efficient than shown in this report.

## Figures

CHURCH RD

← <5,738> [2004]

<5,681> [2004] →

← <7,830> [2004]

<7,228> [2004] →

COX RD

← <3,946> [2004]

← <4,264> [2004]

← <8,055> [2004]

← <8,160> [2004]

← <7,576> [2004]

← <7,457> [2004]

THREE CHOPT RD

← <7,079> [2005] ①

← <7,440> [2005]

GASKINS RD

← <17,011> [2004]

<16,999> [2004] →

← <19,500> ②

② <19,500> →

TO I-64

-NOT TO SCALE-

- ① SPECIAL COUNT PROVIDED BY HENRICO COUNTY ON 6-24-2005
- ② EXTRAPOLATED FROM TURNING MOVEMENT COUNTS TAKEN BY EARTH TECH ON 4-21-05.

**LEGEND**

<0000> AVERAGE DAILY TRAFFIC (ADT) VOLUMES  
[2004] YEAR TAKEN  
SOURCE: HENRICO COUNTRY PUBLIC WORKS 2004 TRAFFIC COUNTS, EXCEPT AS NOTED.

FIGURE 1

BASE AVERAGE DAILY TRAFFIC (ADT) COUNTS (YEAR 2004 & 2005)

THREE CHOPT ROAD IMPROVEMENT PROJECT  
HENRICO COUNTY, VA



|                         |                                  |
|-------------------------|----------------------------------|
| PROJ. 556126-781-245-88 | Richmond, Virginia               |
| ANALYZER: D. LEE        | 7870 Villa Park Drive, Suite 400 |
| CHK'D BY:               | 804-515-8300                     |
| 10/03/05                | NO SCALE                         |
| 1                       | OF 1 PROJECT # 76154             |

CHURCH RD

<5853>

<5795>

832 (334)

18 (41)  
586 (179)  
228 (114)

GASKINS RD

<17,351>

<17,339>

1644 (1236)

130 (133)  
1444 (964)  
70 (119)

LOS D(D)  
v/c= 0.82 (0.72)

46 (222)  
111 (603)  
91 (330)

248 (1155)

<7987>

COX RD

<7373>

113 (291)  
123 (434)  
245 (153)

THREE CHOPT RD

<8323>

481 (678)

<7606>

863 (658)  
<7728>

85 (163)  
323 (329)  
455 (166)

179 (328)  
803 (1535)  
137 (171)

1119 (2034)

<19,500>

TO I-64

<19,500>

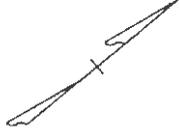
LOS F(E)  
v/c= 1.06 (0.89)

41 (103)  
312 (385)  
299 (133)

652 (621)

<7440>

<7079>



-NOT TO SCALE-

LEGEND

- 000 (000) AM (PM) PEAK HOUR TRAFFIC VOLUMES
- <0000> AVERAGE DAILY TRAFFIC (ADT) VOLUMES
- LOS E (F) LEVEL OF SERVICE FOR AM (PM) PEAK HOUR

FIGURE 2

EXISTING CONDITIONS (YEAR 2005)  
TRAFFIC DATA

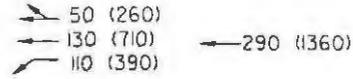
|   |  |
|---|--|
| <b>THREE CHOPT ROAD<br/>IMPROVEMENT PROJECT</b><br>HENRICO COUNTY, VA |  |
| EarthTech<br>A Tyco International Ltd. Company                        |  |
| PRD.J. 556126-701-245-00<br>ANALYZER: D. LEE<br>CHW'D BY:             | Richmond, Virginia<br>7870 Villa Park Drive, Suite 400<br>804-315-8100 |
| 10/03/05 NO SCALE   | 1 OF 1 PROJECT # 76154   |

CHURCH RD

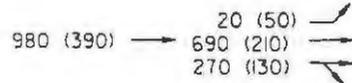
<13,600>



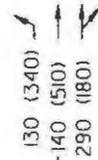
LOS D(D)  
v/c= 0.69 (0.75)



<17,800>



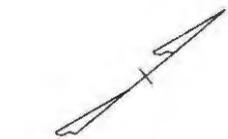
COX RD



<19,400>

560 (1030)

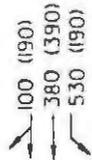
THREE CHOPT RD



-NOT TO SCALE-

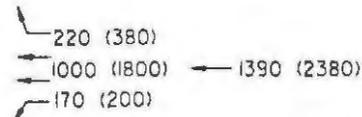
GASKINS RD

<40,600>

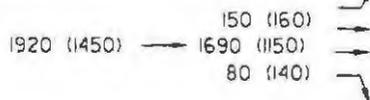


1010 (770)

<18,000>

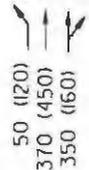


<46,000>



TO I-64 →

LOS F(E)  
v/c= 1.21 (0.99)



770 (730)

<17,000>

**LEGEND**

- 000 (000) AM (PM) PEAK HOUR TRAFFIC VOLUMES
- <0000> AVERAGE DAILY TRAFFIC (ADT) VOLUMES
- LOS E (F) LEVEL OF SERVICE FOR AM (PM) PEAK HOUR

FIGURE 3

NO-BUILD (YEAR 2013)  
TRAFFIC DATA

|   |                                  |
|---|----------------------------------|
| THREE CHOPT ROAD<br>IMPROVEMENT PROJECT<br>HENRICO COUNTY, VA |                                  |
| EarthTech<br>A Tyco International Ltd. Company                |                                  |
| PROJ. 556126-781-245-88                                       | Richmond, Virginia               |
| ANALYZER: D. LEE  | 7870 Villa Park Drive, Suite 400 |
| CHK'D BY:   | 804-515-8300                     |
| 18/83/88 NO SCALE   | 1 OF 1 PROJECT # 76154           |

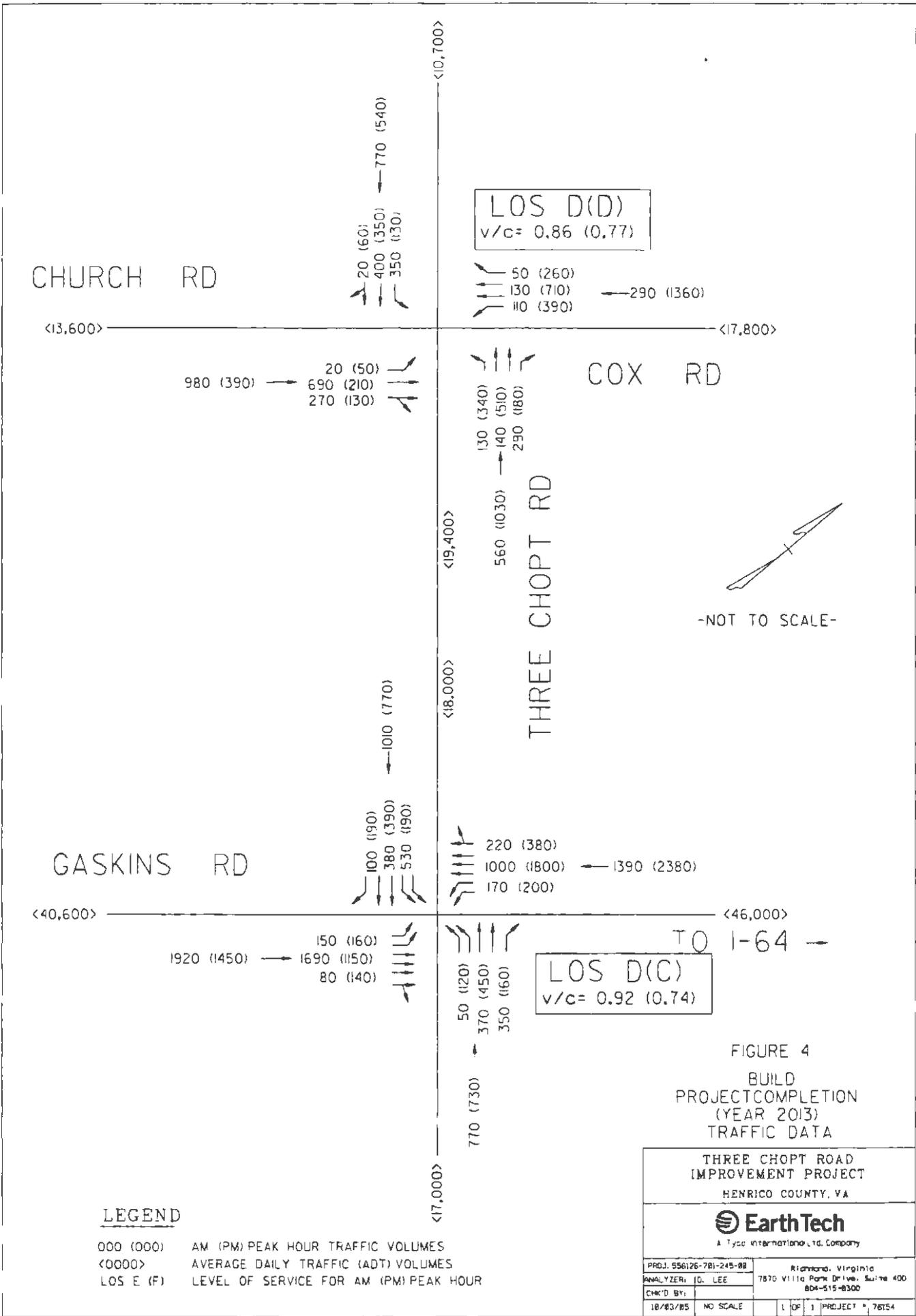


FIGURE 4  
 BUILD  
 PROJECT COMPLETION  
 (YEAR 2013)  
 TRAFFIC DATA

|   |  |
|---|--|
| THREE CHOPT ROAD<br>IMPROVEMENT PROJECT<br>HENRICO COUNTY, VA |  |
| <b>EarthTech</b><br>A Tyco International Ltd. Company         |  |
| PROJ. 556126-781-245-88                                       | Richmond, Virginia                               |
| ANALYZER: D. LEE  | 7870 Villa Park Drive, Suite 400<br>804-515-8300 |
| CHK'D BY:   |  |
| 18/83/85  | NO SCALE   |
| 1 OF 1  | PROJECT # 78154                                  |

CHURCH RD

<20,700>

<19,900>

40 (110)  
740 (650)  
660 (240)  
1440 (1000)

LOS F(F)  
v/c= 1.25 (1.19)

80 (390)  
200 (1070) ← 440 (2050)  
160 (590)

COX RD

<27,300>

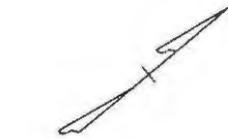
1480 (595) → 30 (70)  
1040 (320)  
410 (200)

200 (520)  
220 (770)  
430 (270)

<29,400>

850 (1560)

THREE CHOPT RD



-NOT TO SCALE-

<27,200>

530 (1170)

GASKINS RD

<61,600>

150 (290)  
570 (590)  
810 (290)

320 (580)  
1430 (2730) ← 1990 (3610)  
240 (300)

<29,200>

2920 (2200) → 230 (240)  
2570 (1750)  
120 (210)

70 (180)  
560 (680)  
530 (240)

LOS F(F)  
v/c= 1.82 (1.53)

TO I-64 →

<25,800>

1160 (1100)

LEGEND

000 (000) AM (PM) PEAK HOUR TRAFFIC VOLUMES  
<0000> AVERAGE DAILY TRAFFIC (ADT) VOLUMES  
LOS E (F) LEVEL OF SERVICE FOR AM (PM) PEAK HOUR

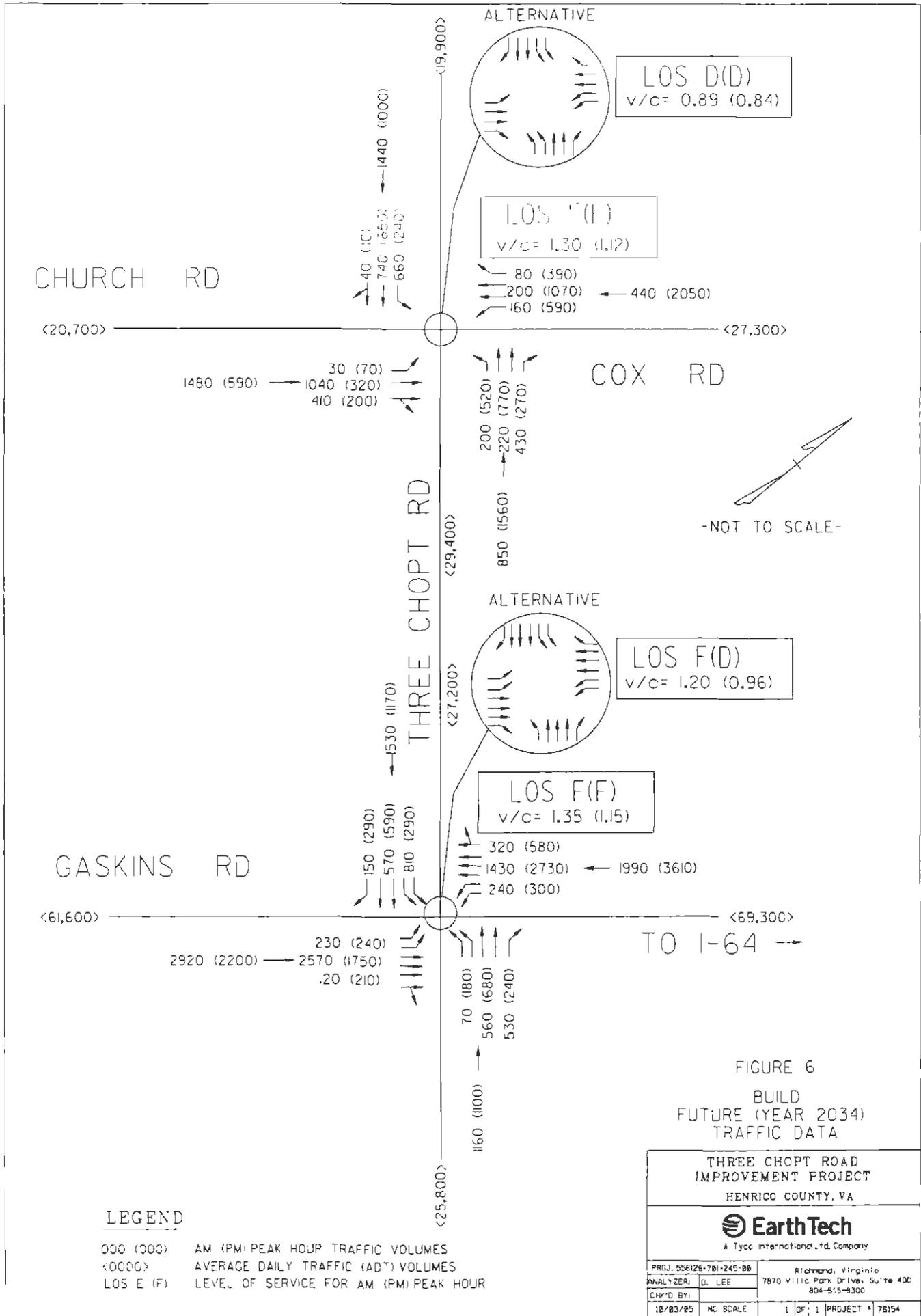
FIGURE 5

NO-BUILD  
FUTURE (YEAR 2034)  
TRAFFIC DATA

THREE CHOPT ROAD  
IMPROVEMENT PROJECT  
HENRICO COUNTY, VA



|                         |                                  |
|-------------------------|----------------------------------|
| PROJ. 556126-781-245-88 | Richmond, Virginia               |
| ANALYZER: D. LEE        | 7870 Villa Park Drive, Suite 400 |
| CHK'D BY:               | 804-515-8300                     |
| 18/83/85                | NO SCALE                         |
| 1 OF 1                  | PROJECT # 76154                  |



## Appendices

**Appendix A**

**Photographs along Three Chopt Road Corridor**

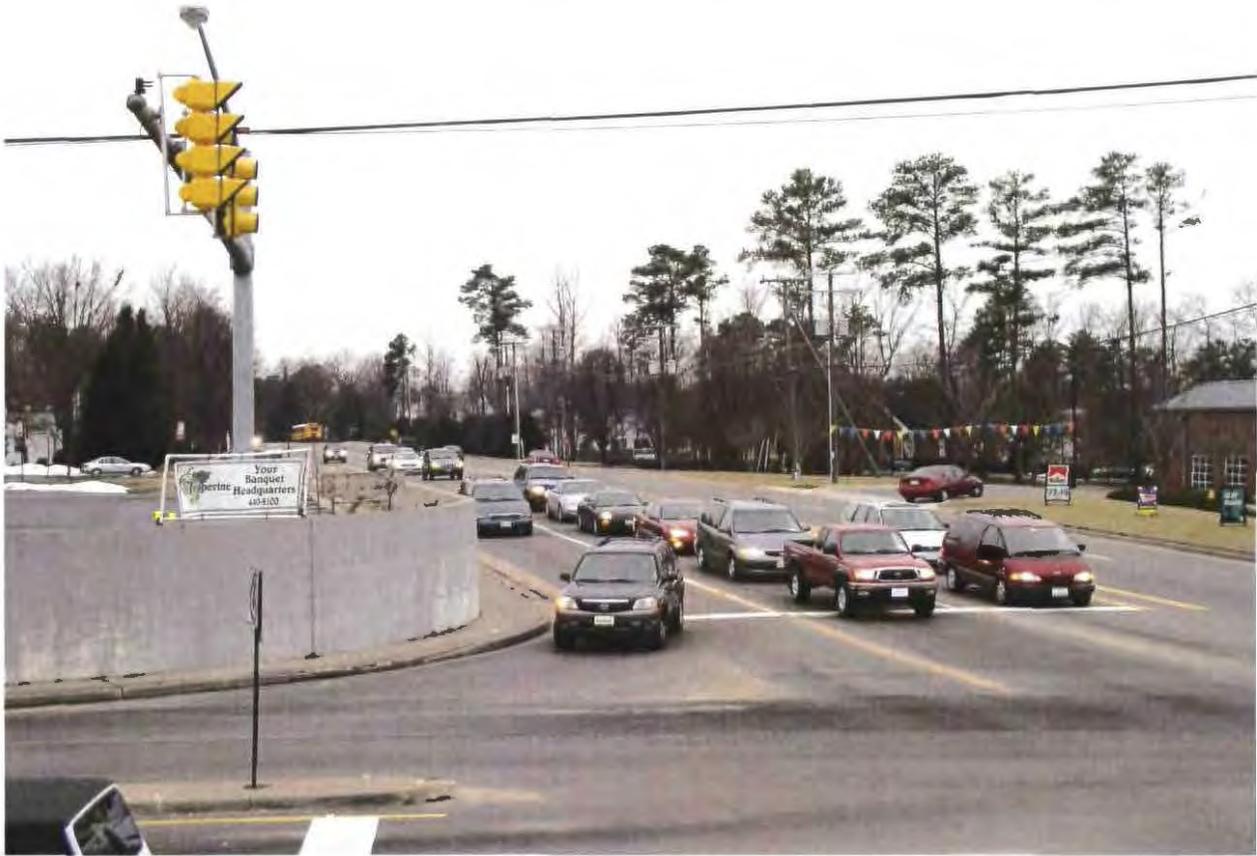
**Photograph 1: Three Chopt Road typical two-lane section.**



**Photograph 2: Three Chopt Road showing widening for new development.**



**Photograph 3: Church Road at Three Chopt Road showing northbound through traffic avoiding outside lane in AM traffic peak.**



**Photograph 4: Three Chopt Road at Cox Road Intersection showing westbound left-turn queuing during AM peak.**



**Photograph 5: Cox Road at Three Chopt Road intersection showing southbound PM peak queuing.**



**Photograph 6: Three Chopt Road at Cox Road Intersection showing eastbound left-turn queuing during AM peak.**



**Photograph 7: Three Chopt Road at Gaskins Road showing westbound AM peak queues for traffic turning left to I-64 interchange.**

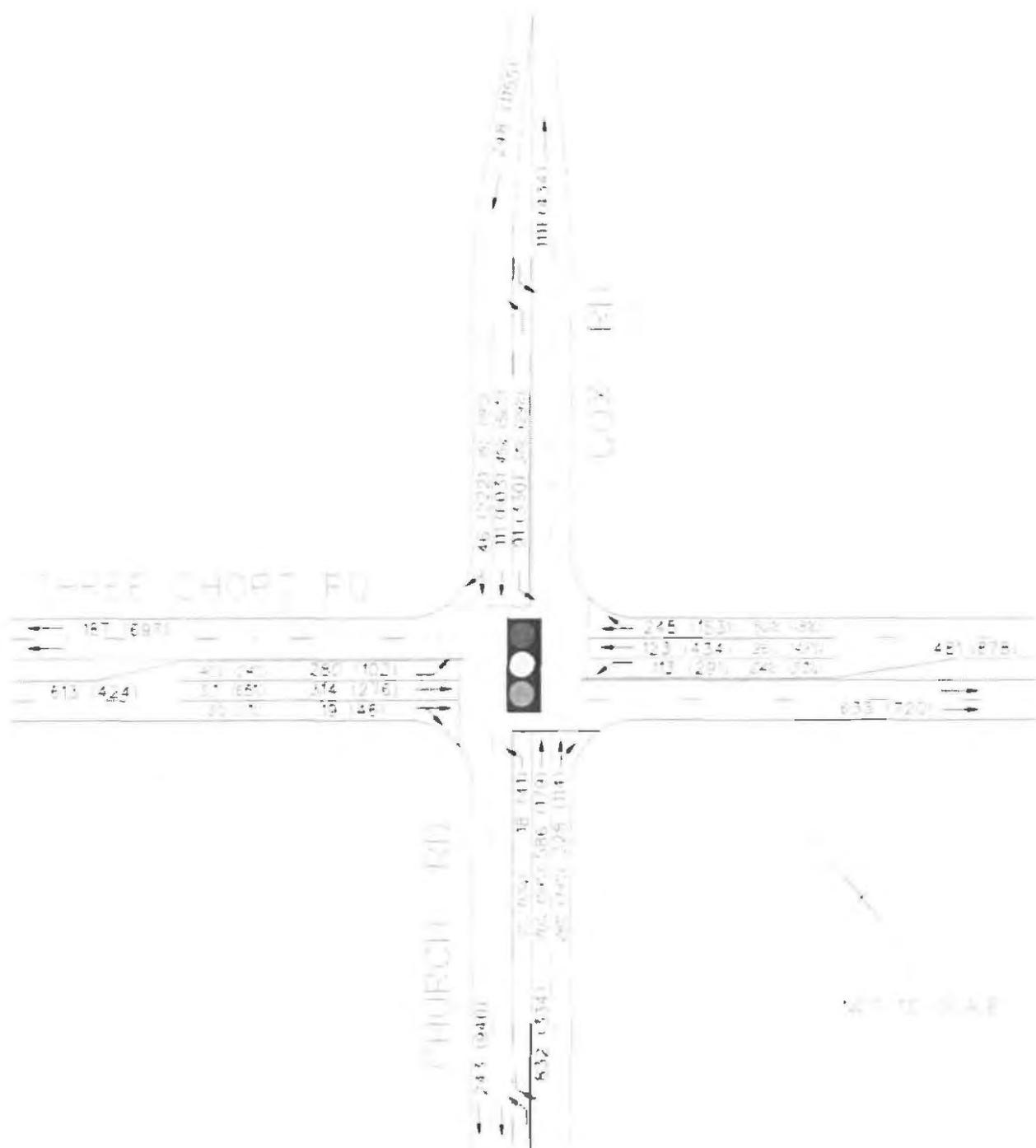


**Photograph 8: Gaskins Road at I-64 interchange showing southbound PM peak traffic queues.**



**Appendix B**

**Traffic Data**



**LEGEND**

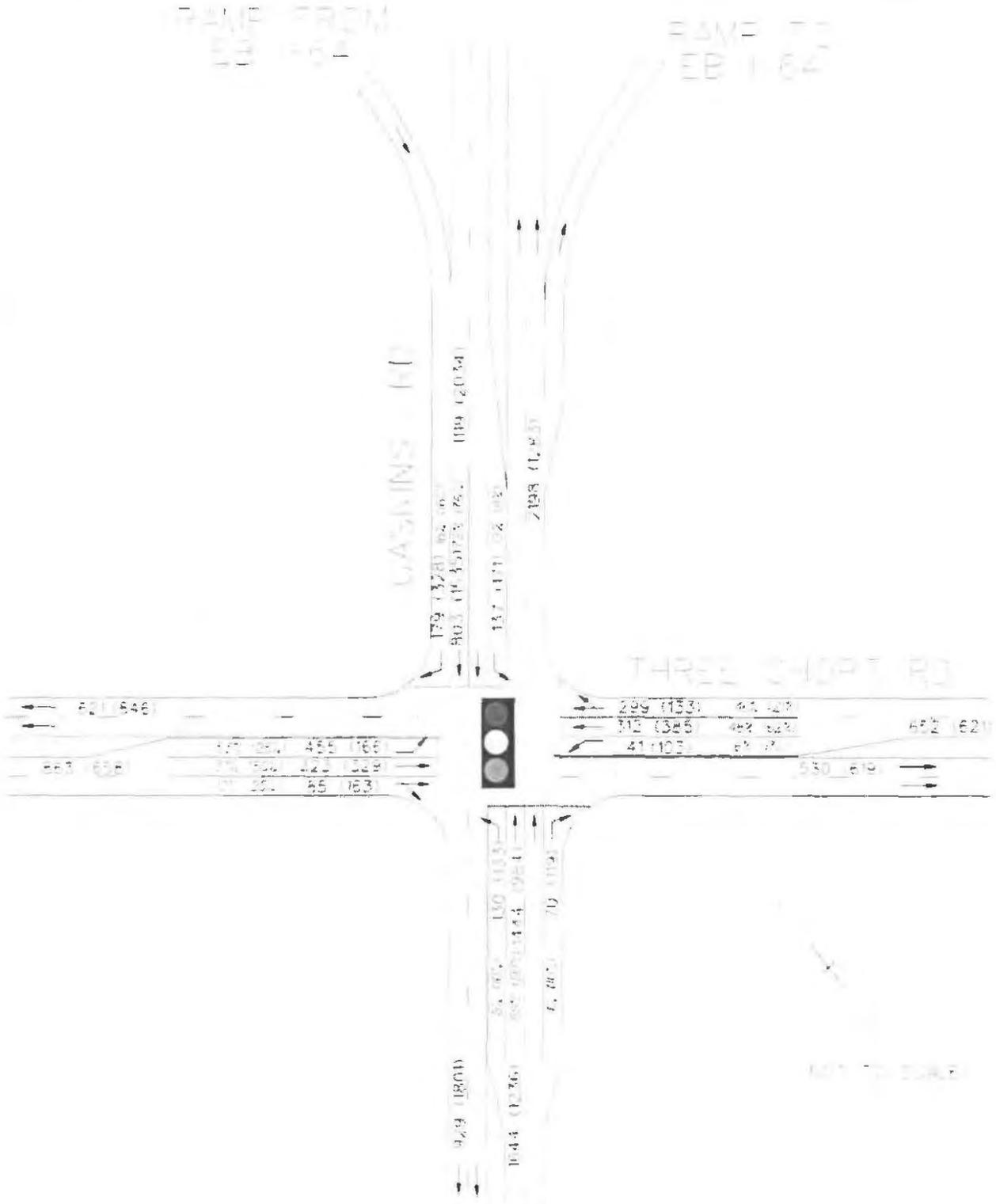
- TRAFFIC SIGNAL
- 000 (000) 40' 15" PEAK HOUR TRAFFIC VOLUMES
- 00 (00) 20' 15" PEAK HOUR TRAFFIC DISTRIBUTION

EXISTING CONDITIONS AND PROPOSED  
 IMPROVEMENTS TO THE INTERSECTION OF  
 THREE CHOP RD AND CHURCH RD  
 WITH CHURCH RD

PLANNED BY: [Name]  
 DATE: [Date]

**EARTH TECH**

TRANSFORMING THE WAY WE LIVE



EXISTING CONDITIONS - 10/18/2005  
 INTERSECTION OF THREE SHOOT ROAD  
 WITH WASHINS ROAD

**LEGEND**

- TRAFFIC SIGNAL
- ADT 10000 AM 1000 PEAK HOUR TRAFFIC VOLUME
- ADT 1000 AM 1000 PEAK HOUR TRAFFIC DISTRIBUTION

THREE SHOOT RD  
 INTERSECTION WITH  
 WASHINS RD

**EARTH TECH**

TRAFFIC ENGINEERING

**EXISTING 2005 TURNING MOVEMENT COUNTS**

Taken April 19, 2005

By  
Earth Tech, Inc  
7870 Villa Park Drive  
Suite 400  
Richmond, VA 23228

Total Vehicles At  
AM Intersection of Three Chopt Road & Cox/Church Road  
Henrico County Virginia

| Street Name<br>Start Time | Cox Rd--Southbound |      |      |       |      | Three Chopt Rd --Westbound |      |      |       |      | Church Rd --Northbound |      |      |       |      | Three Chopt Rd --Eastbound |      |      |       |      | Intersection<br>Total |
|---------------------------|--------------------|------|------|-------|------|----------------------------|------|------|-------|------|------------------------|------|------|-------|------|----------------------------|------|------|-------|------|-----------------------|
|                           | Right              | Thru | Left | Total | Peds | Right                      | Thru | Left | Total | Peds | Right                  | Thru | Left | Total | Peds | Right                      | Thru | Left | Total | Peds |                       |
| 7 00 AM                   | 4                  | 21   | 15   | 40    | 0    | 31                         | 18   | 8    | 57    |      | 77                     | 84   | 4    | 164   |      | 3                          | 61   | 33   | 97    |      | 358                   |
| 7 15 AM                   | 6                  | 18   | 21   | 45    | 0    | 42                         | 23   | 15   | 80    |      | 74                     | 117  | 7    | 198   |      | 0                          | 69   | 51   | 120   |      | 443                   |
| 7 30 AM                   | 18                 | 25   | 24   | 66    | 0    | 51                         | 25   | 27   | 103   |      | 63                     | 126  | 4    | 193   |      | 4                          | 105  | 82   | 190   |      | 562                   |
| 7 45 AM                   | 14                 | 30   | 22   | 66    | 0    | 63                         | 30   | 32   | 125   |      | 55                     | 155  | 4    | 213   |      | 4                          | 64   | 66   | 134   |      | 538                   |
| 8 00 AM                   | 11                 | 27   | 23   | 61    | 0    | 63                         | 32   | 20   | 115   |      | 59                     | 155  | 3    | 216   |      | 6                          | 87   | 70   | 162   |      | 554                   |
| 8 15 AM                   | 3                  | 29   | 22   | 54    | 0    | 68                         | 36   | 34   | 137   |      | 51                     | 150  | 7    | 208   |      | 5                          | 58   | 62   | 125   |      | 524                   |
| 8 30 AM                   | 10                 | 23   | 21   | 54    | 0    | 53                         | 41   | 14   | 108   |      | 54                     | 102  | 7    | 162   |      | 6                          | 75   | 46   | 127   |      | 451                   |
| 8 45 AM                   | 13                 | 23   | 33   | 69    | 0    | 64                         | 38   | 37   | 138   |      | 44                     | 71   | 8    | 122   |      | 7                          | 53   | 43   | 102   |      | 431                   |

Hourly Totals

|              |      |      |      |      |  |      |      |      |      |  |      |      |      |      |  |      |      |      |      |  |      |         |
|--------------|------|------|------|------|--|------|------|------|------|--|------|------|------|------|--|------|------|------|------|--|------|---------|
| 7 00 to 8 00 | 42   | 94   | 82   | 218  |  | 187  | 96   | 82   | 365  |  | 269  | 482  | 19   | 770  |  | 11   | 299  | 232  | 542  |  | 1895 | Truck % |
| 7 15 to 8 15 | 49   | 100  | 90   | 239  |  | 219  | 110  | 94   | 423  |  | 251  | 553  | 18   | 822  |  | 14   | 325  | 269  | 608  |  | 2092 |         |
| 7 30 to 8 30 | 46   | 111  | 91   | 248  |  | 245  | 123  | 113  | 481  |  | 228  | 586  | 18   | 832  |  | 19   | 314  | 280  | 613  |  | 2174 | 2       |
| 7 45 to 8 45 | 38   | 109  | 88   | 235  |  | 247  | 139  | 100  | 486  |  | 219  | 562  | 21   | 802  |  | 21   | 284  | 244  | 549  |  | 2072 |         |
| 8 00 to 9 00 | 37   | 102  | 99   | 238  |  | 248  | 147  | 105  | 500  |  | 208  | 478  | 25   | 711  |  | 24   | 273  | 221  | 518  |  | 1967 |         |
|              |      |      |      |      |  |      |      |      | 0    |  |      |      |      |      |  |      |      |      |      |  |      |         |
| Plf          | 0.64 | 0.93 | 0.95 | 0.94 |  | 0.90 | 0.85 | 0.83 | 0.86 |  | 0.90 | 0.95 | 0.64 | 0.96 |  | 0.79 | 0.75 | 0.85 | 0.81 |  | 0.98 |         |

EXISTING 2005 TURNING MOVEMENT COUNTS

Taken April 21, 2005

By  
Earth Tech, Inc  
7870 Villa Park Drive  
Suite 400  
Richmond, VA 23228

Total Vehicles At  
AM Intersection of Three Chopt Road & Gaskins Rd  
Henrico County Virginia

| Street Name<br>Start Time | Gaskins Rd--Southbound |      |      |       | Three Chopt Rd --Westbound |      |      |       | Gaskins Rd --Northbound |      |      |       | Three Chopt Rd --Eastbound |      |      |       | Intersection<br>Total |
|---------------------------|------------------------|------|------|-------|----------------------------|------|------|-------|-------------------------|------|------|-------|----------------------------|------|------|-------|-----------------------|
|                           | Right                  | Thru | Left | Total | Right                      | Thru | Left | Total | Right                   | Thru | Left | Total | Right                      | Thru | Left | Total |                       |
| 7 00 AM                   | 28                     | 129  | 20   | 177   | 45                         | 39   | 11   | 95    | 11                      | 49   | 16   | 76    | 59                         | 52   | 13   | 124   | 472                   |
| 7 15 AM                   | 29                     | 162  | 24   | 215   | 80                         | 79   | 12   | 171   | 16                      | 423  | 24   | 463   | 14                         | 73   | 106  | 193   | 1042                  |
| 7 30 AM                   | 47                     | 212  | 21   | 280   | 85                         | 81   | 12   | 178   | 20                      | 360  | 26   | 406   | 13                         | 79   | 124  | 216   | 1080                  |
| 7 45 AM                   | 50                     | 232  | 23   | 305   | 70                         | 73   | 8    | 151   | 14                      | 366  | 35   | 415   | 25                         | 73   | 102  | 200   | 1071                  |
| 8 00 AM                   | 44                     | 169  | 28   | 241   | 68                         | 73   | 7    | 148   | 14                      | 368  | 35   | 417   | 24                         | 78   | 125  | 227   | 1033                  |
| 8 15 AM                   | 38                     | 190  | 65   | 293   | 76                         | 85   | 14   | 175   | 22                      | 350  | 34   | 406   | 23                         | 93   | 104  | 220   | 1094                  |
| 8 30 AM                   | 33                     | 176  | 21   | 230   | 61                         | 84   | 13   | 158   | 30                      | 354  | 44   | 428   | 29                         | 62   | 103  | 194   | 1010                  |
| 8 45 AM                   | 35                     | 196  | 35   | 266   | 44                         | 52   | 20   | 116   | 25                      | 349  | 17   | 391   | 15                         | 71   | 84   | 170   | 943                   |

| Hourly Totals |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Truck % |    |
|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------|----|
| 7 00 to 8 00  | 154  | 735  | 88   | 977  | 280  | 272  | 43   | 595  | 61   | 1198 | 101  | 1360 | 111  | 277  | 345  | 733  | 3665    |    |
| 7 15 to 8 15  | 170  | 775  | 96   | 1041 | 303  | 306  | 39   | 648  | 64   | 1517 | 120  | 1701 | 76   | 303  | 457  | 836  | 4226    |    |
| 7 30 to 8 30  | 179  | 803  | 137  | 1119 | 299  | 312  | 41   | 652  | 70   | 1444 | 130  | 1644 | 85   | 323  | 455  | 863  | 4278    | 3% |
| 7 45 to 8 45  | 165  | 767  | 137  | 1069 | 275  | 315  | 42   | 632  | 80   | 1438 | 148  | 1666 | 101  | 306  | 434  | 841  | 4208    |    |
| 8 00 to 9 00  | 150  | 731  | 149  | 1030 | 249  | 294  | 54   | 597  | 91   | 1421 | 130  | 1642 | 91   | 304  | 416  | 811  | 4080    |    |
| Phf           | 0.90 | 0.87 | 0.53 | 0.92 | 0.88 | 0.92 | 0.73 | 0.92 | 0.80 | 0.98 | 0.93 | 0.99 | 0.85 | 0.87 | 0.91 | 0.98 | 0.98    |    |

**EXISTING 2005 TURNING MOVEMENT COUNTS**

Taken April 19, 2005

By  
Earth Tech, Inc  
7870 Villa Park Drive  
Suite 400  
Richmond, VA 23228

Total Vehicles At  
PM Intersection of Three Chopt Road & Cox/Church Road  
Henrico County, Virginia

| Street Name<br>Start Time | Cox Rd--Southbound |      |      |       | Three Chopt Rd --Westbound |      |      |       | Church Rd.--Northbound |      |      |       | Three Chopt Rd --Eastbound |      |      |       | Intersection<br>Total |
|---------------------------|--------------------|------|------|-------|----------------------------|------|------|-------|------------------------|------|------|-------|----------------------------|------|------|-------|-----------------------|
|                           | Right              | Thru | Left | Total | Right                      | Thru | Left | Total | Right                  | Thru | Left | Total | Right                      | Thru | Left | Total |                       |
| 4 00 PM                   | 28                 | 79   | 39   | 146   | 35                         | 71   | 41   | 147   | 40                     | 43   | 8    | 91    | 8                          | 66   | 22   | 96    | 480                   |
| 4 15 PM                   | 30                 | 113  | 82   | 225   | 36                         | 91   | 53   | 180   | 25                     | 49   | 8    | 82    | 12                         | 58   | 33   | 103   | 590                   |
| 4 30 PM                   | 30                 | 113  | 82   | 225   | 36                         | 91   | 53   | 180   | 25                     | 49   | 8    | 82    | 12                         | 58   | 33   | 103   | 590                   |
| 4 45 PM                   | 48                 | 105  | 74   | 227   | 26                         | 82   | 67   | 175   | 32                     | 49   | 6    | 87    | 15                         | 57   | 28   | 100   | 589                   |
| 5 00 PM                   | 49                 | 170  | 106  | 325   | 43                         | 86   | 58   | 187   | 29                     | 56   | 9    | 94    | 7                          | 69   | 19   | 95    | 701                   |
| 5 15 PM                   | 54                 | 167  | 80   | 301   | 45                         | 116  | 83   | 244   | 33                     | 40   | 6    | 79    | 12                         | 62   | 26   | 100   | 724                   |
| 5 30 PM                   | 62                 | 141  | 74   | 277   | 31                         | 113  | 76   | 220   | 28                     | 42   | 16   | 86    | 15                         | 87   | 16   | 118   | 701                   |
| 5 45 PM                   | 57                 | 125  | 70   | 252   | 34                         | 119  | 74   | 227   | 24                     | 41   | 10   | 75    | 12                         | 58   | 41   | 111   | 665                   |

Hourly Totals

|              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |         |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------|
| 4 00 to 5 00 | 136  | 410  | 277  | 823  | 133  | 305  | 214  | 682  | 122  | 190  | 30   | 342  | 47   | 239  | 116  | 402  | 2249 | Truck % |
| 4 15 to 5 15 | 157  | 501  | 344  | 1002 | 141  | 350  | 231  | 722  | 111  | 203  | 31   | 345  | 46   | 242  | 113  | 401  | 2470 |         |
| 4 30 to 5 30 | 181  | 555  | 342  | 1078 | 150  | 375  | 261  | 786  | 119  | 194  | 29   | 342  | 46   | 246  | 106  | 398  | 2604 |         |
| 4 45 to 5 45 | 213  | 583  | 334  | 1130 | 145  | 397  | 284  | 826  | 122  | 187  | 37   | 346  | 49   | 275  | 89   | 413  | 2715 |         |
| 5 00 to 6 00 | 222  | 603  | 330  | 1155 | 153  | 434  | 291  | 878  | 114  | 179  | 41   | 334  | 46   | 276  | 102  | 424  | 2791 |         |
| PM           | 0.40 | 0.89 | 0.78 | 0.89 | 0.85 | 0.91 | 0.88 | 0.90 | 0.86 | 0.80 | 0.64 | 0.89 | 0.77 | 0.79 | 0.98 | 0.90 | 0.96 |         |

EXISTING 2005 TURNING MOVEMENT COUNTS

Taken April 21, 2005

By  
Earth Tech, Inc  
7870 Villa Park Drive  
Suite 400  
Richmond VA 23228

Total Vehicles At  
1 PM Intersection of Three Chopt Road & Gaskins Rd  
Henrico County, Virginia

| Street Name<br>Start Time | Gaskins Rd--Southbound |      |      |       | Three Chopt Rd --Westbound |       |      |      | Gaskins Rd --Northbound |      |       |      | Three Chopt Rd --Eastbound |       |      |       | Intersection<br>Total |      |      |       |              |
|---------------------------|------------------------|------|------|-------|----------------------------|-------|------|------|-------------------------|------|-------|------|----------------------------|-------|------|-------|-----------------------|------|------|-------|--------------|
|                           | Right                  | Thru | Left | Total | Peds                       | Right | Thru | Left | Total                   | Peds | Right | Thru | Left                       | Total | Peds | Right |                       | Thru | Left | Total | Peds         |
| 4 00 PM                   | 70                     | 340  | 27   | 437   |                            | 40    | 71   | 29   | 140                     |      | 26    | 250  | 13                         | 289   |      | 49    | 70                    | 56   | 175  |       | 1041         |
| 4 15 PM                   | 96                     | 276  | 48   | 420   |                            | 41    | 101  | 16   | 158                     |      | 20    | 229  | 32                         | 281   |      | 36    | 89                    | 59   | 184  |       | 1043         |
| 4 30 PM                   | 75                     | 368  | 32   | 475   |                            | 37    | 93   | 25   | 155                     |      | 31    | 247  | 41                         | 319   |      | 56    | 64                    | 49   | 169  |       | 1118         |
| 4 45 PM                   | 55                     | 360  | 40   | 455   |                            | 38    | 77   | 23   | 138                     |      | 27    | 186  | 27                         | 240   |      | 34    | 88                    | 31   | 153  |       | 986          |
| 5 00 PM                   | 75                     | 409  | 44   | 528   |                            | 36    | 93   | 26   | 155                     |      | 48    | 272  | 30                         | 350   |      | 53    | 94                    | 33   | 180  |       | 1213         |
| 5 15 PM                   | 81                     | 389  | 55   | 525   |                            | 37    | 84   | 26   | 147                     |      | 30    | 248  | 38                         | 316   |      | 39    | 75                    | 45   | 159  |       | 1147         |
| 5 30 PM                   | 61                     | 348  | 36   | 445   |                            | 29    | 85   | 26   | 140                     |      | 23    | 253  | 37                         | 313   |      | 45    | 90                    | 52   | 187  |       | 1085         |
| 5 45 PM                   | 111                    | 389  | 36   | 536   |                            | 31    | 123  | 25   | 179                     |      | 18    | 211  | 28                         | 257   |      | 26    | 70                    | 36   | 132  |       | 1104         |
| <b>Hourly Totals</b>      |                        |      |      |       |                            |       |      |      |                         |      |       |      |                            |       |      |       |                       |      |      |       |              |
| 4 00 to 5 00              | 296                    | 1344 | 147  | 1787  |                            | 156   | 342  | 93   | 591                     |      | 104   | 912  | 113                        | 1129  |      | 175   | 311                   | 195  | 681  |       | 4188 Truck % |
| 4 15 to 5 15              | 301                    | 1413 | 164  | 1878  |                            | 152   | 364  | 90   | 606                     |      | 126   | 934  | 130                        | 1190  |      | 179   | 335                   | 172  | 686  |       | 4360         |
| 4 30 to 5 30              | 286                    | 1526 | 171  | 1983  |                            | 148   | 347  | 100  | 595                     |      | 136   | 953  | 136                        | 1225  |      | 182   | 321                   | 158  | 661  |       | 4464 2%      |
| 4 45 to 5 45              | 272                    | 1506 | 175  | 1953  |                            | 140   | 339  | 101  | 580                     |      | 128   | 959  | 132                        | 1219  |      | 171   | 347                   | 161  | 679  |       | 4431         |
| 5 00 to 6 00              | 328                    | 1535 | 171  | 2034  |                            | 133   | 385  | 103  | 621                     |      | 119   | 984  | 133                        | 1236  |      | 163   | 329                   | 166  | 658  |       | 4549         |
| Phf                       | 0.74                   | 0.94 | 0.78 | 0.95  |                            | 0.90  | 0.78 | 0.99 | 0.87                    |      | 0.62  | 0.90 | 0.88                       | 0.88  |      | 0.77  | 0.88                  | 0.80 | 0.91 |       | 0.94         |

**Appendix C**

**HCM Capacity Printouts – Year 2005 Analysis**

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

EXIST COND 2005 AM  
 7/14/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|------|------|------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations    |       |      |      |      |       |      |      |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0  | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00 | 0.95  |      | 1.00 | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 |
| Frt                    | 1.00  | 0.97 |      | 1.00 | 0.93  |      | 1.00 | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770  | 3428 |      | 1770 | 3279  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770  | 3428 |      | 1770 | 3279  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Volume (vph)           | 455   | 323  | 85   | 41   | 312   | 299  | 130  | 1444  | 70   | 137   | 803  | 179  |
| Peak-hour factor, PHF  | 0.98  | 0.98 | 0.98 | 0.92 | 0.92  | 0.92 | 0.99 | 0.99  | 0.99 | 0.92  | 0.92 | 0.92 |
| Adj. Flow (vph)        | 464   | 330  | 87   | 45   | 339   | 325  | 131  | 1459  | 71   | 149   | 873  | 195  |
| RTOR Reduction (vph)   | 0     | 12   | 0    | 0    | 103   | 0    | 0    | 0     | 17   | 0     | 0    | 98   |
| Lane Group Flow (vph)  | 464   | 405  | 0    | 45   | 561   | 0    | 131  | 1459  | 54   | 149   | 873  | 97   |
| Turn Type              | Prot  |      |      | Prot |       |      | Prot |       | Perm | Prot  |      | Perm |
| Protected Phases       | 5     | 2    |      | 1    | 6     |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |      |      |      |       |      |      |       | 8    |       |      | 4    |
| Actuated Green, G (s)  | 40.0  | 57.7 |      | 8.1  | 25.8  |      | 16.6 | 65.0  | 65.0 | 17.7  | 66.1 | 66.1 |
| Effective Green, g (s) | 40.0  | 59.2 |      | 8.1  | 27.3  |      | 16.6 | 66.5  | 66.5 | 17.7  | 67.6 | 67.6 |
| Actuated g/C Ratio     | 0.24  | 0.35 |      | 0.05 | 0.16  |      | 0.10 | 0.40  | 0.40 | 0.11  | 0.40 | 0.40 |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0  | 5.5   |      | 4.0  | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0  | 3.0   |      | 3.0  | 3.0   | 3.0  | 3.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)     | 423   | 1212 |      | 86   | 534   |      | 175  | 1405  | 628  | 187   | 1428 | 639  |
| v/s Ratio Prot         | c0.26 | 0.12 |      | 0.03 | c0.20 |      | 0.07 | c0.41 |      | c0.08 | 0.25 |      |
| v/s Ratio Perm         |       |      |      |      |       |      |      |       | 0.04 |       |      | 0.12 |
| v/c Ratio              | 1.10  | 0.33 |      | 0.52 | 1.05  |      | 0.75 | 1.04  | 0.09 | 0.80  | 0.61 | 0.15 |
| Uniform Delay, d1      | 63.8  | 39.7 |      | 77.8 | 70.1  |      | 73.4 | 50.5  | 31.5 | 73.1  | 39.5 | 31.7 |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 72.6  | 0.2  |      | 5.6  | 52.9  |      | 16.0 | 34.6  | 0.1  | 20.5  | 1.1  | 0.2  |
| Delay (s)              | 136.3 | 39.9 |      | 83.5 | 123.0 |      | 89.4 | 85.1  | 31.6 | 93.7  | 40.7 | 32.0 |
| Level of Service       | F     | D    |      | F    | F     |      | F    | F     | C    | F     | D    | C    |
| Approach Delay (s)     |       | 90.7 |      |      | 120.5 |      |      | 83.2  |      |       | 45.8 |      |
| Approach LOS           |       | F    |      |      | F     |      |      | F     |      |       | D    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 80.4   | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.06   |                      |      |
| Actuated Cycle Length (s)         | 167.5  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 104.3% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Queues  
1: THREE CHOPT RD & GASKINS RD

EXIST COND 2005 AM  
7/14/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 455   | 323   | 85  | 41  | 312   | 299   | 130  | 1444  | 70  | 137   | 803   | 179   |
| Peak Hour Factor        | 0.98  | 0.98  | 0.98  | 0.92  | 0.92  | 0.92  | 0.99   | 0.99  | 0.99  | 0.92  | 0.92  | 0.92  |
| Lane Group Flow (vph)   | 464   | 417   | 0   | 45  | 664   | 0   | 131  | 1459  | 71  | 149   | 873   | 195   |
| v/c Ratio               | 1.09  | 0.34  |   | 0.46  | 1.06  |   | 0.74   | 1.03  | 0.11  | 0.79  | 0.61  | 0.26  |
| Control Delay           | 128.1   | 39.8  |   | 78.2  | 106.2   |   | 86.7   | 81.3  | 20.2  | 91.3  | 41.8  | 8.0   |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.5  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 128.1   | 39.8  |   | 78.2  | 106.2   |   | 87.1   | 81.3  | 20.2  | 91.3  | 41.8  | 8.0   |
| Queue Length 50th (ft)  | ~582  | 174   |   | 49  | ~363  |   | 143  | ~916  | 29  | 162   | 398   | 21  |
| Queue Length 95th (ft)  | #815  | 232   |   | 94  | #498  |   | 219  | #1058   | 66  | #260  | 482   | 78  |
| Internal Link Dist (ft) |   | 151   |   |   | 599   |   |  | 856   |   |   | 499   |   |
| Turn Bay Length (ft)    | 250   |   |   | 200   |   |   | 260  |   | 200   | 500   |   |   |
| Base Capacity (vph)     | 425   | 1230  |   | 240   | 625   |   | 208  | 1412  | 649   | 209   | 1435  | 739   |
| 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   | 16  |   | 0   | 0   |   | 6  | 0   | 0   | 0   | 0   | 0   |
| Reduced v/c Ratio       | 1.09  | 0.34  |   | 0.19  | 1.06  |   | 0.65   | 1.03  | 0.11  | 0.71  | 0.61  | 0.26  |

**Intersection Summary**

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

Timings  
1: THREE CHOPT RD & GASKINS RD

EXIST COND 2005 AM  
7/14/2005

| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations | ↖     | ↗     | ↖     | ↗     | ↖     | ↗     | ↖     | ↗     | ↖     | ↗     |
| Volume (vph)        | 455   | 323   | 41    | 312   | 130   | 1444  | 70    | 137   | 803   | 179   |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Perm  | Prot  |       | Perm  |
| Protected Phases    | 5     | 2     | 1     | 6     | 3     | 8     |       | 7     | 4     |       |
| Permitted Phases    |       |       |       |       |       |       | 8     |       |       | 4     |
| Detector Phases     | 5     | 2     | 1     | 6     | 3     | 8     | 8     | 7     | 4     | 4     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 15.0  | 15.0  | 3.0   | 15.0  | 15.0  |
| Minimum Split (s)   | 7.0   | 8.5   | 7.0   | 8.5   | 7.0   | 20.5  | 20.5  | 7.0   | 20.5  | 20.5  |
| Total Split (s)     | 44.0  | 45.5  | 29.0  | 30.5  | 24.0  | 70.5  | 70.5  | 24.0  | 70.5  | 70.5  |
| Total Split (%)     | 26.0% | 26.9% | 17.2% | 18.0% | 14.2% | 41.7% | 41.7% | 14.2% | 41.7% | 41.7% |
| Yellow Time (s)     | 3.0   | 4.0   | 3.0   | 4.0   | 3.0   | 4.0   | 4.0   | 3.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 1.0   | 1.5   | 1.0   | 1.5   | 1.0   | 1.5   | 1.5   | 1.0   | 1.5   | 1.5   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | None  | None  | Min   | None  | None  | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 169  
 Actuated Cycle Length: 166.8  
 Natural Cycle: 120  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |        |      |        |
|------|--------|------|--------|
| ↖ a1 | ↗ a2   | ↖ a3 | ↗ a4   |
| 29 s | 45.5 s | 24 s | 70.5 s |
| ↖ a5 | ↗ a6   | ↖ a7 | ↗ a8   |
| 44 s | 30.5 s | 24 s | 70.5 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

EXIST COND 2005 AM  
7/19/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|------|------|------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations    | ↘     | ↗    |      | ↘    | ↗     |      | ↘    | ↗     | ↘    | ↗     | ↗    | ↘    |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0  | 4.0   | 4.0  | 4.0   | 4.0  |      |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00 | 0.95  |      | 1.00 | 1.00  | 1.00 | 1.00  | 0.95 |      |
| Frt                    | 1.00  | 0.99 |      | 1.00 | 0.90  |      | 1.00 | 1.00  | 0.85 | 1.00  | 0.96 |      |
| Flt Protected          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 |      |
| Satd. Flow (prot)      | 1770  | 3510 |      | 1770 | 3186  |      | 1770 | 1863  | 1583 | 1770  | 3383 |      |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 |      |
| Satd. Flow (perm)      | 1770  | 3510 |      | 1770 | 3186  |      | 1770 | 1863  | 1583 | 1770  | 3383 |      |
| Volume (vph)           | 280   | 314  | 19   | 113  | 123   | 245  | 18   | 586   | 228  | 91    | 111  | 46   |
| Peak-hour factor, PHF  | 0.81  | 0.81 | 0.81 | 0.88 | 0.88  | 0.88 | 0.96 | 0.96  | 0.96 | 0.94  | 0.94 | 0.94 |
| Adj. Flow (vph)        | 346   | 388  | 23   | 128  | 140   | 278  | 19   | 610   | 238  | 97    | 118  | 49   |
| RTOR Reduction (vph)   | 0     | 3    | 0    | 0    | 242   | 0    | 0    | 0     | 81   | 0     | 0    | 0    |
| Lane Group Flow (vph)  | 346   | 408  | 0    | 128  | 176   | 0    | 19   | 610   | 157  | 97    | 167  | 0    |
| Turn Type              | Prot  |      |      | Prot |       |      | Prot |       | Perm | Prot  |      |      |
| Protected Phases       | 1     | 6    |      | 5    | 2     |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |      |      |      |       |      |      |       | 8    |       |      |      |
| Actuated Green, G (s)  | 25.3  | 25.3 |      | 13.6 | 13.6  |      | 8.2  | 45.6  | 45.6 | 13.2  | 50.6 |      |
| Effective Green, g (s) | 26.8  | 27.3 |      | 15.1 | 15.6  |      | 9.7  | 47.6  | 47.6 | 14.7  | 52.6 |      |
| Actuated g/C Ratio     | 0.22  | 0.23 |      | 0.13 | 0.13  |      | 0.08 | 0.39  | 0.39 | 0.12  | 0.44 |      |
| Clearance Time (s)     | 5.5   | 6.0  |      | 5.5  | 6.0   |      | 5.5  | 6.0   | 6.0  | 5.5   | 6.0  |      |
| Vehicle Extension (s)  | 3.0   | 4.5  |      | 3.0  | 4.5   |      | 3.0  | 3.0   | 3.0  | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)     | 393   | 794  |      | 221  | 412   |      | 142  | 735   | 624  | 216   | 1474 |      |
| v/s Ratio Prot         | c0.20 | 0.12 |      | 0.07 | c0.13 |      | 0.01 | c0.33 |      | c0.05 | 0.05 |      |
| v/s Ratio Perm         |       |      |      |      |       |      |      |       | 0.15 |       |      |      |
| v/c Ratio              | 0.88  | 0.51 |      | 0.58 | 0.43  |      | 0.13 | 0.83  | 0.25 | 0.45  | 0.11 |      |
| Uniform Delay, d1      | 45.4  | 40.9 |      | 49.8 | 48.4  |      | 51.6 | 32.9  | 24.6 | 49.2  | 20.2 |      |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 |      |
| Incremental Delay, d2  | 19.9  | 0.9  |      | 3.7  | 1.2   |      | 0.4  | 7.7   | 0.2  | 1.5   | 0.0  |      |
| Delay (s)              | 65.3  | 41.8 |      | 53.5 | 49.7  |      | 52.0 | 40.6  | 24.8 | 50.7  | 20.2 |      |
| Level of Service       | E     | D    |      | D    | D     |      | D    | D     | C    | D     | C    |      |
| Approach Delay (s)     |       | 52.6 |      |      | 50.6  |      |      | 36.5  |      |       | 31.4 |      |
| Approach LOS           |       | D    |      |      | D     |      |      | D     |      |       | C    |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 44.1  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.82  |                      |      |
| Actuated Cycle Length (s)         | 120.7 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 76.0% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

EXIST COND 2005 AM  
7/19/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 280   | 314   | 19  | 113   | 123   | 245   | 18  | 586   | 228   | 91  | 111   | 46  |
| Peak Hour Factor        | 0.81  | 0.81  | 0.81  | 0.88  | 0.88  | 0.88  | 0.96  | 0.96  | 0.96  | 0.94  | 0.94  | 0.94  |
| Lane Group Flow (vph)   | 346   | 411   | 0   | 128   | 418   | 0   | 19  | 610   | 238   | 97  | 167   | 0   |
| v/c Ratio               | 0.85  | 0.50  |   | 0.56  | 0.63  |   | 0.09  | 0.80  | 0.33  | 0.49  | 0.11  |   |
| Control Delay           | 64.6  | 41.3  |   | 51.7  | 17.0  |   | 44.9  | 42.0  | 13.4  | 52.2  | 25.9  |   |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   |
| Total Delay             | 64.6  | 41.3  |   | 51.7  | 17.0  |   | 44.9  | 42.0  | 13.4  | 52.2  | 25.9  |   |
| Queue Length 50th (ft)  | 253   | 143   |   | 92  | 51  |   | 14  | 404   | 50  | 70  | 30  |   |
| Queue Length 95th (ft)  | #422  | 194   |   | 164   | 101   |   | 28  | #744  | 135   | 136   | 108   |   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |   | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   |   | 200   |   |   | 200   |   |   |
| Base Capacity (vph)     | 408   | 1136  |   | 369   | 1138  |   | 394   | 762   | 726   | 408   | 1669  |   |
| Starvation Cap Reductn  | 0   | 0   |   | 0   | 0   |   | 0   | 0   | 0   | 0   | 0   |   |
| Spillback Cap Reductn   | 0   | 0   |   | 0   | 0   |   | 0   | 0   | 0   | 0   | 0   |   |
| Storage Cap Reductn     | 0   | 0   |   | 0   | 0   |   | 0   | 0   | 0   | 0   | 0   |   |
| Reduced v/c Ratio       | 0.85  | 0.36  |   | 0.35  | 0.37  |   | 0.05  | 0.80  | 0.33  | 0.24  | 0.10  |   |

Intersection Summary

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

Timings  
2: THREE CHOPT RD & COX RD

EXIST COND 2005 AM  
7/19/2005

| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | NER   | SWL   | SWT   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 280   | 314   | 113   | 123   | 18    | 586   | 228   | 91    | 111   |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Perm  | Prot  |       |
| Protected Phases    | 1     | 6     | 5     | 2     | 3     | 8     |       | 7     | 4     |
| Permitted Phases    |       |       |       |       |       |       | 8     |       |       |
| Detector Phases     | 1     | 6     | 5     | 2     | 3     | 8     | 8     | 7     | 4     |
| Minimum Initial (s) | 3.0   | 12.0  | 3.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 9.5   | 20.0  | 9.5   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 30.5  | 46.0  | 30.5  | 46.0  | 30.5  | 51.0  | 51.0  | 35.5  | 56.0  |
| Total Split (%)     | 18.7% | 28.2% | 18.7% | 28.2% | 18.7% | 31.3% | 31.3% | 21.8% | 34.4% |
| Yellow Time (s)     | 3.5   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   | 4.0   | 3.5   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lag   | Lead  | Lead  | Lag   | Lead  |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | Min   | None  | Min   | None  | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 163  
 Actuated Cycle Length: 116.4  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|        |      |      |        |
|--------|------|------|--------|
| ø1     | ø2   | ø4   | ø3     |
| 30.5 s | 46 s | 56 s | 30.5 s |
| ø5     | ø6   | ø8   | ø7     |
| 30.5 s | 46 s | 51 s | 35.5 s |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

EXIST COND 2005 PM  
 7/12/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL  | NET  | NER  | SWL   | SWT   | SWR  |
|------------------------|-------|------|------|------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations    | ↖     | ↕    | ↗    | ↖    | ↕     | ↗    | ↖    | ↕    | ↗    | ↖     | ↕     | ↗    |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0  | 4.0  | 4.0  | 4.0   | 4.0   | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00 | 0.95  |      | 1.00 | 0.95 | 1.00 | 1.00  | 0.95  | 1.00 |
| Frt                    | 1.00  | 0.95 |      | 1.00 | 0.96  |      | 1.00 | 1.00 | 0.85 | 1.00  | 1.00  | 0.85 |
| Flt Protected          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00 | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (prot)      | 1770  | 3364 |      | 1770 | 3403  |      | 1770 | 3539 | 1583 | 1770  | 3539  | 1583 |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00 | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (perm)      | 1770  | 3364 |      | 1770 | 3403  |      | 1770 | 3539 | 1583 | 1770  | 3539  | 1583 |
| Volume (vph)           | 166   | 329  | 163  | 103  | 385   | 133  | 133  | 984  | 119  | 171   | 1535  | 328  |
| Peak-hour factor, PHF  | 0.91  | 0.91 | 0.91 | 0.87 | 0.87  | 0.87 | 0.88 | 0.88 | 0.88 | 0.95  | 0.95  | 0.95 |
| Adj. Flow (vph)        | 182   | 362  | 179  | 118  | 443   | 153  | 151  | 1118 | 135  | 180   | 1616  | 345  |
| RTOR Reduction (vph)   | 0     | 29   | 0    | 0    | 17    | 0    | 0    | 0    | 37   | 0     | 0     | 78   |
| Lane Group Flow (vph)  | 182   | 512  | 0    | 118  | 579   | 0    | 151  | 1118 | 98   | 180   | 1616  | 267  |
| Turn Type              | Prot  |      |      | Prot |       |      | Prot |      | Perm | Prot  |       | Perm |
| Protected Phases       | 5     | 2    |      | 1    | 6     |      | 3    | 8    |      | 7     | 4     |      |
| Permitted Phases       |       |      |      |      |       |      |      | 8    |      |       |       | 4    |
| Actuated Green, G (s)  | 23.2  | 36.1 |      | 17.2 | 30.1  |      | 19.8 | 87.4 | 87.4 | 21.9  | 89.5  | 89.5 |
| Effective Green, g (s) | 23.2  | 37.6 |      | 17.2 | 31.6  |      | 19.8 | 88.9 | 88.9 | 21.9  | 91.0  | 91.0 |
| Actuated g/C Ratio     | 0.13  | 0.21 |      | 0.09 | 0.17  |      | 0.11 | 0.49 | 0.49 | 0.12  | 0.50  | 0.50 |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0  | 5.5   |      | 4.0  | 5.5  | 5.5  | 4.0   | 5.5   | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0  | 3.0   |      | 3.0  | 3.0  | 3.0  | 3.0   | 5.0   | 5.0  |
| Lane Grp Cap (vph)     | 226   | 697  |      | 168  | 592   |      | 193  | 1732 | 775  | 213   | 1773  | 793  |
| v/s Ratio Prot         | c0.10 | 0.16 |      | 0.07 | c0.18 |      | 0.09 | 0.32 |      | c0.10 | c0.46 |      |
| v/s Ratio Perm         |       |      |      |      |       |      |      |      | 0.09 |       |       | 0.22 |
| v/c Ratio              | 0.81  | 0.73 |      | 0.70 | 0.98  |      | 0.78 | 0.65 | 0.13 | 0.85  | 0.91  | 0.34 |
| Uniform Delay, d1      | 77.0  | 67.3 |      | 79.7 | 74.6  |      | 78.8 | 34.6 | 25.2 | 78.2  | 41.6  | 27.2 |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 |
| Incremental Delay, d2  | 18.5  | 4.0  |      | 12.5 | 31.0  |      | 18.4 | 0.8  | 0.1  | 25.2  | 7.9   | 0.5  |
| Delay (s)              | 95.5  | 71.3 |      | 92.2 | 105.6 |      | 97.2 | 35.4 | 25.3 | 103.4 | 49.5  | 27.7 |
| Level of Service       | F     | E    |      | F    | F     |      | F    | D    | C    | F     | D     | C    |
| Approach Delay (s)     |       | 77.4 |      |      | 103.4 |      |      | 41.1 |      |       | 50.5  |      |
| Approach LOS           |       | E    |      |      | F     |      |      | D    |      |       | D     |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 59.4  | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 0.89  |                      |      |
| Actuated Cycle Length (s)         | 181.6 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 87.2% | ICU Level of Service | E    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
1: THREE CHOPT RD & GASKINS RD

EXIST COND 2005 PM  
7/12/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 166   | 329   | 163   | 103   | 385   | 133   | 133   | 984   | 119   | 171   | 1535  | 328   |
| Peak Hour Factor        | 0.91  | 0.91  | 0.91  | 0.87  | 0.87  | 0.87  | 0.88  | 0.88  | 0.88  | 0.95  | 0.95  | 0.95  |
| Lane Group Flow (vph)   | 182   | 541   | 0   | 118   | 596   | 0   | 151   | 1118  | 135   | 180   | 1616  | 345   |
| v/c Ratio               | 0.81  | 0.75  |   | 0.71  | 0.98  |   | 0.78  | 0.65  | 0.17  | 0.84  | 0.91  | 0.40  |
| Control Delay           | 88.7  | 71.2  |   | 85.7  | 102.0   |   | 92.3  | 37.6  | 13.3  | 97.8  | 50.9  | 16.9  |
| Queue Delay             | 10.6  | 0.0   |   | 1.1   | 0.0   |   | 3.9   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 99.3  | 71.2  |   | 86.8  | 102.0   |   | 96.2  | 37.6  | 13.3  | 97.8  | 50.9  | 16.9  |
| Queue Length 50th (ft)  | 217   | 306   |   | 141   | 372   |   | 180   | 538   | 40  | 213   | 940   | 136   |
| Queue Length 95th (ft)  | 319   | 404   |   | 214   | #522  |   | 268   | 634   | 87  | #354  | #1217   | 241   |
| Internal Link Dist (ft) |   | 151   |   |   | 599   |   |   | 856   |   |   |   | 499   |
| Turn Bay Length (ft)    | 250   |   |   | 200   |   |   | 260   |   | 200   | 500   |   |   |
| Base Capacity (vph)     | 282   | 725   |   | 274   | 609   |   | 237   | 1760  | 824   | 240   | 1781  | 875   |
| 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     | 73  | 0   |   | 48  | 0   |   | 37  | 0   | 0   | 0   | 0   | 0   |
| Reduced v/c Ratio       | 0.87  | 0.75  |   | 0.52  | 0.98  |   | 0.76  | 0.64  | 0.16  | 0.75  | 0.91  | 0.39  |

Intersection Summary

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

Timings  
1: THREE CHOPT RD & GASKINS RD

EXIST COND 2005 PM  
7/12/2005

| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |  |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |  |
| Volume (vph)        | 166   | 329   | 103   | 385   | 133   | 984   | 119   | 171   | 1535  | 328   |  |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Perm  | Prot  |       | Perm  |  |
| Protected Phases    | 5     | 2     | 1     | 6     | 3     | 8     |       | 7     | 4     |       |  |
| Permitted Phases    |       |       |       |       |       |       | 8     |       |       | 4     |  |
| Detector Phases     | 5     | 2     | 1     | 6     | 3     | 8     | 8     | 7     | 4     | 4     |  |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 15.0  | 15.0  | 3.0   | 15.0  | 15.0  |  |
| Minimum Split (s)   | 7.0   | 8.5   | 7.0   | 8.5   | 7.0   | 20.5  | 20.5  | 7.0   | 20.5  | 20.5  |  |
| Total Split (s)     | 34.0  | 35.5  | 34.0  | 35.5  | 29.0  | 95.5  | 95.5  | 29.0  | 95.5  | 95.5  |  |
| Total Split (%)     | 17.5% | 18.3% | 17.5% | 18.3% | 14.9% | 49.2% | 49.2% | 14.9% | 49.2% | 49.2% |  |
| Yellow Time (s)     | 3.0   | 4.0   | 3.0   | 4.0   | 3.0   | 4.0   | 4.0   | 3.0   | 4.0   | 4.0   |  |
| All-Red Time (s)    | 1.0   | 1.5   | 1.0   | 1.5   | 1.0   | 1.5   | 1.5   | 1.0   | 1.5   | 1.5   |  |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |  |
| Lead-Lag Optimize?  | Yes   |  |
| Recall Mode         | None  | None  | None  | Min   | None  | None  | None  | None  | None  | None  |  |

Intersection Summary

Cycle Length: 194  
 Actuated Cycle Length: 181.7  
 Natural Cycle: 90  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |        |      |        |
|------|--------|------|--------|
| ø1   | ø2     | ø3   | ø4     |
| 34 s | 35.5 s | 29 s | 95.5 s |
| ø5   | ø6     | ø7   | ø8     |
| 34 s | 35.5 s | 29 s | 95.5 s |

| Movement                          | SEL  | SET  | SER  | NWL   | NWT   | NWR  | NEL  | NET  | NER  | SWL   | SWT   | SWR  |
|-----------------------------------|------|------|------|-------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations               | ↖    | ↕    |      | ↖     | ↕     |      | ↖    | ↕    | ↗    | ↖     | ↕     |      |
| Ideal Flow (vphpl)                | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)               | 4.0  | 4.0  |      | 4.0   | 4.0   |      | 4.0  | 4.0  | 4.0  | 4.0   | 4.0   |      |
| Lane Util. Factor                 | 1.00 | 0.95 |      | 1.00  | 0.95  |      | 1.00 | 1.00 | 1.00 | 1.00  | 0.95  |      |
| Fr <sub>t</sub>                   | 1.00 | 0.98 |      | 1.00  | 0.96  |      | 1.00 | 1.00 | 0.85 | 1.00  | 0.96  |      |
| Fl <sub>t</sub> Protected         | 0.95 | 1.00 |      | 0.95  | 1.00  |      | 0.95 | 1.00 | 1.00 | 0.95  | 1.00  |      |
| Satd. Flow (prot)                 | 1770 | 3463 |      | 1770  | 3401  |      | 1770 | 1863 | 1583 | 1770  | 3396  |      |
| Fl <sub>t</sub> Permitted         | 0.95 | 1.00 |      | 0.95  | 1.00  |      | 0.95 | 1.00 | 1.00 | 0.95  | 1.00  |      |
| Satd. Flow (perm)                 | 1770 | 3463 |      | 1770  | 3401  |      | 1770 | 1863 | 1583 | 1770  | 3396  |      |
| Volume (vph)                      | 102  | 276  | 46   | 291   | 434   | 153  | 41   | 179  | 114  | 330   | 603   | 222  |
| Peak-hour factor, PHF             | 0.80 | 0.80 | 0.80 | 0.88  | 0.88  | 0.88 | 0.96 | 0.96 | 0.96 | 0.94  | 0.94  | 0.94 |
| Adj. Flow (vph)                   | 128  | 345  | 58   | 331   | 493   | 174  | 43   | 186  | 119  | 351   | 641   | 236  |
| RTOR Reduction (vph)              | 0    | 9    | 0    | 0     | 20    | 0    | 0    | 0    | 81   | 0     | 0     | 0    |
| Lane Group Flow (vph)             | 128  | 394  | 0    | 331   | 647   | 0    | 43   | 186  | 38   | 351   | 877   | 0    |
| Turn Type                         | Prot |      | Prot |       | Prot  |      | Perm |      | Prot |       |       |      |
| Protected Phases                  | 1    | 6    |      | 5     | 2     |      | 3    | 8    |      | 7     | 4     |      |
| Permitted Phases                  |      |      |      |       |       |      |      |      | 8    |       |       |      |
| Actuated Green, G (s)             | 13.8 | 22.1 |      | 25.4  | 33.7  |      | 5.6  | 20.7 | 20.7 | 30.5  | 45.6  |      |
| Effective Green, g (s)            | 15.3 | 24.1 |      | 26.9  | 35.7  |      | 7.1  | 22.7 | 22.7 | 32.0  | 47.6  |      |
| Actuated g/C Ratio                | 0.13 | 0.20 |      | 0.22  | 0.29  |      | 0.06 | 0.19 | 0.19 | 0.26  | 0.39  |      |
| Clearance Time (s)                | 5.5  | 6.0  |      | 5.5   | 6.0   |      | 5.5  | 6.0  | 6.0  | 5.5   | 6.0   |      |
| Vehicle Extension (s)             | 3.0  | 4.5  |      | 3.0   | 4.5   |      | 3.0  | 3.0  | 3.0  | 3.0   | 3.0   |      |
| Lane Grp Cap (vph)                | 223  | 686  |      | 391   | 998   |      | 103  | 347  | 295  | 465   | 1328  |      |
| v/s Ratio Prot                    | 0.07 | 0.12 |      | c0.19 | c0.20 |      | 0.02 | 0.10 |      | c0.20 | c0.26 |      |
| v/s Ratio Perm                    |      |      |      |       |       |      |      |      | 0.08 |       |       |      |
| v/c Ratio                         | 0.57 | 0.57 |      | 0.85  | 0.65  |      | 0.42 | 0.54 | 0.13 | 0.75  | 0.66  |      |
| Uniform Delay, d <sub>1</sub>     | 50.1 | 44.2 |      | 45.4  | 37.5  |      | 55.3 | 44.7 | 41.3 | 41.2  | 30.4  |      |
| Progression Factor                | 1.00 | 1.00 |      | 1.00  | 1.00  |      | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  |      |
| Incremental Delay, d <sub>2</sub> | 3.5  | 1.6  |      | 15.4  | 1.8   |      | 2.7  | 1.6  | 0.2  | 6.8   | 1.2   |      |
| Delay (s)                         | 53.7 | 45.8 |      | 60.9  | 39.3  |      | 58.0 | 46.3 | 41.5 | 48.1  | 31.7  |      |
| Level of Service                  | D    | D    |      | E     | D     |      | E    | D    | D    | D     | C     |      |
| Approach Delay (s)                |      | 47.7 |      |       | 46.5  |      |      | 46.1 |      |       | 36.4  |      |
| Approach LOS                      |      | D    |      |       | D     |      |      | D    |      |       | D     |      |

**Intersection Summary**

|                                   |       |                      |     |
|-----------------------------------|-------|----------------------|-----|
| HCM Average Control Delay         | 42.6  | HCM Level of Service | D   |
| HCM Volume to Capacity ratio      | 0.72  |                      |     |
| Actuated Cycle Length (s)         | 121.7 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 67.2% | ICU Level of Service | C   |
| Analysis Period (min)             | 15    |                      |     |
| c Critical Lane Group             |       |                      |     |

*O de facto RTL*

Queues  
2: THREE CHOPT RD & COX RD

EXIST COND 2005 PM  
7/12/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 102   | 276   | 46  | 291   | 434   | 153   | 41   | 179   | 114   | 330   | 603   | 222   |
| Peak Hour Factor        | 0.80  | 0.80  | 0.80  | 0.88  | 0.88  | 0.88  | 0.96   | 0.96  | 0.96  | 0.94  | 0.94  | 0.94  |
| Lane Group Flow (vph)   | 128   | 403   | 0   | 331   | 667   | 0   | 43   | 186   | 119   | 351   | 877   | 0   |
| v/c Ratio               | 0.56  | 0.57  |   | 0.83  | 0.64  |   | 0.30   | 0.59  | 0.34  | 0.74  | 0.65  |   |
| Control Delay           | 53.7  | 43.0  |   | 64.4  | 38.5  |   | 57.5   | 47.8  | 13.1  | 53.0  | 33.9  |   |
| Queue Delay             | 2.6   | 0.0   |   | 668.9   | 0.1   |   | 0.1  | 0.0   | 0.0   | 203.8   | 0.0   |   |
| Total Delay             | 56.3  | 43.0  |   | 733.3   | 38.5  |   | 57.6   | 47.8  | 13.1  | 256.8   | 34.0  |   |
| Queue Length 50th (ft)  | 89  | 140   |   | 230   | 216   |   | 30   | 128   | 13  | 232   | 292   |   |
| Queue Length 95th (ft)  | 160   | 190   |   | #522  | 347   |   | 80   | 231   | 69  | #524  | 465   |   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |  | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 100   |   |   | 100   |   |   | 100  |   | 100   | 100   |   |   |
| Base Capacity (vph)     | 362   | 1073  |   | 399   | 1164  |   | 335  | 603   | 579   | 474   | 1440  |   |
| Starvation Cap Reductn  | 0   | 0   |   | 0   | 0   |   | 0  | 0   | 0   | 0   | 0   |   |
| Spillback Cap Reductn   | 0   | 0   |   | 0   | 0   |   | 0  | 0   | 0   | 0   | 0   |   |
| Storage Cap Reductn     | 143   | 0   |   | 275   | 40  |   | 51   | 0   | 0   | 231   | 30  |   |
| Reduced v/c Ratio       | 0.58  | 0.38  |   | 2.67  | 0.59  |   | 0.15   | 0.31  | 0.21  | 1.44  | 0.62  |   |

Intersection Summary

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

*O de facto RTL*

Timings  
2: THREE CHOPT RD & COX RD

EXIST COND 2005 PM  
10/12/2005

| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | SWL   | SWT   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |
| Volume (vph)        | 102   | 276   | 291   | 434   | 41    | 179   | 330   | 603   |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Prot  |       |
| Protected Phases    | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Permitted Phases    |       |       |       |       |       |       |       |       |
| Detector Phases     | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Minimum Initial (s) | 3.0   | 12.0  | 3.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 9.5   | 20.0  | 9.5   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 30.5  | 46.0  | 30.5  | 46.0  | 30.5  | 46.0  | 35.5  | 56.0  |
| Total Split (%)     | 18.7% | 28.2% | 18.7% | 28.2% | 18.7% | 28.2% | 21.8% | 34.4% |
| Yellow Time (s)     | 3.5   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | Min   | None  | Min   | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 163  
 Actuated Cycle Length: 117.5  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|        |      |        |      |
|--------|------|--------|------|
| ø1     | ø2   | ø3     | ø4   |
| 30.5 s | 46 s | 30.5 s | 56 s |
| ø5     | ø6   | ø7     | ø8   |
| 30.5 s | 46 s | 35.5 s | 46 s |

**Appendix D**

**HCM Capacity Printouts – Year 2013 Analysis**

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

2013 AM NO-BUILD  
7/14/2005

| Movement                          | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|-----------------------------------|-------|-------|------|------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations               |       |       |      |      |       |      |      |       |      |       |      |      |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)               | 4.0   | 4.0   |      | 4.0  | 4.0   |      | 4.0  | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor                 | 1.00  | 0.95  |      | 1.00 | 0.95  |      | 1.00 | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 |
| Fr <sub>t</sub>                   | 1.00  | 0.97  |      | 1.00 | 0.93  |      | 1.00 | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 |
| Fl <sub>t</sub> Protected         | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)                 | 1770  | 3429  |      | 1770 | 3281  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Fl <sub>t</sub> Permitted         | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)                 | 1770  | 3429  |      | 1770 | 3281  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Volume (vph)                      | 530   | 380   | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000 | 220  |
| Peak-hour factor, PHF             | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)                   | 530   | 380   | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000 | 220  |
| RTOR Reduction (vph)              | 0     | 12    | 0    | 0    | 100   | 0    | 0    | 0     | 17   | 0     | 0    | 97   |
| Lane Group Flow (vph)             | 530   | 468   | 0    | 50   | 620   | 0    | 150  | 1690  | 63   | 170   | 1000 | 123  |
| Turn Type                         | Prot  |       |      | Prot |       |      | Prot |       | Perm | Prot  |      | Perm |
| Protected Phases                  | 5     | 2     |      | 1    | 6     |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases                  |       |       |      |      |       |      |      |       | 8    |       |      | 4    |
| Actuated Green, G (s)             | 40.0  | 57.4  |      | 8.5  | 25.9  |      | 17.8 | 65.0  | 65.0 | 18.8  | 66.0 | 66.0 |
| Effective Green, g (s)            | 40.0  | 58.9  |      | 8.5  | 27.4  |      | 17.8 | 66.5  | 66.5 | 18.8  | 67.5 | 67.5 |
| Actuated g/C Ratio                | 0.24  | 0.35  |      | 0.05 | 0.16  |      | 0.11 | 0.39  | 0.39 | 0.11  | 0.40 | 0.40 |
| Clearance Time (s)                | 4.0   | 5.5   |      | 4.0  | 5.5   |      | 4.0  | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  |
| Vehicle Extension (s)             | 3.0   | 3.0   |      | 3.0  | 3.0   |      | 3.0  | 3.0   | 3.0  | 3.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)                | 420   | 1197  |      | 89   | 533   |      | 187  | 1395  | 624  | 197   | 1416 | 633  |
| v/s Ratio Prot                    | c0.30 | 0.14  |      | 0.03 | c0.22 |      | 0.08 | c0.48 |      | c0.10 | 0.28 |      |
| v/s Ratio Perm                    |       |       |      |      |       |      |      |       | 0.05 |       |      | 0.14 |
| v/c Ratio                         | 1.26  | 0.39  |      | 0.56 | 1.16  |      | 0.80 | 1.21  | 0.10 | 0.86  | 0.71 | 0.19 |
| Uniform Delay, d <sub>1</sub>     | 64.3  | 41.4  |      | 78.3 | 70.6  |      | 73.7 | 51.1  | 32.2 | 73.7  | 42.3 | 32.9 |
| Progression Factor                | 1.00  | 1.00  |      | 1.00 | 1.00  |      | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d <sub>2</sub> | 135.8 | 0.2   |      | 7.9  | 92.8  |      | 21.4 | 102.1 | 0.1  | 30.0  | 2.0  | 0.3  |
| Delay (s)                         | 200.1 | 41.6  |      | 86.2 | 163.4 |      | 95.1 | 153.2 | 32.3 | 103.7 | 44.4 | 33.2 |
| Level of Service                  | F     | D     |      | F    | F     |      | F    | F     | C    | F     | D    | C    |
| Approach Delay (s)                |       | 124.8 |      |      | 158.4 |      |      | 143.6 |      |       | 49.9 |      |
| Approach LOS                      |       | F     |      |      | F     |      |      | F     |      |       | D    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 116.5  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.21   |                      |      |
| Actuated Cycle Length (s)         | 168.7  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 120.3% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Timings  
1: THREE CHOPT RD & GASKINS RD

2013 AM NO-BUILD  
7/14/2005



| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations | ↘     | ↕     | ↙     | ↕     | ↘     | ↕     | ↗     | ↘     | ↕     | ↗     |
| Volume (vph)        | 530   | 380   | 50    | 370   | 150   | 1690  | 80    | 170   | 1000  | 220   |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Perm  | Prot  |       | Perm  |
| Protected Phases    | 5     | 2     | 1     | 6     | 3     | 8     |       | 7     | 4     |       |
| Permitted Phases    |       |       |       |       |       |       | 8     |       |       | 4     |
| Detector Phases     | 5     | 2     | 1     | 6     | 3     | 8     | 8     | 7     | 4     | 4     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 15.0  | 15.0  | 3.0   | 15.0  | 15.0  |
| Minimum Split (s)   | 7.0   | 8.5   | 7.0   | 8.5   | 7.0   | 20.5  | 20.5  | 7.0   | 20.5  | 20.5  |
| Total Split (s)     | 44.0  | 45.5  | 29.0  | 30.5  | 24.0  | 70.5  | 70.5  | 24.0  | 70.5  | 70.5  |
| Total Split (%)     | 26.0% | 26.9% | 17.2% | 18.0% | 14.2% | 41.7% | 41.7% | 14.2% | 41.7% | 41.7% |
| Yellow Time (s)     | 3.0   | 4.0   | 3.0   | 4.0   | 3.0   | 4.0   | 4.0   | 3.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 1.0   | 1.5   | 1.0   | 1.5   | 1.0   | 1.5   | 1.5   | 1.0   | 1.5   | 1.5   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | None  | None  | Min   | None  | None  | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 169  
 Actuated Cycle Length: 167.8  
 Natural Cycle: 140  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |        |      |        |
|------|--------|------|--------|
| ↘ ø1 | ↘ ø2   | ↘ ø3 | ↘ ø4   |
| 29 s | 45.5 s | 24 s | 70.5 s |
| ↘ ø5 | ↘ ø6   | ↘ ø7 | ↘ ø8   |
| 44 s | 30.5 s | 24 s | 70.5 s |

Queues  
1: THREE CHOPT RD & GASKINS RD

2013 AM NO-BUILD  
7/14/2005



| Lane Group              | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|-------------------------|-------|------|------|------|-------|------|------|-------|------|-------|------|------|
| Volume (vph)            | 530   | 380  | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000 | 220  |
| Peak Hour Factor        | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Lane Group Flow (vph)   | 530   | 480  | 0    | 50   | 720   | 0    | 150  | 1690  | 80   | 170   | 1000 | 220  |
| v/c Ratio               | 1.26  | 0.40 |      | 0.49 | 1.16  |      | 0.80 | 1.20  | 0.12 | 0.86  | 0.70 | 0.30 |
| Control Delay           | 183.3 | 41.8 |      | 78.6 | 139.6 |      | 92.4 | 142.5 | 21.8 | 100.7 | 45.4 | 10.8 |
| Queue Delay             | 110.9 | 0.0  |      | 0.0  | 0.0   |      | 2.8  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  |
| Total Delay             | 294.2 | 41.8 |      | 78.6 | 139.6 |      | 95.2 | 142.5 | 21.8 | 100.7 | 45.4 | 10.8 |
| Queue Length 50th (ft)  | ~735  | 207  |      | 55   | ~437  |      | 163  | ~1198 | 36   | 187   | 490  | 40   |
| Queue Length 95th (ft)  | #975  | 272  |      | 103  | #574  |      | #262 | #1334 | 76   | #315  | 575  | 106  |
| Internal Link Dist (ft) |       | 151  |      |      | 599   |      |      | 856   |      |       | 499  |      |
| Turn Bay Length (ft)    | 250   |      |      | 200  |       |      | 260  |       | 200  | 500   |      |      |
| Base Capacity (vph)     | 422   | 1214 |      | 239  | 619   |      | 208  | 1403  | 644  | 209   | 1423 | 733  |
| 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     | 70    | 13   |      | 0    | 0     |      | 16   | 0     | 0    | 0     | 0    | 0    |
| Reduced v/c Ratio       | 1.51  | 0.40 |      | 0.21 | 1.16  |      | 0.78 | 1.20  | 0.12 | 0.81  | 0.70 | 0.30 |

**Intersection Summary**

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

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

2013 PM NO-BUILD ✓  
7/12/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR  |
|------------------------|-------|------|------|------|-------|------|-------|------|------|-------|-------|------|
| Lane Configurations    |       |      |      |      |       |      |       |      |      |       |       |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00 | 0.95  |      | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00 |
| Frt                    | 1.00  | 0.95 |      | 1.00 | 0.96  |      | 1.00  | 1.00 | 0.85 | 1.00  | 1.00  | 0.85 |
| Fit Protected          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (prot)      | 1770  | 3365 |      | 1770 | 3400  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583 |
| Fit Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (perm)      | 1770  | 3365 |      | 1770 | 3400  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583 |
| Volume (vph)           | 190   | 390  | 190  | 120  | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380  |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 190   | 390  | 190  | 120  | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380  |
| RTOR Reduction (vph)   | 0     | 29   | 0    | 0    | 18    | 0    | 0     | 0    | 38   | 0     | 0     | 78   |
| Lane Group Flow (vph)  | 190   | 551  | 0    | 120  | 592   | 0    | 160   | 1150 | 102  | 200   | 1800  | 302  |
| Turn Type              | Prot  |      |      | Prot |       |      | Prot  |      | Perm | Prot  |       | Perm |
| Protected Phases       | 5     | 2    |      | 1    | 6     |      | 3     | 8    |      | 7     | 4     |      |
| Permitted Phases       |       |      |      |      |       |      |       |      | 8    |       |       | 4    |
| Actuated Green, G (s)  | 24.0  | 36.7 |      | 17.4 | 30.1  |      | 20.6  | 87.5 | 87.5 | 23.4  | 90.3  | 90.3 |
| Effective Green, g (s) | 24.0  | 38.2 |      | 17.4 | 31.6  |      | 20.6  | 89.0 | 89.0 | 23.4  | 91.8  | 91.8 |
| Actuated g/C Ratio     | 0.13  | 0.21 |      | 0.09 | 0.17  |      | 0.11  | 0.48 | 0.48 | 0.13  | 0.50  | 0.50 |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0  | 5.5   |      | 4.0   | 5.5  | 5.5  | 4.0   | 5.5   | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0  | 3.0   |      | 3.0   | 3.0  | 3.0  | 3.0   | 5.0   | 5.0  |
| Lane Grp Cap (vph)     | 231   | 699  |      | 167  | 584   |      | 198   | 1712 | 766  | 225   | 1766  | 790  |
| v/s Ratio Prot         | c0.11 | 0.17 |      | 0.07 | c0.18 |      | 0.09  | 0.32 |      | c0.11 | c0.51 |      |
| v/s Ratio Perm         |       |      |      |      |       |      |       |      | 0.09 |       |       | 0.24 |
| v/c Ratio              | 0.82  | 0.79 |      | 0.72 | 1.01  |      | 0.81  | 0.67 | 0.13 | 0.89  | 1.02  | 0.38 |
| Uniform Delay, d1      | 77.9  | 69.1 |      | 80.9 | 76.2  |      | 79.8  | 36.3 | 26.2 | 79.0  | 46.1  | 28.6 |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 |
| Incremental Delay, d2  | 20.5  | 5.9  |      | 13.8 | 40.6  |      | 20.9  | 1.1  | 0.1  | 31.7  | 26.4  | 0.6  |
| Delay (s)              | 98.4  | 74.9 |      | 94.7 | 116.8 |      | 100.7 | 37.4 | 26.3 | 110.7 | 72.5  | 29.2 |
| Level of Service       | F     | E    |      | F    | F     |      | F     | D    | C    | F     | E     | C    |
| Approach Delay (s)     |       | 80.7 |      |      | 113.2 |      |       | 43.3 |      |       | 68.8  |      |
| Approach LOS           |       | F    |      |      | F     |      |       | D    |      |       | E     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 69.7   | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 0.99   |                      |      |
| Actuated Cycle Length (s)         | 184.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 100.0% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Queues  
1: THREE CHOPT RD & GASKINS RD

2013 PM NO-BUILD  
7/12/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 190   | 390   | 190   | 120   | 450   | 160   | 160  | 1150  | 140   | 200   | 1800  | 380   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 190   | 580   | 0   | 120   | 610   | 0   | 160  | 1150  | 140   | 200   | 1800  | 380   |
| v/c Ratio               | 0.82  | 0.80  |   | 0.71  | 1.01  |   | 0.81   | 0.67  | 0.17  | 0.89  | 1.02  | 0.44  |
| Control Delay           | 91.1  | 74.4  |   | 86.8  | 110.3   |   | 95.3   | 39.4  | 13.9  | 106.5   | 71.2  | 19.3  |
| Queue Delay             | 19.7  | 0.0   |   | 1.3   | 0.0   |   | 7.7  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 110.8   | 74.4  |   | 88.2  | 110.3   |   | 103.1  | 39.4  | 13.9  | 106.5   | 71.2  | 19.3  |
| Queue Length 50th (ft)  | 229   | 338   |   | 145   | ~405  |   | 193  | 571   | 45  | 243   | ~1241   | 174   |
| Queue Length 95th (ft)  | 333   | #440  |   | 225   | #574  |   | 292  | 683   | 96  | #412  | #1467   | 286   |
| Internal Link Dist (ft) |   | 151   |   |   | 599   |   |  | 856   |   |   | 499   |   |
| Turn Bay Length (ft)    | 250   |   |   | 200   |   |   | 260  |   | 200   | 500   |   |   |
| Base Capacity (vph)     | 280   | 728   |   | 271   | 602   |   | 235  | 1738  | 814   | 239   | 1765  | 867   |
| 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     | 79  | 0   |   | 51  | 0   |   | 44   | 0   | 0   | 0   | 0   | 0   |
| Reduced v/c Ratio       | 0.95  | 0.80  |   | 0.55  | 1.01  |   | 0.84   | 0.66  | 0.17  | 0.84  | 1.02  | 0.44  |

**Intersection Summary**

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

Timings  
1: THREE CHOPT RD & GASKINS RD

2013 PM NO-BUILD  
7/12/2005



| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 190   | 390   | 120   | 450   | 160   | 1150  | 140   | 200   | 1800  | 380   |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Perm  | Prot  |       | Perm  |
| Protected Phases    | 5     | 2     | 1     | 6     | 3     | 8     |       | 7     | 4     |       |
| Permitted Phases    |       |       |       |       |       |       | 8     |       |       | 4     |
| Detector Phases     | 5     | 2     | 1     | 6     | 3     | 8     | 8     | 7     | 4     | 4     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 15.0  | 15.0  | 3.0   | 15.0  | 15.0  |
| Minimum Split (s)   | 7.0   | 8.5   | 7.0   | 8.5   | 7.0   | 20.5  | 20.5  | 7.0   | 20.5  | 20.5  |
| Total Split (s)     | 34.0  | 35.5  | 34.0  | 35.5  | 29.0  | 95.5  | 95.5  | 29.0  | 95.5  | 95.5  |
| Total Split (%)     | 17.5% | 18.3% | 17.5% | 18.3% | 14.9% | 49.2% | 49.2% | 14.9% | 49.2% | 49.2% |
| Yellow Time (s)     | 3.0   | 4.0   | 3.0   | 4.0   | 3.0   | 4.0   | 4.0   | 3.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 1.0   | 1.5   | 1.0   | 1.5   | 1.0   | 1.5   | 1.5   | 1.0   | 1.5   | 1.5   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | None  | None  | Min   | None  | None  | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 194  
 Actuated Cycle Length: 184  
 Natural Cycle: 120  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |        |      |        |
|------|--------|------|--------|
| ø1   | ø2     | ø3   | ø4     |
| 34 s | 35.5 s | 29 s | 95.5 s |
| ø5   | ø6     | ø7   | ø8     |
| 34 s | 35.5 s | 29 s | 95.5 s |

HCM Signalized Intersection Capacity Analysis  
 2: THREE CHOPT RD & COX RD

2013 AM NO-BUILD  
 9/29/2005

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement               | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Lane Configurations    |  |  |   |  |  |   |   |  |   |  |  |   |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   |
| Lane Util. Factor      | 1.00  | 0.95  |   | 1.00  | 0.95  |   | 1.00  | 0.95  |   | 1.00  | 0.95  |   |
| Frt                    | 1.00  | 0.99  |   | 1.00  | 0.90  |   | 1.00  | 0.96  |   | 1.00  | 0.96  |   |
| Flt Protected          | 0.95  | 1.00  |   | 0.95  | 1.00  |   | 0.95  | 1.00  |   | 0.95  | 1.00  |   |
| Satd. Flow (prot)      | 1770  | 3514  |   | 1770  | 3181  |   | 1770  | 3390  |   | 1770  | 3392  |   |
| Flt Permitted          | 0.95  | 1.00  |   | 0.95  | 1.00  |   | 0.95  | 1.00  |   | 0.95  | 1.00  |   |
| Satd. Flow (perm)      | 1770  | 3514  |   | 1770  | 3181  |   | 1770  | 3390  |   | 1770  | 3392  |   |
| Volume (vph)           | 350   | 400   | 20  | 130   | 140   | 290   | 20  | 690   | 270   | 110   | 130   | 50  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 350   | 400   | 20  | 130   | 140   | 290   | 20  | 690   | 270   | 110   | 130   | 50  |
| RTOR Reduction (vph)   | 0   | 2   | 0   | 0   | 252   | 0   | 0   | 21  | 0   | 0   | 0   | 0   |
| Lane Group Flow (vph)  | 350   | 418   | 0   | 130   | 178   | 0   | 20  | 939   | 0   | 110   | 180   | 0   |
| Turn Type              | Prot  |   |   | Prot  |   |   | Prot  |   |   | Prot  |   |   |
| Protected Phases       | 1   | 6   |   | 5   | 2   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases       |   |   |   |   |   |   |   |   |   |   |   |   |
| Actuated Green, G (s)  | 25.2  | 25.1  |   | 13.5  | 13.4  |   | 3.1   | 43.3  |   | 12.2  | 52.4  |   |
| Effective Green, g (s) | 26.7  | 27.1  |   | 15.0  | 15.4  |   | 4.6   | 45.3  |   | 13.7  | 54.4  |   |
| Actuated g/C Ratio     | 0.23  | 0.23  |   | 0.13  | 0.13  |   | 0.04  | 0.39  |   | 0.12  | 0.46  |   |
| Clearance Time (s)     | 5.5   | 6.0   |   | 5.5   | 6.0   |   | 5.5   | 6.0   |   | 5.5   | 6.0   |   |
| Vehicle Extension (s)  | 3.0   | 4.5   |   | 3.0   | 4.5   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   |
| Lane Grp Cap (vph)     | 404   | 813   |   | 227   | 418   |   | 70  | 1311  |   | 207   | 1576  |   |
| v/s Ratio Prot         | c0.20   | c0.12   |   | 0.07  | 0.06  |   | 0.01  | c0.28   |   | c0.06   | 0.05  |   |
| v/s Ratio Perm         |   |   |   |   |   |   |   |   |   |   |   |   |
| v/c Ratio              | 0.87  | 0.51  |   | 0.57  | 0.43  |   | 0.29  | 0.72  |   | 0.53  | 0.11  |   |
| Uniform Delay, d1      | 43.5  | 39.3  |   | 48.0  | 46.8  |   | 54.7  | 30.5  |   | 48.7  | 17.7  |   |
| Progression Factor     | 1.00  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   |
| Incremental Delay, d2  | 17.4  | 0.9   |   | 3.5   | 1.2   |   | 2.2   | 1.9   |   | 2.6   | 0.0   |   |
| Delay (s)              | 60.9  | 40.2  |   | 51.5  | 48.0  |   | 56.9  | 32.3  |   | 51.3  | 17.8  |   |
| Level of Service       | E   | D   |   | D   | D   |   | E   | C   |   | D   | B   |   |
| Approach Delay (s)     |   | 49.6  |   |   | 48.8  |   |   | 32.8  |   |   | 30.5  |   |
| Approach LOS           |   | D   |   |   | D   |   |   | C   |   |   | C   |   |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 41.0  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.69  |                      |      |
| Actuated Cycle Length (s)         | 117.1 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 79.7% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

2013 AM NO-BUILD  
9/29/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 350   | 400   | 20  | 130   | 140   | 290   | 20   | 690   | 270   | 110   | 130   | 50  |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 350   | 420   | 0   | 130   | 430   | 0   | 20   | 960   | 0   | 110   | 180   | 0   |
| v/c Ratio               | 0.84  | 0.50  |   | 0.56  | 0.63  |   | 0.16   | 0.76  |   | 0.51  | 0.11  |   |
| Control Delay           | 62.0  | 40.8  |   | 56.2  | 19.3  |   | 56.8   | 36.3  |   | 56.4  | 18.9  |   |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Total Delay             | 62.0  | 40.8  |   | 56.2  | 19.3  |   | 56.8   | 36.3  |   | 56.4  | 18.9  |   |
| Queue Length 50th (ft)  | 241   | 138   |   | 89  | 48  |   | 14   | 303   |   | 75  | 32  |   |
| Queue Length 95th (ft)  | #484  | 214   |   | 163   | 104   |   | 43   | 470   |   | 144   | 75  |   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |  | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   |   | 200  |   |   | 200   |   |   |
| Base Capacity (vph)     | 415   | 1153  |   | 376   | 1158  |   | 339  | 1268  |   | 480   | 1640  |   |
| Starvation Cap Reductn  | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Spillback Cap Reductn   | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Storage Cap Reductn     | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Reduced v/c Ratio       | 0.84  | 0.36  |   | 0.35  | 0.37  |   | 0.06   | 0.76  |   | 0.23  | 0.11  |   |

Intersection Summary

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

Timings  
2: THREE CHOPT RD & COX RD

2013 AM NO-BUILD  
9/29/2005



| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | SWL   | SWT   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |
| Volume (vph)        | 350   | 400   | 130   | 140   | 20    | 690   | 110   | 130   |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Prot  |       |
| Protected Phases    | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Permitted Phases    |       |       |       |       |       |       |       |       |
| Detector Phases     | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Minimum Initial (s) | 3.0   | 12.0  | 3.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 9.5   | 20.0  | 9.5   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 30.5  | 46.0  | 30.5  | 46.0  | 30.5  | 45.5  | 41.0  | 56.0  |
| Total Split (%)     | 18.7% | 28.2% | 18.7% | 28.2% | 18.7% | 27.9% | 25.2% | 34.4% |
| Yellow Time (s)     | 3.5   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | Min   | None  | Min   | None  | None  | None  | None  |

**Intersection Summary**  
 Cycle Length: 163  
 Actuated Cycle Length: 113.6  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|              |            |              |              |
|--------------|------------|--------------|--------------|
| ø1<br>30.5 s | ø2<br>46 s | ø3<br>30.5 s | ø4<br>56 s   |
| ø5<br>30.5 s | ø6<br>46 s | ø7<br>41 s   | ø8<br>45.5 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2013 PM N0-BUILD  
9/29/2005

| Movement               | SEL  | SET   | SER  | NWL   | NWT  | NWR  | NEL  | NET  | NER  | SWL   | SWT   | SWR  |
|------------------------|------|-------|------|-------|------|------|------|------|------|-------|-------|------|
| Lane Configurations    |      |       |      |       |      |      |      |      |      |       |       |      |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0  | 4.0   |      | 4.0   | 4.0  |      | 4.0  | 4.0  |      | 4.0   | 4.0   |      |
| Lane Util. Factor      | 1.00 | 0.95  |      | 1.00  | 0.95 |      | 1.00 | 0.95 |      | 1.00  | 0.95  |      |
| Frt                    | 1.00 | 0.98  |      | 1.00  | 0.96 |      | 1.00 | 0.94 |      | 1.00  | 0.96  |      |
| Flt Protected          | 0.95 | 1.00  |      | 0.95  | 1.00 |      | 0.95 | 1.00 |      | 0.95  | 1.00  |      |
| Satd. Flow (prot)      | 1770 | 3462  |      | 1770  | 3401 |      | 1770 | 3336 |      | 1770  | 3397  |      |
| Flt Permitted          | 0.95 | 1.00  |      | 0.95  | 1.00 |      | 0.95 | 1.00 |      | 0.95  | 1.00  |      |
| Satd. Flow (perm)      | 1770 | 3462  |      | 1770  | 3401 |      | 1770 | 3336 |      | 1770  | 3397  |      |
| Volume (vph)           | 130  | 350   | 60   | 340   | 510  | 180  | 50   | 210  | 130  | 390   | 710   | 260  |
| Peak-hour factor, PHF  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 130  | 350   | 60   | 340   | 510  | 180  | 50   | 210  | 130  | 390   | 710   | 260  |
| RTOR Reduction (vph)   | 0    | 9     | 0    | 0     | 20   | 0    | 0    | 66   | 0    | 0     | 0     | 0    |
| Lane Group Flow (vph)  | 130  | 401   | 0    | 340   | 670  | 0    | 50   | 274  | 0    | 390   | 970   | 0    |
| Turn Type              | Prot |       |      | Prot  |      |      | Prot |      |      | Prot  |       |      |
| Protected Phases       | 1    | 6     |      | 5     | 2    |      | 3    | 8    |      | 7     | 4     |      |
| Permitted Phases       |      |       |      |       |      |      |      |      |      |       |       |      |
| Actuated Green, G (s)  | 14.0 | 20.8  |      | 26.8  | 35.6 |      | 7.5  | 18.8 |      | 32.3  | 43.6  |      |
| Effective Green, g (s) | 14.0 | 22.8  |      | 28.8  | 37.6 |      | 9.5  | 20.8 |      | 34.3  | 45.6  |      |
| Actuated g/C Ratio     | 0.11 | 0.19  |      | 0.23  | 0.31 |      | 0.08 | 0.17 |      | 0.28  | 0.37  |      |
| Clearance Time (s)     | 4.0  | 6.0   |      | 6.0   | 6.0  |      | 6.0  | 6.0  |      | 6.0   | 6.0   |      |
| Vehicle Extension (s)  | 3.0  | 4.5   |      | 4.5   | 4.5  |      | 3.0  | 3.0  |      | 3.0   | 3.0   |      |
| Lane Grp Cap (vph)     | 202  | 643   |      | 415   | 1042 |      | 137  | 566  |      | 495   | 1262  |      |
| v/s Ratio Prot         | 0.07 | c0.12 |      | c0.19 | 0.20 |      | 0.03 | 0.08 |      | c0.22 | c0.29 |      |
| v/s Ratio Perm         |      |       |      |       |      |      |      |      |      |       |       |      |
| v/c Ratio              | 0.64 | 0.62  |      | 0.82  | 0.64 |      | 0.36 | 0.48 |      | 0.79  | 0.77  |      |
| Uniform Delay, d1      | 52.0 | 46.0  |      | 44.5  | 36.8 |      | 53.7 | 46.1 |      | 40.8  | 33.9  |      |
| Progression Factor     | 1.00 | 1.00  |      | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00  | 1.00  |      |
| Incremental Delay, d2  | 6.9  | 2.4   |      | 13.1  | 1.7  |      | 1.7  | 0.7  |      | 8.1   | 2.9   |      |
| Delay (s)              | 58.8 | 48.4  |      | 57.6  | 38.4 |      | 55.4 | 46.8 |      | 49.0  | 36.8  |      |
| Level of Service       | E    | D     |      | E     | D    |      | E    | D    |      | D     | D     |      |
| Approach Delay (s)     |      | 50.9  |      |       | 44.8 |      |      | 47.9 |      |       | 40.3  |      |
| Approach LOS           |      | D     |      |       | D    |      |      | D    |      |       | D     |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 44.3  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.75  |                      |      |
| Actuated Cycle Length (s)         | 122.7 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 75.3% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

2013 PM NO-BUILD  
9/29/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 130   | 350   | 60  | 340   | 510   | 180   | 50  | 210   | 130   | 390   | 710   | 260   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 130   | 410   | 0   | 340   | 690   | 0   | 50  | 340   | 0   | 390   | 970   | 0   |
| v/c Ratio               | 0.64  | 0.62  |   | 0.81  | 0.64  |   | 0.32  | 0.57  |   | 0.78  | 0.76  |   |
| Control Delay           | 68.5  | 50.0  |   | 62.5  | 40.1  |   | 62.6  | 40.6  |   | 54.4  | 39.8  |   |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   |
| Total Delay             | 68.5  | 50.0  |   | 62.5  | 40.1  |   | 62.6  | 40.6  |   | 54.4  | 39.8  |   |
| Queue Length 50th (ft)  | 96  | 148   |   | 251   | 234   |   | 36  | 99  |   | 262   | 343   |   |
| Queue Length 95th (ft)  | 188   | 238   |   | #490  | 372   |   | 90  | 167   |   | #544  | 530   |   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |   | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   |   | 200   |   |   | 200   |   |   |
| Base Capacity (vph)     | 355   | 1051  |   | 420   | 1167  |   | 340   | 1029  |   | 534   | 1393  |   |
| Starvation Cap Reductn  | 0   | 0   |   | 0   | 0   |   | 0   | 0   |   | 0   | 0   |   |
| Spillback Cap Reductn   | 0   | 0   |   | 0   | 0   |   | 0   | 0   |   | 0   | 0   |   |
| Storage Cap Reductn     | 0   | 0   |   | 0   | 0   |   | 0   | 0   |   | 0   | 0   |   |
| Reduced v/c Ratio       | 0.37  | 0.39  |   | 0.81  | 0.59  |   | 0.15  | 0.33  |   | 0.73  | 0.70  |   |

Intersection Summary

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

Timings  
2: THREE CHOPT RD & COX RD

2013 PM NO-BUILD  
9/29/2005

| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | SWL   | SWT   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |
| Volume (vph)        | 130   | 350   | 340   | 510   | 50    | 210   | 390   | 710   |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Prot  |       |
| Protected Phases    | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Permitted Phases    |       |       |       |       |       |       |       |       |
| Detector Phases     | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Minimum Initial (s) | 4.0   | 12.0  | 8.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 8.0   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 30.5  | 46.0  | 30.5  | 46.0  | 30.5  | 45.5  | 41.0  | 56.0  |
| Total Split (%)     | 18.7% | 28.2% | 18.7% | 28.2% | 18.7% | 27.9% | 25.2% | 34.4% |
| Yellow Time (s)     | 3.5   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 0.5   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lead  | Lead  | Lag   | Lag   | Lead  | Lag   | Lead  | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | Min   | Min   | Min   | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 163  
 Actuated Cycle Length: 121.7  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|        |        |        |        |
|--------|--------|--------|--------|
|        |        |        |        |
| ø1     | ø2     | ø3     | ø4     |
| 30.5 s | 46 s   | 30.5 s | 56 s   |
|        |        |        |        |
| ø5     | ø6     | ø7     | ø8     |
| 46 s   | 30.5 s | 41 s   | 45.5 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2013 AM BUILD REC#1  
9/26/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT  | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|------|------|------|------|------|------|-------|------|-------|------|------|
| Lane Configurations    | ↖     | ↕    |      | ↖    | ↕    | ↗    | ↖    | ↕     |      | ↖     | ↕    |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0  | 4.0  | 4.0  | 4.0   |      | 4.0   | 4.0  |      |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00 | 0.95 | 1.00 | 1.00 | 0.95  |      | 1.00  | 0.95 |      |
| Frt                    | 1.00  | 0.99 |      | 1.00 | 1.00 | 0.85 | 1.00 | 0.96  |      | 1.00  | 0.96 |      |
| Fit Protected          | 0.95  | 1.00 |      | 0.95 | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (prot)      | 1770  | 3514 |      | 1770 | 3539 | 1583 | 1770 | 3390  |      | 1770  | 3392 |      |
| Fit Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (perm)      | 1770  | 3514 |      | 1770 | 3539 | 1583 | 1770 | 3390  |      | 1770  | 3392 |      |
| Volume (vph)           | 350   | 400  | 20   | 130  | 140  | 290  | 20   | 690   | 270  | 110   | 130  | 50   |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 350   | 400  | 20   | 130  | 140  | 290  | 20   | 690   | 270  | 110   | 130  | 50   |
| RTOR Reduction (vph)   | 0     | 2    | 0    | 0    | 0    | 233  | 0    | 26    | 0    | 0     | 0    | 0    |
| Lane Group Flow (vph)  | 350   | 418  | 0    | 130  | 140  | 57   | 20   | 934   | 0    | 110   | 180  | 0    |
| Turn Type              | Prot  |      |      | Prot |      | Perm | Prot |       |      | Prot  |      |      |
| Protected Phases       | 1     | 6    |      | 5    | 2    |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |      |      |      |      | 2    |      |       |      |       |      |      |
| Actuated Green, G (s)  | 26.0  | 31.3 |      | 10.5 | 15.8 | 15.8 | 2.6  | 35.5  |      | 11.7  | 44.6 |      |
| Effective Green, g (s) | 27.5  | 33.3 |      | 12.0 | 17.8 | 17.8 | 4.1  | 37.5  |      | 13.2  | 46.6 |      |
| Actuated g/C Ratio     | 0.25  | 0.30 |      | 0.11 | 0.16 | 0.16 | 0.04 | 0.33  |      | 0.12  | 0.42 |      |
| Clearance Time (s)     | 5.5   | 6.0  |      | 5.5  | 6.0  | 6.0  | 5.5  | 6.0   |      | 5.5   | 6.0  |      |
| Vehicle Extension (s)  | 3.0   | 4.5  |      | 3.0  | 4.5  | 4.5  | 3.0  | 3.0   |      | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)     | 435   | 1045 |      | 190  | 562  | 252  | 65   | 1135  |      | 209   | 1411 |      |
| v/s Ratio Prot         | c0.20 | 0.12 |      | 0.07 | 0.04 |      | 0.01 | c0.28 |      | c0.06 | 0.05 |      |
| v/s Ratio Perm         |       |      |      |      |      | 0.18 |      |       |      |       |      |      |
| v/c Ratio              | 0.80  | 0.40 |      | 0.68 | 0.25 | 0.23 | 0.31 | 0.82  |      | 0.53  | 0.13 |      |
| Uniform Delay, d1      | 39.7  | 31.4 |      | 48.2 | 41.2 | 41.1 | 52.6 | 34.2  |      | 46.5  | 20.2 |      |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.00  | 1.00 |      |
| Incremental Delay, d2  | 10.4  | 0.4  |      | 9.8  | 0.4  | 0.8  | 2.7  | 4.9   |      | 2.4   | 0.0  |      |
| Delay (s)              | 50.1  | 31.8 |      | 57.9 | 41.7 | 41.9 | 55.3 | 39.1  |      | 48.8  | 20.2 |      |
| Level of Service       | D     | C    |      | E    | D    | D    | E    | D     |      | D     | C    |      |
| Approach Delay (s)     |       | 40.1 |      |      | 45.6 |      |      | 39.5  |      |       | 31.1 |      |
| Approach LOS           |       | D    |      |      | D    |      |      | D     |      |       | C    |      |

Intersection Summary

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 40.0  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.85  |                      |      |
| Actuated Cycle Length (s)         | 112.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 75.1% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2013 PM BUILD REC#1  
9/26/2005

| Movement               | SEL  | SET   | SER  | NWL   | NWT  | NWR  | NEL  | NET   | NER  | SWL   | SWT   | SWR  |
|------------------------|------|-------|------|-------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations    |      |       |      |       |      |      |      |       |      |       |       |      |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  | 4.0  | 4.0   |      | 4.0   | 4.0   |      |
| Lane Util. Factor      | 1.00 | 0.95  |      | 1.00  | 0.95 | 1.00 | 1.00 | 0.95  |      | 1.00  | 0.95  |      |
| Frt                    | 1.00 | 0.98  |      | 1.00  | 1.00 | 0.85 | 1.00 | 0.94  |      | 1.00  | 0.96  |      |
| Flt Protected          | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00  |      |
| Satd. Flow (prot)      | 1770 | 3462  |      | 1770  | 3539 | 1583 | 1770 | 3336  |      | 1770  | 3397  |      |
| Flt Permitted          | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00  |      |
| Satd. Flow (perm)      | 1770 | 3462  |      | 1770  | 3539 | 1583 | 1770 | 3336  |      | 1770  | 3397  |      |
| Volume (vph)           | 130  | 350   | 60   | 340   | 510  | 180  | 50   | 210   | 130  | 390   | 710   | 260  |
| Peak-hour factor, PHF  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 130  | 350   | 60   | 340   | 510  | 180  | 50   | 210   | 130  | 390   | 710   | 260  |
| RTOR Reduction (vph)   | 0    | 8     | 0    | 0     | 0    | 120  | 0    | 57    | 0    | 0     | 0     | 0    |
| Lane Group Flow (vph)  | 130  | 402   | 0    | 340   | 510  | 60   | 50   | 283   | 0    | 390   | 970   | 0    |
| Turn Type              | Prot |       |      | Prot  |      | Perm | Prot |       |      | Prot  |       |      |
| Protected Phases       | 1    | 6     |      | 5     | 2    |      | 3    | 8     |      | 7     | 4     |      |
| Permitted Phases       |      |       |      |       |      | 2    |      |       |      |       |       |      |
| Actuated Green, G (s)  | 11.3 | 20.4  |      | 29.5  | 38.6 | 38.6 | 7.4  | 18.8  |      | 30.7  | 42.1  |      |
| Effective Green, g (s) | 12.8 | 22.4  |      | 31.0  | 40.6 | 40.6 | 8.9  | 20.8  |      | 32.2  | 44.1  |      |
| Actuated g/C Ratio     | 0.10 | 0.18  |      | 0.25  | 0.33 | 0.33 | 0.07 | 0.17  |      | 0.26  | 0.36  |      |
| Clearance Time (s)     | 5.5  | 6.0   |      | 5.5   | 6.0  | 6.0  | 5.5  | 6.0   |      | 5.5   | 6.0   |      |
| Vehicle Extension (s)  | 3.0  | 4.5   |      | 3.0   | 4.5  | 4.5  | 3.0  | 3.0   |      | 3.0   | 3.0   |      |
| Lane Grp Cap (vph)     | 185  | 634   |      | 448   | 1174 | 525  | 129  | 567   |      | 466   | 1224  |      |
| v/s Ratio Prot         | 0.07 | c0.12 |      | c0.19 | 0.14 |      | 0.03 | c0.10 |      | c0.22 | c0.29 |      |
| v/s Ratio Perm         |      |       |      |       |      | 0.11 |      |       |      |       |       |      |
| v/c Ratio              | 0.70 | 0.63  |      | 0.76  | 0.43 | 0.11 | 0.39 | 0.50  |      | 0.84  | 0.79  |      |
| Uniform Delay, d1      | 53.0 | 46.2  |      | 42.2  | 31.9 | 28.4 | 54.1 | 46.1  |      | 42.6  | 35.1  |      |
| Progression Factor     | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.00  | 1.00  |      |
| Incremental Delay, d2  | 11.4 | 2.6   |      | 7.2   | 0.4  | 0.2  | 1.9  | 0.7   |      | 12.4  | 3.6   |      |
| Delay (s)              | 64.4 | 48.8  |      | 49.5  | 32.4 | 28.6 | 56.1 | 46.8  |      | 55.0  | 38.7  |      |
| Level of Service       | E    | D     |      | D     | C    | C    | E    | D     |      | D     | D     |      |
| Approach Delay (s)     |      | 52.6  |      |       | 37.4 |      |      | 48.0  |      |       | 43.3  |      |
| Approach LOS           |      | D     |      |       | D    |      |      | D     |      |       | D     |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 43.5  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.73  |                      |      |
| Actuated Cycle Length (s)         | 122.4 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 75.3% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

HCM Signalized Intersection Capacity Analysis  
 2: THREE CHOPT RD & COX RD

2013 AM BUILD REC#2  
 9/26/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|------|------|------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations    | ↖     | ↕    |      | ↖    | ↕     |      | ↖    | ↕     |      | ↖     | ↕    | ↗    |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00 | 0.95  |      | 1.00 | 0.95  |      | 1.00  | 0.95 | 1.00 |
| Frt                    | 1.00  | 0.99 |      | 1.00 | 0.90  |      | 1.00 | 0.96  |      | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770  | 3514 |      | 1770 | 3181  |      | 1770 | 3390  |      | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770  | 3514 |      | 1770 | 3181  |      | 1770 | 3390  |      | 1770  | 3539 | 1583 |
| Volume (vph)           | 350   | 400  | 20   | 130  | 140   | 290  | 20   | 690   | 270  | 110   | 130  | 50   |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 350   | 400  | 20   | 130  | 140   | 290  | 20   | 690   | 270  | 110   | 130  | 50   |
| RTOR Reduction (vph)   | 0     | 2    | 0    | 0    | 227   | 0    | 0    | 26    | 0    | 0     | 0    | 0    |
| Lane Group Flow (vph)  | 350   | 418  | 0    | 130  | 203   | 0    | 20   | 934   | 0    | 110   | 130  | 50   |
| Turn Type              | Prot  |      |      | Prot |       |      | Prot |       |      | Prot  |      | Perm |
| Protected Phases       | 1     | 6    |      | 5    | 2     |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |      |      |      |       |      |      |       |      |       |      | 4    |
| Actuated Green, G (s)  | 26.7  | 33.0 |      | 10.7 | 17.0  |      | 2.6  | 36.5  |      | 12.1  | 46.0 | 46.0 |
| Effective Green, g (s) | 28.2  | 35.0 |      | 12.2 | 19.0  |      | 4.1  | 38.5  |      | 13.6  | 48.0 | 48.0 |
| Actuated g/C Ratio     | 0.24  | 0.30 |      | 0.11 | 0.16  |      | 0.04 | 0.33  |      | 0.12  | 0.42 | 0.42 |
| Clearance Time (s)     | 5.5   | 6.0  |      | 5.5  | 6.0   |      | 5.5  | 6.0   |      | 5.5   | 6.0  | 6.0  |
| Vehicle Extension (s)  | 3.0   | 4.5  |      | 3.0  | 4.5   |      | 3.0  | 3.0   |      | 3.0   | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 433   | 1067 |      | 187  | 524   |      | 63   | 1132  |      | 209   | 1473 | 659  |
| v/s Ratio Prot         | c0.20 | 0.12 |      | 0.07 | c0.14 |      | 0.01 | c0.28 |      | c0.06 | 0.04 |      |
| v/s Ratio Perm         |       |      |      |      |       |      |      |       |      |       |      | 0.03 |
| v/c Ratio              | 0.81  | 0.39 |      | 0.70 | 0.39  |      | 0.32 | 0.83  |      | 0.53  | 0.09 | 0.08 |
| Uniform Delay, d1      | 41.0  | 31.7 |      | 49.8 | 43.0  |      | 54.2 | 35.3  |      | 47.8  | 20.4 | 20.3 |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 10.6  | 0.4  |      | 10.7 | 0.8   |      | 2.9  | 5.0   |      | 2.4   | 0.0  | 0.0  |
| Delay (s)              | 51.6  | 32.1 |      | 60.4 | 43.8  |      | 57.1 | 40.3  |      | 50.2  | 20.4 | 20.3 |
| Level of Service       | D     | C    |      | E    | D     |      | E    | D     |      | D     | C    | C    |
| Approach Delay (s)     |       | 41.0 |      |      | 47.6  |      |      | 40.7  |      |       | 31.7 |      |
| Approach LOS           |       | D    |      |      | D     |      |      | D     |      |       | C    |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 41.3  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.79  |                      |      |
| Actuated Cycle Length (s)         | 115.3 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 79.7% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

HCM Signalized Intersection Capacity Analysis  
 2: THREE CHOPT RD & COX RD

2013 PM BUILD REC#2  
 9/26/2005

| Movement               | SEL  | SET   | SER  | NWL   | NWT  | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|------|-------|------|-------|------|------|------|-------|------|-------|------|------|
| Lane Configurations    | ↖    | ↕     |      | ↗     | ↕    |      | ↖    | ↕     |      | ↗     | ↕    | ↖    |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0  | 4.0   |      | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00 | 0.95  |      | 1.00  | 0.95 |      | 1.00 | 0.95  |      | 1.00  | 0.95 | 1.00 |
| Fr't                   | 1.00 | 0.98  |      | 1.00  | 0.96 |      | 1.00 | 0.94  |      | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95 | 1.00  |      | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770 | 3462  |      | 1770  | 3401 |      | 1770 | 3336  |      | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95 | 1.00  |      | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770 | 3462  |      | 1770  | 3401 |      | 1770 | 3336  |      | 1770  | 3539 | 1583 |
| Volume (vph)           | 130  | 350   | 60   | 340   | 510  | 180  | 50   | 210   | 130  | 390   | 710  | 260  |
| Peak-hour factor, PHF  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 130  | 350   | 60   | 340   | 510  | 180  | 50   | 210   | 130  | 390   | 710  | 260  |
| RTOR Reduction (vph)   | 0    | 8     | 0    | 0     | 22   | 0    | 0    | 59    | 0    | 0     | 0    | 0    |
| Lane Group Flow (vph)  | 130  | 402   | 0    | 340   | 668  | 0    | 50   | 281   | 0    | 390   | 710  | 260  |
| Turn Type              | Prot |       |      | Prot  |      |      | Prot |       |      | Prot  |      | Perm |
| Protected Phases       | 1    | 6     |      | 5     | 2    |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |      |       |      |       |      |      |      |       |      |       |      | 4    |
| Actuated Green, G (s)  | 11.1 | 20.5  |      | 28.7  | 38.1 |      | 5.5  | 14.5  |      | 33.4  | 42.4 | 42.4 |
| Effective Green, g (s) | 12.6 | 22.5  |      | 30.2  | 40.1 |      | 7.0  | 16.5  |      | 34.9  | 44.4 | 44.4 |
| Actuated g/C Ratio     | 0.10 | 0.19  |      | 0.25  | 0.33 |      | 0.06 | 0.14  |      | 0.29  | 0.37 | 0.37 |
| Clearance Time (s)     | 5.5  | 6.0   |      | 5.5   | 6.0  |      | 5.5  | 6.0   |      | 5.5   | 6.0  | 6.0  |
| Vehicle Extension (s)  | 3.0  | 4.5   |      | 3.0   | 4.5  |      | 3.0  | 3.0   |      | 3.0   | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 186  | 649   |      | 445   | 1136 |      | 103  | 458   |      | 514   | 1308 | 585  |
| v/s Ratio Prot         | 0.07 | c0.12 |      | c0.19 | 0.20 |      | 0.03 | c0.10 |      | c0.22 | 0.20 |      |
| v/s Ratio Perm         |      |       |      |       |      |      |      |       |      |       |      | 0.16 |
| v/c Ratio              | 0.70 | 0.62  |      | 0.76  | 0.59 |      | 0.49 | 0.61  |      | 0.76  | 0.54 | 0.44 |
| Uniform Delay, d1      | 51.9 | 44.9  |      | 41.6  | 33.2 |      | 54.8 | 48.8  |      | 38.8  | 29.8 | 28.5 |
| Progression Factor     | 1.00 | 1.00  |      | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 10.9 | 2.3   |      | 7.6   | 1.1  |      | 3.6  | 2.4   |      | 6.3   | 0.5  | 0.5  |
| Delay (s)              | 62.8 | 47.1  |      | 49.3  | 34.2 |      | 58.4 | 51.2  |      | 45.1  | 30.3 | 29.1 |
| Level of Service       | E    | D     |      | D     | C    |      | E    | D     |      | D     | C    | C    |
| Approach Delay (s)     |      | 50.9  |      |       | 39.2 |      |      | 52.2  |      |       | 34.3 |      |
| Approach LOS           |      | D     |      |       | D    |      |      | D     |      |       | C    |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 40.6  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.73  |                      |      |
| Actuated Cycle Length (s)         | 120.1 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 75.3% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 2: THREE CHOPT RD & COX RD

2013 AM BUILD REC.ALL  
 9/26/2005

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement               | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Lane Configurations    |  |  |   |  |  |  |  |  |   |  |  |  |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95  |   | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |   | 1.00  | 0.95  | 1.00  |
| Frt                    | 1.00  | 0.99  |   | 1.00  | 1.00  | 0.85  | 1.00  | 0.96  |   | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3514  |   | 1770  | 3539  | 1583  | 1770  | 3390  |   | 1770  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3514  |   | 1770  | 3539  | 1583  | 1770  | 3390  |   | 1770  | 3539  | 1583  |
| Volume (vph)           | 350   | 400   | 20  | 130   | 140   | 290   | 20  | 690   | 270   | 110   | 130   | 50  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 350   | 400   | 20  | 130   | 140   | 290   | 20  | 690   | 270   | 110   | 130   | 50  |
| RTOR Reduction (vph)   | 0   | 3   | 0   | 0   | 0   | 250   | 0   | 33  | 0   | 0   | 0   | 0   |
| Lane Group Flow (vph)  | 350   | 417   | 0   | 130   | 140   | 40  | 20  | 927   | 0   | 110   | 130   | 50  |
| Turn Type              | Prot  |   |   | Prot  |   | Perm  | Prot  |   |   | Prot  |   | Perm  |
| Protected Phases       | 1   | 6   |   | 5   | 2   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases       |   |   |   |   |   | 2   |   |   |   |   |   | 4   |
| Actuated Green, G (s)  | 24.0  | 23.4  |   | 12.6  | 12.0  | 12.0  | 2.7   | 33.2  |   | 8.9   | 39.4  | 39.4  |
| Effective Green, g (s) | 26.0  | 25.4  |   | 14.6  | 14.0  | 14.0  | 4.7   | 35.2  |   | 10.9  | 41.4  | 41.4  |
| Actuated g/C Ratio     | 0.25  | 0.25  |   | 0.14  | 0.14  | 0.14  | 0.05  | 0.34  |   | 0.11  | 0.41  | 0.41  |
| Clearance Time (s)     | 6.0   | 6.0   |   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |   | 6.0   | 6.0   | 6.0   |
| Vehicle Extension (s)  | 4.5   | 4.5   |   | 4.5   | 4.5   | 4.5   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)     | 451   | 874   |   | 253   | 485   | 217   | 81  | 1169  |   | 189   | 1435  | 642   |
| v/s Ratio Prot         | c0.20   | 0.12  |   | 0.07  | 0.04  |   | 0.01  | c0.28   |   | c0.06   | 0.04  |   |
| v/s Ratio Perm         |   |   |   |   |   | 0.18  |   |   |   |   |   | 0.03  |
| v/c Ratio              | 0.78  | 0.48  |   | 0.51  | 0.29  | 0.18  | 0.25  | 0.79  |   | 0.58  | 0.09  | 0.08  |
| Uniform Delay, d1      | 35.3  | 32.7  |   | 40.5  | 39.6  | 39.0  | 47.0  | 30.2  |   | 43.4  | 18.7  | 18.6  |
| Progression Factor     | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 9.1   | 0.7   |   | 2.9   | 0.6   | 0.7   | 1.6   | 3.8   |   | 4.5   | 0.0   | 0.1   |
| Delay (s)              | 44.5  | 33.4  |   | 43.4  | 40.1  | 39.7  | 48.6  | 33.9  |   | 47.9  | 18.8  | 18.7  |
| Level of Service       | D   | C   |   | D   | D   | D   | D   | C   |   | D   | B   | B   |
| Approach Delay (s)     |   | 38.4  |   |   | 40.7  |   |   | 34.2  |   |   | 29.8  |   |
| Approach LOS           |   | D   |   |   | D   |   |   | C   |   |   | C   |   |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 36.4  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.86  |                      |      |
| Actuated Cycle Length (s)         | 102.1 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 75.1% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

2013 AM BUILD REC.ALL

9/26/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 350   | 400   | 20  | 130   | 140   | 290   | 20  | 690   | 270   | 110   | 130   | 50  |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 350   | 420   | 0   | 130   | 140   | 290   | 20  | 960   | 0   | 110   | 130   | 50  |
| v/c Ratio               | 0.75  | 0.47  |   | 0.49  | 0.28  | 0.61  | 0.13  | 0.83  |   | 0.49  | 0.09  | 0.08  |
| Control Delay           | 43.3  | 34.5  |   | 50.9  | 45.0  | 9.8   | 52.0  | 34.6  |   | 50.6  | 20.3  | 21.3  |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 43.3  | 34.5  |   | 50.9  | 45.0  | 9.8   | 52.0  | 34.6  |   | 50.6  | 20.3  | 21.3  |
| Queue Length 50th (ft)  | 232   | 136   |   | 89  | 50  | 0   | 14  | 316   |   | 76  | 24  | 18  |
| Queue Length 95th (ft)  | #384  | 189   |   | 162   | 83  | 81  | 40  | 433   |   | 140   | 56  | 53  |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |   | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   | 200   | 200   |   |   | 200   |   | 200   |
| Base Capacity (vph)     | 545   | 1124  |   | 299   | 653   | 529   | 260   | 1322  |   | 279   | 1611  | 721   |
| 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       | 0.64  | 0.37  |   | 0.43  | 0.21  | 0.55  | 0.08  | 0.73  |   | 0.39  | 0.08  | 0.07  |

Intersection Summary

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

Timings  
2: THREE CHOPT RD & COX RD

2013 AM BUILD REC.ALL  
9/26/2005

| Lane Group          | SEL   | SET   | NWL   | NWT   | NWR   | NEL   | NET   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 350   | 400   | 130   | 140   | 290   | 20    | 690   | 110   | 130   | 50    |
| Turn Type           | Prot  |       | Prot  |       | Perm  | Prot  |       | Prot  |       | Perm  |
| Protected Phases    | 1     | 6     | 5     | 2     |       | 3     | 8     | 7     | 4     |       |
| Permitted Phases    |       |       |       |       | 2     |       |       |       |       | 4     |
| Detector Phases     | 1     | 6     | 5     | 2     | 2     | 3     | 8     | 7     | 4     | 4     |
| Minimum Initial (s) | 12.0  | 12.0  | 8.0   | 8.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 35.0  | 37.0  | 20.0  | 22.0  | 22.0  | 20.0  | 43.0  | 20.0  | 43.0  | 43.0  |
| Total Split (%)     | 29.2% | 30.8% | 16.7% | 18.3% | 18.3% | 16.7% | 35.8% | 16.7% | 35.8% | 35.8% |
| Yellow Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | Min   | Min   | Min   | Min   | Min   | None  | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 99.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|      |      |      |      |
|------|------|------|------|
| ø1   | ø2   | ø3   | ø4   |
| 35 s | 22 s | 20 s | 43 s |
| ø5   | ø6   | ø7   | ø8   |
| 20 s | 37 s | 20 s | 43 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2013 AM BUILD REC.ALL.SPLIT  
9/29/2005

| Movement               | SEL   | SET   | SER  | NWL   | NWT  | NWR   | NEL   | NET   | NER  | SWL   | SWT  | SWR   |
|------------------------|-------|-------|------|-------|------|-------|-------|-------|------|-------|------|-------|
| Lane Configurations    |       |       |      |       |      |       |       |       |      |       |      |       |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900  | 1900 | 1900  | 1900  | 1900  | 1900 | 1900  | 1900 | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0   | 4.0  | 4.0   | 4.0   | 4.0   |      | 4.0   | 4.0  | 4.0   |
| Lane Util. Factor      | 0.91  | 0.91  |      | 0.91  | 0.91 | 1.00  | 0.91  | 0.91  |      | 0.91  | 0.91 | 1.00  |
| Fr't                   | 1.00  | 0.99  |      | 1.00  | 1.00 | 0.85  | 1.00  | 0.96  |      | 1.00  | 1.00 | 0.85  |
| Flt Protected          | 0.95  | 0.99  |      | 0.95  | 0.99 | 1.00  | 0.95  | 1.00  |      | 0.95  | 0.99 | 1.00  |
| Satd. Flow (prot)      | 1610  | 3338  |      | 1610  | 3351 | 1583  | 1610  | 3247  |      | 1610  | 3356 | 1583  |
| Flt Permitted          | 0.95  | 0.99  |      | 0.95  | 0.99 | 1.00  | 0.95  | 1.00  |      | 0.95  | 0.99 | 1.00  |
| Satd. Flow (perm)      | 1610  | 3338  |      | 1610  | 3351 | 1583  | 1610  | 3247  |      | 1610  | 3356 | 1583  |
| Volume (vph)           | 350   | 400   | 20   | 130   | 140  | 290   | 20    | 690   | 270  | 110   | 130  | 50    |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  |
| Adj. Flow (vph)        | 350   | 400   | 20   | 130   | 140  | 290   | 20    | 690   | 270  | 110   | 130  | 50    |
| RTOR Reduction (vph)   | 0     | 2     | 0    | 0     | 0    | 78    | 0     | 32    | 0    | 0     | 0    | 0     |
| Lane Group Flow (vph)  | 248   | 520   | 0    | 87    | 183  | 212   | 20    | 928   | 0    | 77    | 163  | 50    |
| Turn Type              | Split |       |      | Split |      | pm+ov | Split |       |      | Split |      | pm+ov |
| Protected Phases       | 6     | 6     |      | 2     | 2    | 4     | 8     | 8     |      | 4     | 4    | 6     |
| Permitted Phases       |       |       |      |       |      | 2     |       |       |      |       |      | 4     |
| Actuated Green, G (s)  | 21.6  | 21.6  |      | 12.4  | 12.4 | 22.9  | 33.5  | 33.5  |      | 10.5  | 10.5 | 32.1  |
| Effective Green, g (s) | 23.6  | 23.6  |      | 14.4  | 14.4 | 26.9  | 35.5  | 35.5  |      | 12.5  | 12.5 | 36.1  |
| Actuated g/C Ratio     | 0.23  | 0.23  |      | 0.14  | 0.14 | 0.26  | 0.35  | 0.35  |      | 0.12  | 0.12 | 0.35  |
| Clearance Time (s)     | 6.0   | 6.0   |      | 6.0   | 6.0  | 6.0   | 6.0   | 6.0   |      | 6.0   | 6.0  | 6.0   |
| Vehicle Extension (s)  | 4.5   | 4.5   |      | 4.5   | 4.5  | 3.0   | 3.0   | 3.0   |      | 3.0   | 3.0  | 4.5   |
| Lane Grp Cap (vph)     | 373   | 772   |      | 227   | 473  | 417   | 560   | 1130  |      | 197   | 411  | 622   |
| v/s Ratio Prot         | 0.15  | c0.16 |      | 0.05  | 0.05 | c0.06 | 0.01  | c0.29 |      | 0.05  | 0.05 | 0.02  |
| v/s Ratio Perm         |       |       |      |       |      | 0.07  |       |       |      |       |      | 0.01  |
| v/c Ratio              | 0.66  | 0.67  |      | 0.38  | 0.39 | 0.51  | 0.04  | 0.82  |      | 0.39  | 0.40 | 0.08  |
| Uniform Delay, d1      | 35.6  | 35.7  |      | 39.8  | 39.8 | 31.9  | 22.0  | 30.4  |      | 41.2  | 41.3 | 21.9  |
| Progression Factor     | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00  |
| Incremental Delay, d2  | 5.3   | 2.8   |      | 1.9   | 0.9  | 1.0   | 0.0   | 4.9   |      | 1.3   | 0.6  | 0.1   |
| Delay (s)              | 40.9  | 38.4  |      | 41.6  | 40.7 | 32.9  | 22.0  | 35.3  |      | 42.5  | 41.9 | 22.0  |
| Level of Service       | D     | D     |      | D     | D    | C     | C     | D     |      | D     | D    | C     |
| Approach Delay (s)     |       | 39.2  |      |       | 36.8 |       |       | 35.0  |      |       | 38.6 |       |
| Approach LOS           |       | D     |      |       | D    |       |       | C     |      |       | D    |       |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 37.0  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.68  |                      |      |
| Actuated Cycle Length (s)         | 102.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 62.4% | ICU Level of Service | B    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

2013 AM BUILD REC.ALL.SPLIT  
9/29/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 350   | 400   | 20  | 130   | 140   | 290   | 20   | 690   | 270   | 110   | 130   | 50  |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 248   | 522   | 0   | 87  | 183   | 290   | 20   | 960   | 0   | 77  | 163   | 50  |
| v/c Ratio               | 0.67  | 0.68  |   | 0.38  | 0.39  | 0.59  | 0.04   | 0.83  |   | 0.39  | 0.40  | 0.08  |
| Control Delay           | 48.4  | 42.6  |   | 49.8  | 45.7  | 16.4  | 24.6   | 37.3  |   | 52.2  | 47.7  | 22.4  |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   |   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 48.4  | 42.6  |   | 49.8  | 45.7  | 16.4  | 24.6   | 37.3  |   | 52.2  | 47.7  | 22.4  |
| Queue Length 50th (ft)  | 171   | 180   |   | 62  | 65  | 60  | 9  | 316   |   | 56  | 59  | 22  |
| Queue Length 95th (ft)  | 297   | 269   |   | 125   | 109   | 117   | 30   | 437   |   | 114   | 101   | 51  |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |  | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   | 200   | 200  |   |   | 200   |   | 200   |
| Base Capacity (vph)     | 417   | 867   |   | 279   | 581   | 534   | 635  | 1310  |   | 248   | 518   | 600   |
| 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       | 0.59  | 0.60  |   | 0.31  | 0.31  | 0.54  | 0.03   | 0.73  |   | 0.31  | 0.31  | 0.08  |

Intersection Summary

Timings  
2: THREE CHOPT RD & COX RD

2013 AM BUILD REC.ALL.SPLIT  
9/29/2005



| Lane Group          | SEL   | SET   | NWL   | NWT   | NWR   | NEL   | NET   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 350   | 400   | 130   | 140   | 290   | 20    | 690   | 110   | 130   | 50    |
| Turn Type           | Split |       | Split |       | pm+ov | Split |       | Split |       | pm+ov |
| Protected Phases    | 6     | 6     | 2     | 2     | 4     | 8     | 8     | 4     | 4     | 6     |
| Permitted Phases    |       |       |       |       | 2     |       |       |       |       | 4     |
| Detector Phases     | 6     | 6     | 2     | 2     | 4     | 8     | 8     | 4     | 4     | 6     |
| Minimum Initial (s) | 12.0  | 12.0  | 8.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 12.0  |
| Minimum Split (s)   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 31.0  | 31.0  | 22.0  | 22.0  | 20.0  | 47.0  | 47.0  | 20.0  | 20.0  | 31.0  |
| Total Split (%)     | 25.8% | 25.8% | 18.3% | 18.3% | 16.7% | 39.2% | 39.2% | 16.7% | 16.7% | 25.8% |
| Yellow Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            |       |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?  |       |       |       |       |       |       |       |       |       |       |
| Recall Mode         | Min   | Min   | Min   | Min   | None  | None  | None  | None  | None  | Min   |

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 103  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|            |            |            |            |
|------------|------------|------------|------------|
| ø2<br>22 s | ø6<br>31 s | ø4<br>20 s | ø8<br>47 s |
|------------|------------|------------|------------|

HCM Signalized Intersection Capacity Analysis  
 2: THREE CHOPT RD & COX RD

2013 PM BUILD REC.ALL  
 9/26/2005

| Movement               | SEL  | SET   | SER  | NWL   | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|------|-------|------|-------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations    |      |       |      |       |       |      |      |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0  | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00 | 0.95  |      | 1.00  | 0.95  | 1.00 | 1.00 | 0.95  |      | 1.00  | 0.95 | 1.00 |
| Frt                    | 1.00 | 0.98  |      | 1.00  | 1.00  | 0.85 | 1.00 | 0.94  |      | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770 | 3462  |      | 1770  | 3539  | 1583 | 1770 | 3336  |      | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770 | 3462  |      | 1770  | 3539  | 1583 | 1770 | 3336  |      | 1770  | 3539 | 1583 |
| Volume (vph)           | 130  | 350   | 60   | 340   | 510   | 180  | 50   | 210   | 130  | 390   | 710  | 260  |
| Peak-hour factor, PHF  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 130  | 350   | 60   | 340   | 510   | 180  | 50   | 210   | 130  | 390   | 710  | 260  |
| RTOR Reduction (vph)   | 0    | 12    | 0    | 0     | 0     | 131  | 0    | 80    | 0    | 0     | 0    | 0    |
| Lane Group Flow (vph)  | 130  | 398   | 0    | 340   | 510   | 49   | 50   | 260   | 0    | 390   | 710  | 260  |
| Turn Type              | Prot |       |      | Prot  |       | Perm | Prot |       |      | Prot  |      | Perm |
| Protected Phases       | 1    | 6     |      | 5     | 2     |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |      |       |      |       |       | 2    |      |       |      |       |      | 4    |
| Actuated Green, G (s)  | 13.6 | 16.5  |      | 24.0  | 26.9  | 26.9 | 5.3  | 11.8  |      | 29.1  | 35.6 | 35.6 |
| Effective Green, g (s) | 15.6 | 18.5  |      | 26.0  | 28.9  | 28.9 | 7.3  | 13.8  |      | 31.1  | 37.6 | 37.6 |
| Actuated g/C Ratio     | 0.15 | 0.18  |      | 0.25  | 0.27  | 0.27 | 0.07 | 0.13  |      | 0.30  | 0.36 | 0.36 |
| Clearance Time (s)     | 6.0  | 6.0   |      | 6.0   | 6.0   | 6.0  | 6.0  | 6.0   |      | 6.0   | 6.0  | 6.0  |
| Vehicle Extension (s)  | 4.5  | 4.5   |      | 4.5   | 4.5   | 4.5  | 3.0  | 3.0   |      | 3.0   | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 262  | 608   |      | 437   | 970   | 434  | 123  | 437   |      | 522   | 1262 | 565  |
| v/s Ratio Prot         | 0.07 | c0.12 |      | c0.19 | c0.14 |      | 0.03 | c0.10 |      | c0.22 | 0.20 |      |
| v/s Ratio Perm         |      |       |      |       |       | 0.11 |      |       |      |       |      | 0.16 |
| v/c Ratio              | 0.50 | 0.66  |      | 0.78  | 0.53  | 0.11 | 0.41 | 0.60  |      | 0.75  | 0.56 | 0.46 |
| Uniform Delay, d1      | 41.3 | 40.5  |      | 37.0  | 32.4  | 28.7 | 47.0 | 43.2  |      | 33.6  | 27.3 | 26.1 |
| Progression Factor     | 1.00 | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 2.5  | 3.1   |      | 9.5   | 0.8   | 0.2  | 2.2  | 2.2   |      | 5.8   | 0.6  | 0.6  |
| Delay (s)              | 43.8 | 43.6  |      | 46.5  | 33.3  | 28.9 | 49.2 | 45.3  |      | 39.4  | 27.9 | 26.7 |
| Level of Service       | D    | D     |      | D     | C     | C    | D    | D     |      | D     | C    | C    |
| Approach Delay (s)     |      | 43.6  |      |       | 36.9  |      |      | 45.8  |      |       | 30.9 |      |
| Approach LOS           |      | D     |      |       | D     |      |      | D     |      |       | C    |      |

| Intersection Summary              |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 36.6  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.77  |                      |      |
| Actuated Cycle Length (s)         | 105.4 | Sum of lost time (s) | 20.0 |
| Intersection Capacity Utilization | 75.3% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

2013 PM BUILD REC.ALL  
9/26/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 130   | 350   | 60  | 340   | 510   | 180   | 50   | 210   | 130   | 390   | 710   | 260   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 130   | 410   | 0   | 340   | 510   | 180   | 50   | 340   | 0   | 390   | 710   | 260   |
| v/c Ratio               | 0.49  | 0.65  |   | 0.76  | 0.51  | 0.31  | 0.29   | 0.64  |   | 0.81  | 0.55  | 0.45  |
| Control Delay           | 51.4  | 44.7  |   | 43.9  | 33.3  | 5.9   | 50.9   | 36.9  |   | 42.7  | 30.6  | 31.5  |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.4   | 0.0   | 0.0  | 0.0   |   | 0.0   | 0.5   | 0.0   |
| Total Delay             | 51.4  | 44.7  |   | 43.9  | 33.6  | 5.9   | 50.9   | 36.9  |   | 42.7  | 31.1  | 31.5  |
| Queue Length 50th (ft)  | 90  | 144   |   | 228   | 161   | 0   | 35   | 90  |   | 264   | 229   | 153   |
| Queue Length 95th (ft)  | 162   | 210   |   | 349   | 223   | 52  | 76   | 148   |   | 389   | 312   | 250   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |  | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   | 200   | 200  |   |   | 200   |   | 200   |
| Base Capacity (vph)     | 283   | 691   |   | 528   | 1174  | 646   | 253  | 599   |   | 583   | 1333  | 596   |
| 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   | 252   | 0   | 0  | 0   |   | 0   | 257   | 0   |
| Reduced v/c Ratio       | 0.46  | 0.59  |   | 0.64  | 0.55  | 0.28  | 0.20   | 0.57  |   | 0.67  | 0.66  | 0.44  |

Intersection Summary

Timings  
2: THREE CHOPT RD & COX RD

2013 PM BUILD REC.ALL  
9/26/2005

| Lane Group          | SEL   | SET   | NWL   | NWT   | NWR   | NEL   | NET   | SWL   | SWT   | SWR   |  |  |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |  |  |
| Volume (vph)        | 130   | 350   | 340   | 510   | 180   | 50    | 210   | 390   | 710   | 260   |  |  |
| Turn Type           | Prot  |       | Prot  |       | Perm  | Prot  |       | Prot  |       | Perm  |  |  |
| Protected Phases    | 1     | 6     | 5     | 2     |       | 3     | 8     | 7     | 4     |       |  |  |
| Permitted Phases    |       |       |       |       | 2     |       |       |       |       | 4     |  |  |
| Detector Phases     | 1     | 6     | 5     | 2     | 2     | 3     | 8     | 7     | 4     | 4     |  |  |
| Minimum Initial (s) | 12.0  | 12.0  | 8.0   | 8.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  |  |
| Minimum Split (s)   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |  |  |
| Total Split (s)     | 20.0  | 24.0  | 36.0  | 40.0  | 40.0  | 20.0  | 20.0  | 40.0  | 40.0  | 40.0  |  |  |
| Total Split (%)     | 16.7% | 20.0% | 30.0% | 33.3% | 33.3% | 16.7% | 16.7% | 33.3% | 33.3% | 33.3% |  |  |
| Yellow Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |  |  |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |  |  |
| Lead/Lag            | Lead  | Lead  | Lag   | Lag   | Lag   | Lead  | Lead  | Lag   | Lag   | Lag   |  |  |
| Lead-Lag Optimize?  | Yes   |  |  |
| Recall Mode         | Min   | Min   | Min   | Min   | Min   | None  | None  | None  | None  | None  |  |  |

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 103.4  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|      |      |      |      |
|------|------|------|------|
|      |      |      |      |
| 20 s | 40 s | 20 s | 40 s |
|      |      |      |      |
| 24 s | 36 s | 20 s | 40 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2013 PM BUILD REC.ALL.SPLIT  
9/29/2005

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement               | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Lane Configurations    |  |  |   |  |  |  |  |  |  |  |  |  |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   | 4.0  | 4.0   |   | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 0.91  | 0.91  |   | 0.91  | 0.91  | 1.00  | 0.91   | 0.91  |   | 0.91  | 0.91  | 1.00  |
| Frt                    | 1.00  | 0.98  |   | 1.00  | 1.00  | 0.85  | 1.00   | 0.94  |   | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00  |   | 0.95  | 0.99  | 1.00  | 0.95   | 1.00  |   | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1610  | 3316  |   | 1610  | 3371  | 1583  | 1610   | 3196  |   | 1610  | 3382  | 1583  |
| Flt Permitted          | 0.95  | 1.00  |   | 0.95  | 0.99  | 1.00  | 0.95   | 1.00  |   | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1610  | 3316  |   | 1610  | 3371  | 1583  | 1610   | 3196  |   | 1610  | 3382  | 1583  |
| Volume (vph)           | 130   | 350   | 60  | 340   | 510   | 180   | 50   | 210   | 130   | 390   | 710   | 260   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 130   | 350   | 60  | 340   | 510   | 180   | 50   | 210   | 130   | 390   | 710   | 260   |
| RTOR Reduction (vph)   | 0   | 11  | 0   | 0   | 0   | 81  | 0  | 68  | 0   | 0   | 0   | 0   |
| Lane Group Flow (vph)  | 130   | 399   | 0   | 274   | 576   | 99  | 50   | 272   | 0   | 354   | 746   | 260   |
| Turn Type              | Split   |   |   | Split   |   | pm+ov   | Split  |   |   | Split   |   | pm+ov   |
| Protected Phases       | 6   | 6   |   | 2   | 2   | 4   | 8  | 8   |   | 4   | 4   | 6   |
| Permitted Phases       |   |   |   |   |   | 2   |  |   |   |   |   | 4   |
| Actuated Green, G (s)  | 16.1  | 16.1  |   | 25.6  | 25.6  | 55.1  | 12.3   | 12.3  |   | 29.5  | 29.5  | 45.6  |
| Effective Green, g (s) | 18.1  | 18.1  |   | 27.6  | 27.6  | 59.1  | 14.3   | 14.3  |   | 31.5  | 31.5  | 49.6  |
| Actuated g/C Ratio     | 0.17  | 0.17  |   | 0.26  | 0.26  | 0.55  | 0.13   | 0.13  |   | 0.29  | 0.29  | 0.46  |
| Clearance Time (s)     | 6.0   | 6.0   |   | 6.0   | 6.0   | 6.0   | 6.0  | 6.0   |   | 6.0   | 6.0   | 6.0   |
| Vehicle Extension (s)  | 4.5   | 4.5   |   | 4.5   | 4.5   | 3.0   | 3.0  | 3.0   |   | 3.0   | 3.0   | 4.5   |
| Lane Grp Cap (vph)     | 271   | 558   |   | 413   | 865   | 870   | 214  | 425   |   | 472   | 991   | 789   |
| v/s Ratio Prot         | 0.08  | c0.12   |   | 0.17  | c0.17   | 0.03  | 0.03   | c0.08   |   | 0.22  | c0.22   | 0.06  |
| v/s Ratio Perm         |   |   |   |   |   | 0.03  |  |   |   |   |   | 0.11  |
| v/c Ratio              | 0.48  | 0.72  |   | 0.66  | 0.67  | 0.11  | 0.23   | 0.64  |   | 0.75  | 0.75  | 0.33  |
| Uniform Delay, d1      | 40.4  | 42.3  |   | 35.8  | 35.8  | 11.6  | 41.7   | 44.2  |   | 34.4  | 34.5  | 18.4  |
| Progression Factor     | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  |   | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 2.3   | 4.9   |   | 4.8   | 2.3   | 0.1   | 0.6  | 3.1   |   | 6.6   | 3.3   | 0.4   |
| Delay (s)              | 42.7  | 47.2  |   | 40.6  | 38.2  | 11.7  | 42.3   | 47.3  |   | 41.0  | 37.7  | 18.8  |
| Level of Service       | D   | D   |   | D   | D   | B   | D  | D   |   | D   | D   | B   |
| Approach Delay (s)     |   | 46.1  |   |   | 34.2  |   |  | 46.7  |   |   | 35.0  |   |
| Approach LOS           |   | D   |   |   | C   |   |  | D   |   |   | C   |   |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 37.9  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.70  |                      |      |
| Actuated Cycle Length (s)         | 107.5 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 67.8% | ICU Level of Service | C    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

2013 PM BUILD REC.ALL.SPLIT  
9/29/2005



| Lane Group              | SEL  | SET  | SER  | NWL  | NWT  | NWR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Volume (vph)            | 130  | 350  | 60   | 340  | 510  | 180  | 50   | 210  | 130  | 390  | 710  | 260  |
| Peak Hour Factor        | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lane Group Flow (vph)   | 130  | 410  | 0    | 274  | 576  | 180  | 50   | 340  | 0    | 354  | 746  | 260  |
| v/c Ratio               | 0.48 | 0.72 |      | 0.67 | 0.67 | 0.19 | 0.23 | 0.69 |      | 0.75 | 0.76 | 0.33 |
| Control Delay           | 51.0 | 51.5 |      | 46.4 | 41.4 | 1.3  | 49.0 | 43.8 |      | 47.1 | 41.0 | 18.5 |
| Queue Delay             | 0.0  | 0.0  |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |      | 0.0  | 0.0  | 0.0  |
| Total Delay             | 51.0 | 51.5 |      | 46.4 | 41.4 | 1.3  | 49.0 | 43.8 |      | 47.1 | 41.0 | 18.5 |
| Queue Length 50th (ft)  | 101  | 162  |      | 204  | 215  | 0    | 38   | 106  |      | 265  | 280  | 116  |
| Queue Length 95th (ft)  | 174  | 224  |      | 312  | 282  | 14   | 82   | 161  |      | 392  | 356  | 178  |
| Internal Link Dist (ft) |      | 645  |      |      | 472  |      |      | 963  |      |      | 575  |      |
| Turn Bay Length (ft)    | 300  |      |      | 200  |      | 200  | 200  |      |      | 200  |      | 200  |
| Base Capacity (vph)     | 286  | 600  |      | 464  | 971  | 984  | 239  | 543  |      | 530  | 1115 | 779  |
| 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       | 0.45 | 0.68 |      | 0.59 | 0.59 | 0.18 | 0.21 | 0.63 |      | 0.67 | 0.67 | 0.33 |

Intersection Summary

Timings  
2: THREE CHOPT RD & COX RD

2013 PM BUILD REC.ALL.SPLIT  
9/29/2005



| Lane Group          | SEL   | SET   | NWL   | NWT   | NWR   | NEL   | NET   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 130   | 350   | 340   | 510   | 180   | 50    | 210   | 390   | 710   | 260   |
| Turn Type           | Split |       | Split |       | pm+ov | Split |       | Split |       | pm+ov |
| Protected Phases    | 6     | 6     | 2     | 2     | 4     | 8     | 8     | 4     | 4     | 6     |
| Permitted Phases    |       |       |       |       | 2     |       |       |       |       | 4     |
| Detector Phases     | 6     | 6     | 2     | 2     | 4     | 8     | 8     | 4     | 4     | 6     |
| Minimum Initial (s) | 12.0  | 12.0  | 8.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 12.0  |
| Minimum Split (s)   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 23.0  | 23.0  | 36.0  | 36.0  | 41.0  | 20.0  | 20.0  | 41.0  | 41.0  | 23.0  |
| Total Split (%)     | 19.2% | 19.2% | 30.0% | 30.0% | 34.2% | 16.7% | 16.7% | 34.2% | 34.2% | 19.2% |
| Yellow Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            |       |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?  |       |       |       |       |       |       |       |       |       |       |
| Recall Mode         | Min   | Min   | Min   | Min   | None  | None  | None  | None  | None  | Min   |

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 108.2  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|      |      |      |      |
|------|------|------|------|
| ø2   | ø6   | ø4   | ø8   |
| 36 s | 23 s | 41 s | 20 s |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC#3  
 9/26/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|------|------|------|-------|------|-------|-------|------|-------|------|------|
| Lane Configurations    |       |      |      |      |       |      |       |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00 | 0.95  |      | 1.00  | 0.95  | 1.00 | 0.97  | 0.95 | 1.00 |
| Fr <sub>t</sub>        | 1.00  | 0.97 |      | 1.00 | 0.93  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 |
| Fit Protected          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770  | 3429 |      | 1770 | 3281  |      | 1770  | 3539  | 1583 | 3433  | 3539 | 1583 |
| Fit Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770  | 3429 |      | 1770 | 3281  |      | 1770  | 3539  | 1583 | 3433  | 3539 | 1583 |
| Volume (vph)           | 530   | 380  | 100  | 50   | 370   | 350  | 150   | 1690  | 80   | 170   | 1000 | 220  |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 530   | 380  | 100  | 50   | 370   | 350  | 150   | 1690  | 80   | 170   | 1000 | 220  |
| RTOR Reduction (vph)   | 0     | 14   | 0    | 0    | 78    | 0    | 0     | 0     | 17   | 0     | 0    | 97   |
| Lane Group Flow (vph)  | 530   | 466  | 0    | 50   | 642   | 0    | 150   | 1690  | 63   | 170   | 1000 | 123  |
| Turn Type              | Prot  |      |      | Prot |       |      | Prot  |       | Perm | Prot  |      | Perm |
| Protected Phases       | 5     | 2    |      | 1    | 6     |      | 3     | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |      |      |      |       |      |       |       | 8    |       |      | 4    |
| Actuated Green, G (s)  | 44.8  | 66.6 |      | 7.7  | 29.5  |      | 17.0  | 69.5  | 69.5 | 7.0   | 59.5 | 59.5 |
| Effective Green, g (s) | 44.8  | 68.1 |      | 7.7  | 31.0  |      | 17.0  | 71.0  | 71.0 | 7.0   | 61.0 | 61.0 |
| Actuated g/C Ratio     | 0.26  | 0.40 |      | 0.05 | 0.18  |      | 0.10  | 0.42  | 0.42 | 0.04  | 0.36 | 0.36 |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0  | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)     | 467   | 1375 |      | 80   | 599   |      | 177   | 1480  | 662  | 142   | 1271 | 569  |
| v/s Ratio Prot         | c0.30 | 0.14 |      | 0.03 | c0.22 |      | 0.08  | c0.48 |      | c0.05 | 0.28 |      |
| v/s Ratio Perm         |       |      |      |      |       |      |       |       | 0.05 |       |      | 0.14 |
| v/c Ratio              | 1.13  | 0.34 |      | 0.62 | 1.07  |      | 0.85  | 1.14  | 0.09 | 1.20  | 0.79 | 0.22 |
| Uniform Delay, d1      | 62.5  | 35.2 |      | 79.6 | 69.4  |      | 75.1  | 49.4  | 29.9 | 81.4  | 48.6 | 37.8 |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 84.1  | 0.1  |      | 14.2 | 57.7  |      | 29.4  | 72.5  | 0.1  | 138.2 | 3.8  | 0.4  |
| Delay (s)              | 146.6 | 35.4 |      | 93.9 | 127.1 |      | 104.5 | 121.9 | 30.0 | 219.6 | 52.4 | 38.2 |
| Level of Service       | F     | D    |      | F    | F     |      | F     | F     | C    | F     | D    | D    |
| Approach Delay (s)     |       | 93.8 |      |      | 124.9 |      |       | 116.7 |      |       | 70.6 |      |
| Approach LOS           |       | F    |      |      | F     |      |       | F     |      |       | E    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 100.8  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.15   |                      |      |
| Actuated Cycle Length (s)         | 169.8  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 115.7% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 PM BUILD REC#3  
 9/26/2005

| Movement               | SEL   | SET  | SER  | NWL   | NWT   | NWR  | NEL   | NET   | NER   | SWL  | SWT   | SWR   |
|------------------------|-------|------|------|-------|-------|------|-------|-------|-------|------|-------|-------|
| Lane Configurations    |       |      |      |       |       |      |       |       |       |      |       |       |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  | 1900 | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00  | 0.95  |      | 1.00  | 0.95  | 1.00  | 0.97 | 0.95  | 1.00  |
| Frt                    | 1.00  | 0.95 |      | 1.00  | 0.96  |      | 1.00  | 1.00  | 0.85  | 1.00 | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00 |      | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00  | 0.95 | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3365 |      | 1770  | 3400  |      | 1770  | 3539  | 1583  | 3433 | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00  | 0.95 | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3365 |      | 1770  | 3400  |      | 1770  | 3539  | 1583  | 3433 | 3539  | 1583  |
| Volume (vph)           | 190   | 390  | 190  | 120   | 450   | 160  | 160   | 1150  | 140   | 200  | 1800  | 380   |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  |
| Adj. Flow (vph)        | 190   | 390  | 190  | 120   | 450   | 160  | 160   | 1150  | 140   | 200  | 1800  | 380   |
| RTOR Reduction (vph)   | 0     | 31   | 0    | 0     | 19    | 0    | 0     | 0     | 38    | 0    | 0     | 82    |
| Lane Group Flow (vph)  | 190   | 549  | 0    | 120   | 591   | 0    | 160   | 1150  | 102   | 200  | 1800  | 298   |
| Turn Type              | Prot  |      |      | Prot  |       |      | Prot  |       | Perm  | Prot |       | Perm  |
| Protected Phases       | 5     | 2    |      | 1     | 6     |      | 3     | 8     |       | 7    | 4     |       |
| Permitted Phases       |       |      |      |       |       |      |       |       | 8     |      |       | 4     |
| Actuated Green, G (s)  | 21.9  | 40.1 |      | 15.9  | 34.1  |      | 18.9  | 102.9 | 102.9 | 15.5 | 99.5  | 99.5  |
| Effective Green, g (s) | 21.9  | 41.6 |      | 15.9  | 35.6  |      | 18.9  | 104.4 | 104.4 | 15.5 | 101.0 | 101.0 |
| Actuated g/C Ratio     | 0.11  | 0.22 |      | 0.08  | 0.18  |      | 0.10  | 0.54  | 0.54  | 0.08 | 0.52  | 0.52  |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0   | 5.5   |      | 4.0   | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0   | 3.0  | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 200   | 724  |      | 146   | 626   |      | 173   | 1910  | 855   | 275  | 1848  | 827   |
| v/s Ratio Prot         | c0.11 | 0.17 |      | 0.07  | c0.18 |      | c0.09 | c0.32 |       | 0.06 | c0.51 |       |
| v/s Ratio Perm         |       |      |      |       |       |      |       |       | 0.09  |      |       | 0.24  |
| v/c Ratio              | 0.95  | 0.76 |      | 0.82  | 0.94  |      | 0.92  | 0.60  | 0.12  | 0.73 | 0.97  | 0.36  |
| Uniform Delay, d1      | 85.2  | 71.2 |      | 87.4  | 77.9  |      | 86.5  | 30.3  | 21.9  | 86.9 | 44.9  | 27.2  |
| Progression Factor     | 1.00  | 1.00 |      | 1.00  | 1.00  |      | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  |
| Incremental Delay, d2  | 48.8  | 4.6  |      | 29.6  | 23.0  |      | 46.8  | 0.5   | 0.1   | 9.2  | 15.3  | 0.6   |
| Delay (s)              | 134.0 | 75.8 |      | 116.9 | 100.9 |      | 133.4 | 30.9  | 22.0  | 96.1 | 60.3  | 27.8  |
| Level of Service       | F     | E    |      | F     | F     |      | F     | C     | C     | F    | E     | C     |
| Approach Delay (s)     |       | 90.1 |      |       | 103.6 |      |       | 41.3  |       |      | 58.1  |       |
| Approach LOS           |       | F    |      |       | F     |      |       | D     |       |      | E     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 64.4   | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 0.98   |                      |      |
| Actuated Cycle Length (s)         | 193.4  | Sum of lost time (s) | 20.0 |
| Intersection Capacity Utilization | 100.0% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC#4  
9/26/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT   | SWR  |
|------------------------|-------|-------|------|------|-------|------|------|-------|------|-------|-------|------|
| Lane Configurations    | ↖     | ↕     |      | ↖    | ↕     |      | ↖↗   | ↕     | ↖    | ↖     | ↕     | ↖    |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0  | 4.0   |      | 4.0  | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00 | 0.95  |      | 0.97 | 0.95  | 1.00 | 1.00  | 0.95  | 1.00 |
| Frt                    | 1.00  | 0.97  |      | 1.00 | 0.93  |      | 1.00 | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 |
| Fit Protected          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (prot)      | 1770  | 3429  |      | 1770 | 3281  |      | 3433 | 3539  | 1583 | 1770  | 3539  | 1583 |
| Fit Permitted          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (perm)      | 1770  | 3429  |      | 1770 | 3281  |      | 3433 | 3539  | 1583 | 1770  | 3539  | 1583 |
| Volume (vph)           | 530   | 380   | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000  | 220  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 530   | 380   | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000  | 220  |
| RTOR Reduction (vph)   | 0     | 14    | 0    | 0    | 101   | 0    | 0    | 0     | 17   | 0     | 0     | 98   |
| Lane Group Flow (vph)  | 530   | 466   | 0    | 50   | 619   | 0    | 150  | 1690  | 63   | 170   | 1000  | 122  |
| Turn Type              | Prot  |       |      | Prot |       |      | Prot |       | Perm | Prot  |       | Perm |
| Protected Phases       | 5     | 2     |      | 1    | 6     |      | 3    | 8     |      | 7     | 4     |      |
| Permitted Phases       |       |       |      |      |       |      |      |       | 8    |       |       | 4    |
| Actuated Green, G (s)  | 42.8  | 61.6  |      | 7.7  | 26.5  |      | 11.3 | 67.5  | 67.5 | 14.0  | 70.2  | 70.2 |
| Effective Green, g (s) | 42.8  | 63.1  |      | 7.7  | 28.0  |      | 11.3 | 69.0  | 69.0 | 14.0  | 71.7  | 71.7 |
| Actuated g/C Ratio     | 0.25  | 0.37  |      | 0.05 | 0.16  |      | 0.07 | 0.41  | 0.41 | 0.08  | 0.42  | 0.42 |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0  | 5.5   |      | 4.0  | 5.5   | 5.5  | 4.0   | 5.5   | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0  | 3.0   |      | 3.0  | 3.0   | 3.0  | 3.0   | 5.0   | 5.0  |
| Lane Grp Cap (vph)     | 446   | 1274  |      | 80   | 541   |      | 228  | 1438  | 643  | 146   | 1494  | 668  |
| v/s Ratio Prot         | c0.30 | 0.14  |      | 0.03 | c0.22 |      | 0.04 | c0.48 |      | c0.10 | c0.28 |      |
| v/s Ratio Perm         |       |       |      |      |       |      |      |       | 0.05 |       |       | 0.14 |
| v/c Ratio              | 1.19  | 0.37  |      | 0.62 | 1.14  |      | 0.66 | 1.18  | 0.10 | 1.16  | 0.67  | 0.18 |
| Uniform Delay, d1      | 63.5  | 38.8  |      | 79.6 | 70.9  |      | 77.4 | 50.4  | 31.2 | 77.9  | 39.5  | 30.7 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00 | 1.00  |      | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Incremental Delay, d2  | 105.3 | 0.2   |      | 14.2 | 85.0  |      | 6.7  | 86.5  | 0.1  | 125.5 | 1.5   | 0.3  |
| Delay (s)              | 168.8 | 39.0  |      | 93.9 | 155.9 |      | 84.1 | 136.9 | 31.2 | 203.4 | 41.0  | 31.0 |
| Level of Service       | F     | D     |      | F    | F     |      | F    | F     | C    | F     | D     | C    |
| Approach Delay (s)     |       | 107.1 |      |      | 151.9 |      |      | 128.4 |      |       | 59.3  |      |
| Approach LOS           |       | F     |      |      | F     |      |      | F     |      |       | E     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 108.8  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.23   |                      |      |
| Actuated Cycle Length (s)         | 169.8  | Sum of lost time (s) | 20.0 |
| Intersection Capacity Utilization | 120.3% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 PM BUILD REC#4  
 9/26/2005

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement               | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Lane Configurations    |  |  |   |  |  |   |  |  |  |  |  |  |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95  |   | 1.00  | 0.95  |   | 0.97   | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Frt                    | 1.00  | 0.95  |   | 1.00  | 0.96  |   | 1.00   | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00  |   | 0.95  | 1.00  |   | 0.95   | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3365  |   | 1770  | 3400  |   | 3433   | 3539  | 1583  | 1770  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00  |   | 0.95  | 1.00  |   | 0.95   | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3365  |   | 1770  | 3400  |   | 3433   | 3539  | 1583  | 1770  | 3539  | 1583  |
| Volume (vph)           | 190   | 390   | 190   | 120   | 450   | 160   | 160  | 1150  | 140   | 200   | 1800  | 380   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 190   | 390   | 190   | 120   | 450   | 160   | 160  | 1150  | 140   | 200   | 1800  | 380   |
| RTOR Reduction (vph)   | 0   | 31  | 0   | 0   | 18  | 0   | 0  | 0   | 35  | 0   | 0   | 80  |
| Lane Group Flow (vph)  | 190   | 549   | 0   | 120   | 592   | 0   | 160  | 1150  | 105   | 200   | 1800  | 300   |
| Turn Type              | Prot  |   |   | Prot  |   |   | Prot   |   | Perm  | Prot  |   | Perm  |
| Protected Phases       | 5   | 2   |   | 1   | 6   |   | 3  | 8   |   | 7   | 4   |   |
| Permitted Phases       |   |   |   |   |   |   |  |   | 8   |   |   | 4   |
| Actuated Green, G (s)  | 22.8  | 43.0  |   | 15.8  | 36.0  |   | 10.0   | 86.7  | 86.7  | 25.9  | 102.6   | 102.6   |
| Effective Green, g (s) | 22.8  | 44.5  |   | 15.8  | 37.5  |   | 10.0   | 88.2  | 88.2  | 25.9  | 104.1   | 104.1   |
| Actuated g/C Ratio     | 0.12  | 0.23  |   | 0.08  | 0.20  |   | 0.05   | 0.46  | 0.46  | 0.14  | 0.55  | 0.55  |
| Clearance Time (s)     | 4.0   | 5.5   |   | 4.0   | 5.5   |   | 4.0  | 5.5   | 5.5   | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0  | 3.0   | 3.0   | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 212   | 786   |   | 147   | 670   |   | 180  | 1639  | 733   | 241   | 1935  | 865   |
| v/s Ratio Prot         | c0.11   | 0.17  |   | 0.07  | c0.18   |   | 0.05   | 0.32  |   | c0.11   | c0.51   |   |
| v/s Ratio Perm         |   |   |   |   |   |   |  |   | 0.09  |   |   | 0.24  |
| v/c Ratio              | 0.90  | 0.70  |   | 0.82  | 0.88  |   | 0.89   | 0.70  | 0.14  | 0.83  | 0.93  | 0.35  |
| Uniform Delay, d1      | 82.6  | 66.8  |   | 85.9  | 74.3  |   | 89.6   | 40.6  | 29.4  | 80.1  | 39.8  | 24.1  |
| Progression Factor     | 1.00  | 1.00  |   | 1.00  | 1.00  |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 34.7  | 2.7   |   | 28.2  | 13.1  |   | 37.1   | 1.4   | 0.1   | 20.5  | 9.0   | 0.5   |
| Delay (s)              | 117.3   | 69.5  |   | 114.1   | 87.4  |   | 126.8  | 42.0  | 29.5  | 100.6   | 48.8  | 24.6  |
| Level of Service       | F   | E   |   | F   | F   |   | F  | D   | C   | F   | D   | C   |
| Approach Delay (s)     |   | 81.3  |   |   | 91.8  |   |  | 50.2  |   |   | 49.3  |   |
| Approach LOS           |   | F   |   |   | F   |   |  | D   |   |   | D   |   |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 60.0  | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 0.92  |                      |      |
| Actuated Cycle Length (s)         | 190.4 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 95.7% | ICU Level of Service | F    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC#5  
 9/26/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|------|------|------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations    |       |      |      |      |       |      |      |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0  | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 0.97  | 0.95 |      | 1.00 | 0.95  |      | 1.00 | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 |
| Frt                    | 1.00  | 0.97 |      | 1.00 | 0.93  |      | 1.00 | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 3433  | 3429 |      | 1770 | 3281  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 3433  | 3429 |      | 1770 | 3281  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Volume (vph)           | 530   | 380  | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000 | 220  |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 530   | 380  | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000 | 220  |
| RTOR Reduction (vph)   | 0     | 13   | 0    | 0    | 101   | 0    | 0    | 0     | 17   | 0     | 0    | 94   |
| Lane Group Flow (vph)  | 530   | 467  | 0    | 50   | 619   | 0    | 150  | 1690  | 63   | 170   | 1000 | 126  |
| Turn Type              | Prot  |      |      | Prot |       |      | Prot |       | Perm | Prot  |      | Perm |
| Protected Phases       | 5     | 2    |      | 1    | 6     |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |      |      |      |       |      |      |       | 8    |       |      | 4    |
| Actuated Green, G (s)  | 25.8  | 49.6 |      | 7.7  | 31.5  |      | 18.6 | 77.5  | 77.5 | 16.0  | 74.9 | 74.9 |
| Effective Green, g (s) | 25.8  | 51.1 |      | 7.7  | 33.0  |      | 18.6 | 79.0  | 79.0 | 16.0  | 76.4 | 76.4 |
| Actuated g/C Ratio     | 0.15  | 0.30 |      | 0.05 | 0.19  |      | 0.11 | 0.47  | 0.47 | 0.09  | 0.45 | 0.45 |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0  | 5.5   |      | 4.0  | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0  | 3.0   |      | 3.0  | 3.0   | 3.0  | 3.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)     | 522   | 1032 |      | 80   | 638   |      | 194  | 1647  | 736  | 167   | 1592 | 712  |
| v/s Ratio Prot         | c0.15 | 0.14 |      | 0.03 | c0.22 |      | 0.08 | c0.48 |      | c0.10 | 0.28 |      |
| v/s Ratio Perm         |       |      |      |      |       |      |      |       | 0.05 |       |      | 0.14 |
| v/c Ratio              | 1.02  | 0.45 |      | 0.62 | 0.97  |      | 0.77 | 1.03  | 0.09 | 1.02  | 0.63 | 0.18 |
| Uniform Delay, d1      | 72.0  | 48.0 |      | 79.6 | 67.9  |      | 73.5 | 45.4  | 25.3 | 76.9  | 35.8 | 27.9 |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 43.3  | 0.3  |      | 14.2 | 28.3  |      | 17.3 | 29.1  | 0.1  | 74.4  | 1.1  | 0.2  |
| Delay (s)              | 115.3 | 48.3 |      | 93.9 | 96.2  |      | 90.8 | 74.5  | 25.3 | 151.3 | 36.9 | 28.2 |
| Level of Service       | F     | D    |      | F    | F     |      | F    | E     | C    | F     | D    | C    |
| Approach Delay (s)     |       | 83.5 |      |      | 96.1  |      |      | 73.7  |      |       | 49.5 |      |
| Approach LOS           |       | F    |      |      | F     |      |      | E     |      |       | D    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 72.4   | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 1.05   |                      |      |
| Actuated Cycle Length (s)         | 169.8  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 106.1% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 PM BUILD REC#5  
 9/26/2005

| Movement               | SEL   | SET  | SER  | NWL   | NWT   | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR   |
|------------------------|-------|------|------|-------|-------|------|-------|------|------|-------|-------|-------|
| Lane Configurations    |       |      |      |       |       |      |       |      |      |       |       |       |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0   | 4.0   |      | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 0.97  | 0.95 |      | 1.00  | 0.95  |      | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  |
| Fr't                   | 1.00  | 0.95 |      | 1.00  | 0.96  |      | 1.00  | 1.00 | 0.85 | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00 |      | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 3433  | 3365 |      | 1770  | 3400  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 3433  | 3365 |      | 1770  | 3400  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Volume (vph)           | 190   | 390  | 190  | 120   | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380   |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 190   | 390  | 190  | 120   | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380   |
| RTOR Reduction (vph)   | 0     | 31   | 0    | 0     | 18    | 0    | 0     | 0    | 36   | 0     | 0     | 80    |
| Lane Group Flow (vph)  | 190   | 549  | 0    | 120   | 592   | 0    | 160   | 1150 | 104  | 200   | 1800  | 300   |
| Turn Type              | Prot  |      |      | Prot  |       |      | Prot  |      | Perm | Prot  |       | Perm  |
| Protected Phases       | 5     | 2    |      | 1     | 6     |      | 3     | 8    |      | 7     | 4     |       |
| Permitted Phases       |       |      |      |       |       |      |       |      | 8    |       |       | 4     |
| Actuated Green, G (s)  | 12.0  | 33.6 |      | 15.2  | 36.8  |      | 19.7  | 96.5 | 96.5 | 25.9  | 102.7 | 102.7 |
| Effective Green, g (s) | 12.0  | 35.1 |      | 15.2  | 38.3  |      | 19.7  | 98.0 | 98.0 | 25.9  | 104.2 | 104.2 |
| Actuated g/C Ratio     | 0.06  | 0.18 |      | 0.08  | 0.20  |      | 0.10  | 0.52 | 0.52 | 0.14  | 0.55  | 0.55  |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0   | 5.5   |      | 4.0   | 5.5  | 5.5  | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0   | 3.0   |      | 3.0   | 3.0  | 3.0  | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 217   | 621  |      | 141   | 685   |      | 183   | 1823 | 816  | 241   | 1939  | 867   |
| v/s Ratio Prot         | 0.06  | 0.17 |      | c0.07 | c0.18 |      | 0.09  | 0.32 |      | c0.11 | c0.51 |       |
| v/s Ratio Perm         |       |      |      |       |       |      |       |      | 0.09 |       |       | 0.24  |
| v/c Ratio              | 0.88  | 0.88 |      | 0.85  | 0.86  |      | 0.87  | 0.63 | 0.13 | 0.83  | 0.93  | 0.35  |
| Uniform Delay, d1      | 88.4  | 75.6 |      | 86.4  | 73.4  |      | 84.0  | 33.1 | 23.9 | 80.0  | 39.6  | 24.0  |
| Progression Factor     | 1.00  | 1.00 |      | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 30.1  | 14.1 |      | 36.0  | 11.0  |      | 33.9  | 0.7  | 0.1  | 20.5  | 8.7   | 0.5   |
| Delay (s)              | 118.4 | 89.6 |      | 122.4 | 84.4  |      | 117.9 | 33.8 | 24.0 | 100.5 | 48.3  | 24.5  |
| Level of Service       | F     | F    |      | F     | F     |      | F     | C    | C    | F     | D     | C     |
| Approach Delay (s)     |       | 96.7 |      |       | 90.6  |      |       | 42.2 |      |       | 48.9  |       |
| Approach LOS           |       | F    |      |       | F     |      |       | D    |      |       | D     |       |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 59.7  | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 0.90  |                      |      |
| Actuated Cycle Length (s)         | 190.2 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 95.5% | ICU Level of Service | F    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC#6  
 9/26/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|-------|------|------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations    |       |       |      |      |       |      |      |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0  | 4.0   |      | 4.0  | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  |      | 0.97 | 0.95  |      | 1.00 | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 |
| Flt                    | 1.00  | 0.97  |      | 1.00 | 0.93  |      | 1.00 | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770  | 3429  |      | 3433 | 3281  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770  | 3429  |      | 3433 | 3281  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Volume (vph)           | 530   | 380   | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000 | 220  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 530   | 380   | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000 | 220  |
| RTOR Reduction (vph)   | 0     | 14    | 0    | 0    | 101   | 0    | 0    | 0     | 17   | 0     | 0    | 94   |
| Lane Group Flow (vph)  | 530   | 466   | 0    | 50   | 619   | 0    | 150  | 1690  | 63   | 170   | 1000 | 126  |
| Turn Type              | Prot  |       |      | Prot |       |      | Prot |       | Perm | Prot  |      | Perm |
| Protected Phases       | 5     | 2     |      | 1    | 6     |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |       |      |      |       |      |      |       | 8    |       |      | 4    |
| Actuated Green, G (s)  | 42.8  | 65.3  |      | 4.0  | 26.5  |      | 18.6 | 67.5  | 67.5 | 14.0  | 62.9 | 62.9 |
| Effective Green, g (s) | 42.8  | 66.8  |      | 4.0  | 28.0  |      | 18.6 | 69.0  | 69.0 | 14.0  | 64.4 | 64.4 |
| Actuated g/C Ratio     | 0.25  | 0.39  |      | 0.02 | 0.16  |      | 0.11 | 0.41  | 0.41 | 0.08  | 0.38 | 0.38 |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0  | 5.5   |      | 4.0  | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0  | 3.0   |      | 3.0  | 3.0   | 3.0  | 3.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)     | 446   | 1349  |      | 81   | 541   |      | 194  | 1438  | 643  | 146   | 1342 | 600  |
| v/s Ratio Prot         | c0.30 | 0.14  |      | 0.01 | c0.22 |      | 0.08 | c0.48 |      | c0.10 | 0.28 |      |
| v/s Ratio Perm         |       |       |      |      |       |      |      |       | 0.05 |       |      | 0.14 |
| v/c Ratio              | 1.19  | 0.35  |      | 0.62 | 1.14  |      | 0.77 | 1.18  | 0.10 | 1.16  | 0.75 | 0.21 |
| Uniform Delay, d1      | 63.5  | 36.2  |      | 82.1 | 70.9  |      | 73.5 | 50.4  | 31.2 | 77.9  | 45.6 | 35.5 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00 | 1.00  |      | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 105.3 | 0.2   |      | 13.2 | 85.0  |      | 17.3 | 86.5  | 0.1  | 125.5 | 2.8  | 0.4  |
| Delay (s)              | 168.8 | 36.3  |      | 95.3 | 155.9 |      | 90.8 | 136.9 | 31.2 | 203.4 | 48.4 | 35.9 |
| Level of Service       | F     | D     |      | F    | F     |      | F    | F     | C    | F     | D    | D    |
| Approach Delay (s)     |       | 105.8 |      |      | 152.0 |      |      | 128.9 |      |       | 65.3 |      |
| Approach LOS           |       | F     |      |      | F     |      |      | F     |      |       | E    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 110.5  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.21   |                      |      |
| Actuated Cycle Length (s)         | 169.8  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 120.3% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 PM BUILD REC#6  
 9/26/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR   |
|------------------------|-------|------|------|------|-------|------|-------|------|------|-------|-------|-------|
| Lane Configurations    | ↘     | ↕    |      | ↙    | ↕     |      | ↘     | ↕    | ↙    | ↕     | ↕     | ↙     |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95 |      | 0.97 | 0.95  |      | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  |
| Frt                    | 1.00  | 0.95 |      | 1.00 | 0.96  |      | 1.00  | 1.00 | 0.85 | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3365 |      | 3433 | 3400  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3365 |      | 3433 | 3400  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Volume (vph)           | 190   | 390  | 190  | 120  | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380   |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 190   | 390  | 190  | 120  | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380   |
| RTOR Reduction (vph)   | 0     | 30   | 0    | 0    | 19    | 0    | 0     | 0    | 36   | 0     | 0     | 82    |
| Lane Group Flow (vph)  | 190   | 550  | 0    | 120  | 591   | 0    | 160   | 1150 | 104  | 200   | 1800  | 298   |
| Turn Type              | Prot  |      |      | Prot |       |      | Prot  |      | Perm | Prot  |       | Perm  |
| Protected Phases       | 5     | 2    |      | 1    | 6     |      | 3     | 8    |      | 7     | 4     |       |
| Permitted Phases       |       |      |      |      |       |      |       |      | 8    |       |       | 4     |
| Actuated Green, G (s)  | 21.9  | 45.6 |      | 10.5 | 34.2  |      | 18.9  | 92.3 | 92.3 | 26.1  | 99.5  | 99.5  |
| Effective Green, g (s) | 21.9  | 47.1 |      | 10.5 | 35.7  |      | 18.9  | 93.8 | 93.8 | 26.1  | 101.0 | 101.0 |
| Actuated g/C Ratio     | 0.11  | 0.24 |      | 0.05 | 0.18  |      | 0.10  | 0.48 | 0.48 | 0.13  | 0.52  | 0.52  |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0  | 5.5   |      | 4.0   | 5.5  | 5.5  | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0  | 3.0   |      | 3.0   | 3.0  | 3.0  | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 200   | 819  |      | 186  | 627   |      | 173   | 1716 | 767  | 239   | 1847  | 826   |
| v/s Ratio Prot         | c0.11 | 0.17 |      | 0.03 | c0.18 |      | c0.09 | 0.32 |      | c0.11 | c0.51 |       |
| v/s Ratio Perm         |       |      |      |      |       |      |       |      | 0.09 |       |       | 0.24  |
| v/c Ratio              | 0.95  | 0.67 |      | 0.65 | 0.94  |      | 0.92  | 0.67 | 0.14 | 0.84  | 0.97  | 0.36  |
| Uniform Delay, d1      | 85.3  | 66.2 |      | 89.7 | 77.9  |      | 86.6  | 38.0 | 27.5 | 81.6  | 45.0  | 27.2  |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 48.8  | 2.2  |      | 7.5  | 22.7  |      | 46.8  | 1.0  | 0.1  | 21.7  | 15.4  | 0.6   |
| Delay (s)              | 134.0 | 68.4 |      | 97.1 | 100.6 |      | 133.4 | 39.1 | 27.6 | 103.3 | 60.4  | 27.8  |
| Level of Service       | F     | E    |      | F    | F     |      | F     | D    | C    | F     | E     | C     |
| Approach Delay (s)     |       | 84.6 |      |      | 100.1 |      |       | 48.4 |      |       | 58.8  |       |
| Approach LOS           |       | F    |      |      | F     |      |       | D    |      |       | E     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 65.4   | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 0.95   |                      |      |
| Actuated Cycle Length (s)         | 193.5  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 100.0% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC#7  
 9/26/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|-------|------|------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations    |       |       |      |      |       |      |      |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   |      | 4.0  | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  | 1.00 | 1.00 | 0.95  |      | 1.00 | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 |
| Frt                    | 1.00  | 1.00  | 0.85 | 1.00 | 0.93  |      | 1.00 | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770  | 3539  | 1583 | 1770 | 3281  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  |      | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770  | 3539  | 1583 | 1770 | 3281  |      | 1770 | 3539  | 1583 | 1770  | 3539 | 1583 |
| Volume (vph)           | 530   | 380   | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000 | 220  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 530   | 380   | 100  | 50   | 370   | 350  | 150  | 1690  | 80   | 170   | 1000 | 220  |
| RTOR Reduction (vph)   | 0     | 0     | 63   | 0    | 100   | 0    | 0    | 0     | 17   | 0     | 0    | 94   |
| Lane Group Flow (vph)  | 530   | 380   | 37   | 50   | 620   | 0    | 150  | 1690  | 63   | 170   | 1000 | 126  |
| Turn Type              | Prot  |       | Perm | Prot |       |      | Prot |       | Perm | Prot  |      | Perm |
| Protected Phases       | 5     | 2     |      | 1    | 6     |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |       | 2    |      |       |      |      |       | 8    |       |      | 4    |
| Actuated Green, G (s)  | 42.0  | 61.6  | 61.6 | 7.7  | 27.3  |      | 18.6 | 67.5  | 67.5 | 14.0  | 62.9 | 62.9 |
| Effective Green, g (s) | 42.0  | 63.1  | 63.1 | 7.7  | 28.8  |      | 18.6 | 69.0  | 69.0 | 14.0  | 64.4 | 64.4 |
| Actuated g/C Ratio     | 0.25  | 0.37  | 0.37 | 0.05 | 0.17  |      | 0.11 | 0.41  | 0.41 | 0.08  | 0.38 | 0.38 |
| Clearance Time (s)     | 4.0   | 5.5   | 5.5  | 4.0  | 5.5   |      | 4.0  | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0   | 3.0  | 3.0  | 3.0   |      | 3.0  | 3.0   | 3.0  | 3.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)     | 438   | 1315  | 588  | 80   | 556   |      | 194  | 1438  | 643  | 146   | 1342 | 600  |
| v/s Ratio Prot         | c0.30 | 0.11  |      | 0.03 | c0.22 |      | 0.08 | c0.48 |      | c0.10 | 0.28 |      |
| v/s Ratio Perm         |       |       | 0.06 |      |       |      |      |       | 0.05 |       |      | 0.14 |
| v/c Ratio              | 1.21  | 0.29  | 0.06 | 0.62 | 1.11  |      | 0.77 | 1.18  | 0.10 | 1.16  | 0.75 | 0.21 |
| Uniform Delay, d1      | 63.9  | 37.6  | 34.3 | 79.6 | 70.5  |      | 73.5 | 50.4  | 31.2 | 77.9  | 45.6 | 35.5 |
| Progression Factor     | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |      | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 114.1 | 0.1   | 0.0  | 14.2 | 73.5  |      | 17.3 | 86.5  | 0.1  | 125.5 | 2.8  | 0.4  |
| Delay (s)              | 178.0 | 37.7  | 34.4 | 93.9 | 144.0 |      | 90.8 | 136.9 | 31.2 | 203.4 | 48.4 | 35.9 |
| Level of Service       | F     | D     | C    | F    | F     |      | F    | F     | C    | F     | D    | D    |
| Approach Delay (s)     |       | 111.0 |      |      | 140.7 |      |      | 128.9 |      |       | 65.3 |      |
| Approach LOS           |       | F     |      |      | F     |      |      | F     |      |       | E    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 109.8  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.21   |                      |      |
| Actuated Cycle Length (s)         | 169.8  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 120.3% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 PM BUILD REC#7  
 9/26/2005

| Movement               | SEL   | SET  | SER  | NWL   | NWT   | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR   |
|------------------------|-------|------|------|-------|-------|------|-------|------|------|-------|-------|-------|
| Lane Configurations    |       |      |      |       |       |      |       |      |      |       |       |       |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   |      | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  |      | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  |
| Frt                    | 1.00  | 1.00 | 0.85 | 1.00  | 0.96  |      | 1.00  | 1.00 | 0.85 | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3539 | 1583 | 1770  | 3400  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3539 | 1583 | 1770  | 3400  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Volume (vph)           | 190   | 390  | 190  | 120   | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380   |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 190   | 390  | 190  | 120   | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380   |
| RTOR Reduction (vph)   | 0     | 0    | 151  | 0     | 19    | 0    | 0     | 0    | 36   | 0     | 0     | 82    |
| Lane Group Flow (vph)  | 190   | 390  | 39   | 120   | 591   | 0    | 160   | 1150 | 104  | 200   | 1800  | 298   |
| Turn Type              | Prot  |      | Perm | Prot  |       |      | Prot  |      | Perm | Prot  |       | Perm  |
| Protected Phases       | 5     | 2    |      | 1     | 6     |      | 3     | 8    |      | 7     | 4     |       |
| Permitted Phases       |       |      | 2    |       |       |      |       |      | 8    |       |       | 4     |
| Actuated Green, G (s)  | 21.9  | 38.6 | 38.6 | 17.4  | 34.1  |      | 18.9  | 92.3 | 92.3 | 26.1  | 99.5  | 99.5  |
| Effective Green, g (s) | 21.9  | 40.1 | 40.1 | 17.4  | 35.6  |      | 18.9  | 93.8 | 93.8 | 26.1  | 101.0 | 101.0 |
| Actuated g/C Ratio     | 0.11  | 0.21 | 0.21 | 0.09  | 0.18  |      | 0.10  | 0.49 | 0.49 | 0.13  | 0.52  | 0.52  |
| Clearance Time (s)     | 4.0   | 5.5  | 5.5  | 4.0   | 5.5   |      | 4.0   | 5.5  | 5.5  | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0  | 3.0  | 3.0   | 3.0   |      | 3.0   | 3.0  | 3.0  | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 200   | 734  | 328  | 159   | 626   |      | 173   | 1716 | 768  | 239   | 1848  | 827   |
| v/s Ratio Prot         | c0.11 | 0.11 |      | 0.07  | c0.18 |      | c0.09 | 0.32 |      | c0.11 | c0.51 |       |
| v/s Ratio Perm         |       |      | 0.12 |       |       |      |       |      | 0.09 |       |       | 0.24  |
| v/c Ratio              | 0.95  | 0.53 | 0.12 | 0.75  | 0.94  |      | 0.92  | 0.67 | 0.14 | 0.84  | 0.97  | 0.36  |
| Uniform Delay, d1      | 85.2  | 68.3 | 62.3 | 85.9  | 77.9  |      | 86.5  | 38.0 | 27.4 | 81.6  | 44.9  | 27.2  |
| Progression Factor     | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 48.8  | 0.7  | 0.2  | 18.2  | 23.0  |      | 46.8  | 1.0  | 0.1  | 21.7  | 15.3  | 0.6   |
| Delay (s)              | 134.0 | 69.0 | 62.5 | 104.2 | 100.9 |      | 133.4 | 39.0 | 27.5 | 103.3 | 60.3  | 27.8  |
| Level of Service       | F     | E    | E    | F     | F     |      | F     | D    | C    | F     | E     | C     |
| Approach Delay (s)     |       | 83.4 |      |       | 101.5 |      |       | 48.3 |      |       | 58.7  |       |
| Approach LOS           |       | F    |      |       | F     |      |       | D    |      |       | E     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 65.3   | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 0.95   |                      |      |
| Actuated Cycle Length (s)         | 193.4  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 100.0% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC#8  
 9/27/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR   | NEL   | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|------|------|------|-------|-------|-------|-------|------|-------|------|------|
| Lane Configurations    |       |      |      |      |       |       |       |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900  | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00 | 0.95  | 1.00  | 1.00  | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 |
| Fr't                   | 1.00  | 0.97 |      | 1.00 | 1.00  | 0.85  | 1.00  | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00 |      | 0.95 | 1.00  | 1.00  | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770  | 3429 |      | 1770 | 3539  | 1583  | 1770  | 3539  | 1583 | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95 | 1.00  | 1.00  | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770  | 3429 |      | 1770 | 3539  | 1583  | 1770  | 3539  | 1583 | 1770  | 3539 | 1583 |
| Volume (vph)           | 530   | 380  | 100  | 50   | 370   | 350   | 150   | 1690  | 80   | 170   | 1000 | 220  |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 530   | 380  | 100  | 50   | 370   | 350   | 150   | 1690  | 80   | 170   | 1000 | 220  |
| RTOR Reduction (vph)   | 0     | 14   | 0    | 0    | 0     | 132   | 0     | 0     | 17   | 0     | 0    | 94   |
| Lane Group Flow (vph)  | 530   | 466  | 0    | 50   | 370   | 218   | 150   | 1690  | 63   | 170   | 1000 | 126  |
| Turn Type              | Prot  |      |      | Prot |       | Perm  | Prot  |       | Perm | Prot  |      | Perm |
| Protected Phases       | 5     | 2    |      | 1    | 6     |       | 3     | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |      |      |      |       | 6     |       |       | 8    |       |      | 4    |
| Actuated Green, G (s)  | 45.8  | 58.6 |      | 7.7  | 20.5  | 20.5  | 18.6  | 70.5  | 70.5 | 14.0  | 65.9 | 65.9 |
| Effective Green, g (s) | 45.8  | 60.1 |      | 7.7  | 22.0  | 22.0  | 18.6  | 72.0  | 72.0 | 14.0  | 67.4 | 67.4 |
| Actuated g/C Ratio     | 0.27  | 0.35 |      | 0.05 | 0.13  | 0.13  | 0.11  | 0.42  | 0.42 | 0.08  | 0.40 | 0.40 |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0  | 5.5   | 5.5   | 4.0   | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0  | 3.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)     | 477   | 1214 |      | 80   | 459   | 205   | 194   | 1501  | 671  | 146   | 1405 | 628  |
| v/s Ratio Prot         | c0.30 | 0.14 |      | 0.03 | 0.10  |       | c0.08 | c0.48 |      | c0.10 | 0.28 |      |
| v/s Ratio Perm         |       |      |      |      |       | 0.22  |       |       | 0.05 |       |      | 0.14 |
| v/c Ratio              | 1.11  | 0.38 |      | 0.62 | 0.81  | 1.06  | 0.77  | 1.13  | 0.09 | 1.16  | 0.71 | 0.20 |
| Uniform Delay, d1      | 62.0  | 41.0 |      | 79.6 | 71.8  | 73.9  | 73.5  | 48.9  | 29.3 | 77.9  | 43.0 | 33.5 |
| Progression Factor     | 1.00  | 1.00 |      | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 75.1  | 0.2  |      | 14.2 | 10.0  | 80.2  | 17.3  | 65.9  | 0.1  | 125.5 | 2.1  | 0.3  |
| Delay (s)              | 137.1 | 41.2 |      | 93.9 | 81.8  | 154.1 | 90.8  | 114.8 | 29.4 | 203.4 | 45.2 | 33.9 |
| Level of Service       | F     | D    |      | F    | F     | F     | F     | F     | C    | F     | D    | C    |
| Approach Delay (s)     |       | 91.5 |      |      | 115.4 |       |       | 109.4 |      |       | 62.7 |      |
| Approach LOS           |       | F    |      |      | F     |       |       | F     |      |       | E    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 94.0   | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.18   |                      |      |
| Actuated Cycle Length (s)         | 169.8  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 109.1% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

2013 PM BUILD REC#8  
9/27/2005

| Movement                          | SEL   | SET   | SER  | NWL   | NWT  | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR   |
|-----------------------------------|-------|-------|------|-------|------|------|-------|------|------|-------|-------|-------|
| Lane Configurations               | ↖     | ↕     |      | ↗     | ↕    | ↖    | ↖     | ↕    | ↗    | ↖     | ↕     | ↗     |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.0   | 4.0   |      | 4.0   | 4.0  | 4.0  | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor                 | 1.00  | 0.95  |      | 1.00  | 0.95 | 1.00 | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  |
| Fr <sub>t</sub>                   | 1.00  | 0.95  |      | 1.00  | 1.00 | 0.85 | 1.00  | 1.00 | 0.85 | 1.00  | 1.00  | 0.85  |
| Fl <sub>t</sub> Protected         | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)                 | 1770  | 3365  |      | 1770  | 3539 | 1583 | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Fl <sub>t</sub> Permitted         | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)                 | 1770  | 3365  |      | 1770  | 3539 | 1583 | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Volume (vph)                      | 190   | 390   | 190  | 120   | 450  | 160  | 160   | 1150 | 140  | 200   | 1800  | 380   |
| Peak-hour factor, PHF             | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)                   | 190   | 390   | 190  | 120   | 450  | 160  | 160   | 1150 | 140  | 200   | 1800  | 380   |
| RTOR Reduction (vph)              | 0     | 31    | 0    | 0     | 0    | 137  | 0     | 0    | 36   | 0     | 0     | 80    |
| Lane Group Flow (vph)             | 190   | 549   | 0    | 120   | 450  | 23   | 160   | 1150 | 104  | 200   | 1800  | 300   |
| Turn Type                         | Prot  |       |      | Prot  |      | Perm | Prot  |      | Perm | Prot  |       | Perm  |
| Protected Phases                  | 5     | 2     |      | 1     | 6    |      | 3     | 8    |      | 7     | 4     |       |
| Permitted Phases                  |       |       |      |       |      | 6    |       |      | 8    |       |       | 4     |
| Actuated Green, G (s)             | 22.8  | 34.0  |      | 15.2  | 26.4 | 26.4 | 19.8  | 96.7 | 96.7 | 25.7  | 102.6 | 102.6 |
| Effective Green, g (s)            | 22.8  | 35.5  |      | 15.2  | 27.9 | 27.9 | 19.8  | 98.2 | 98.2 | 25.7  | 104.1 | 104.1 |
| Actuated g/C Ratio                | 0.12  | 0.19  |      | 0.08  | 0.15 | 0.15 | 0.10  | 0.52 | 0.52 | 0.13  | 0.55  | 0.55  |
| Clearance Time (s)                | 4.0   | 5.5   |      | 4.0   | 5.5  | 5.5  | 4.0   | 5.5  | 5.5  | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)             | 3.0   | 3.0   |      | 3.0   | 3.0  | 3.0  | 3.0   | 3.0  | 3.0  | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)                | 212   | 627   |      | 141   | 518  | 232  | 184   | 1823 | 816  | 239   | 1933  | 865   |
| v/s Ratio Prot                    | c0.11 | c0.17 |      | 0.07  | 0.13 |      | 0.09  | 0.32 |      | c0.11 | c0.51 |       |
| v/s Ratio Perm                    |       |       |      |       |      | 0.10 |       |      | 0.09 |       |       | 0.24  |
| v/c Ratio                         | 0.90  | 0.88  |      | 0.85  | 0.87 | 0.10 | 0.87  | 0.63 | 0.13 | 0.84  | 0.93  | 0.35  |
| Uniform Delay, d <sub>1</sub>     | 82.7  | 75.4  |      | 86.6  | 79.6 | 70.5 | 84.1  | 33.2 | 24.0 | 80.4  | 39.9  | 24.2  |
| Progression Factor                | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d <sub>2</sub> | 34.7  | 13.0  |      | 36.0  | 14.4 | 0.2  | 32.6  | 0.7  | 0.1  | 21.7  | 9.1   | 0.5   |
| Delay (s)                         | 117.4 | 88.4  |      | 122.6 | 93.9 | 70.7 | 116.7 | 33.9 | 24.0 | 102.1 | 49.0  | 24.7  |
| Level of Service                  | F     | F     |      | F     | F    | E    | F     | C    | C    | F     | D     | C     |
| Approach Delay (s)                |       | 95.6  |      |       | 93.5 |      |       | 42.1 |      |       | 49.6  |       |
| Approach LOS                      |       | F     |      |       | F    |      |       | D    |      |       | D     |       |

**Intersection Summary**

|                                   |       |                      |     |
|-----------------------------------|-------|----------------------|-----|
| HCM Average Control Delay         | 60.2  | HCM Level of Service | E   |
| HCM Volume to Capacity ratio      | 0.90  |                      |     |
| Actuated Cycle Length (s)         | 190.6 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 95.5% | ICU Level of Service | F   |
| Analysis Period (min)             | 15    |                      |     |
| c Critical Lane Group             |       |                      |     |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC#9  
 9/27/2005

|                                   |  |   |  |  |   |  |  |    |  |  |   |  |
|-----------------------------------|---|--|---|---|--|---|---|---|---|---|--|---|
| Movement                          | SEL   | SET  | SER   | NWL   | NWT  | NWR   | NEL   | NET   | NER   | SWL   | SWT  | SWR   |
| Lane Configurations               |  | <br> |   |  | <br> |   |  | <br><br> |   |  | <br> |   |
| Ideal Flow (vphpl)                | 1900  | 1900   | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  |
| Total Lost time (s)               | 4.0   | 4.0  |   | 4.0   | 4.0  |   | 4.0   | 4.0   |   | 4.0   | 4.0  |   |
| Lane Util. Factor                 | 1.00  | 0.95   |   | 1.00  | 0.95   |   | 1.00  | 0.91  |   | 1.00  | 0.91   |   |
| Fr <sub>t</sub>                   | 1.00  | 0.97   |   | 1.00  | 0.93   |   | 1.00  | 0.99  |   | 1.00  | 0.97   |   |
| Fl <sub>t</sub> Protected         | 0.95  | 1.00   |   | 0.95  | 1.00   |   | 0.95  | 1.00  |   | 0.95  | 1.00   |   |
| Satd. Flow (prot)                 | 1770  | 3429   |   | 1770  | 3281   |   | 1770  | 5051  |   | 1770  | 4948   |   |
| Fl <sub>t</sub> Permitted         | 0.95  | 1.00   |   | 0.95  | 1.00   |   | 0.95  | 1.00  |   | 0.95  | 1.00   |   |
| Satd. Flow (perm)                 | 1770  | 3429   |   | 1770  | 3281   |   | 1770  | 5051  |   | 1770  | 4948   |   |
| Volume (vph)                      | 530   | 380  | 100   | 50  | 370  | 350   | 150   | 1690  | 80  | 170   | 1000   | 220   |
| Peak-hour factor, PHF             | 1.00  | 1.00   | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  |
| Adj. Flow (vph)                   | 530   | 380  | 100   | 50  | 370  | 350   | 150   | 1690  | 80  | 170   | 1000   | 220   |
| RTOR Reduction (vph)              | 0   | 13   | 0   | 0   | 100  | 0   | 0   | 3   | 0   | 0   | 20   | 0   |
| Lane Group Flow (vph)             | 530   | 467  | 0   | 50  | 620  | 0   | 150   | 1767  | 0   | 170   | 1200   | 0   |
| Turn Type                         | Prot  |  |   | Prot  |  |   | Prot  |   |   | Prot  |  |   |
| Protected Phases                  | 5   | 2  |   | 1   | 6  |   | 3   | 8   |   | 7   | 4  |   |
| Permitted Phases                  |   |  |   |   |  |   |   |   |   |   |  |   |
| Actuated Green, G (s)             | 48.0  | 73.3   |   | 7.7   | 33.0   |   | 17.0  | 54.5  |   | 15.0  | 52.5   |   |
| Effective Green, g (s)            | 48.0  | 74.8   |   | 7.7   | 34.5   |   | 17.0  | 56.0  |   | 15.0  | 54.0   |   |
| Actuated g/C Ratio                | 0.28  | 0.44   |   | 0.05  | 0.20   |   | 0.10  | 0.33  |   | 0.09  | 0.32   |   |
| Clearance Time (s)                | 4.0   | 5.5  |   | 4.0   | 5.5  |   | 4.0   | 5.5   |   | 4.0   | 5.5  |   |
| Vehicle Extension (s)             | 3.0   | 3.0  |   | 3.0   | 3.0  |   | 3.0   | 3.0   |   | 3.0   | 5.0  |   |
| Lane Grp Cap (vph)                | 501   | 1513   |   | 80  | 668  |   | 178   | 1669  |   | 157   | 1576   |   |
| v/s Ratio Prot                    | c0.30   | 0.14   |   | 0.03  | c0.22  |   | 0.08  | c0.35   |   | c0.10   | 0.25   |   |
| v/s Ratio Perm                    |   |  |   |   |  |   |   |   |   |   |  |   |
| v/c Ratio                         | 1.06  | 0.31   |   | 0.62  | 0.93   |   | 0.84  | 1.06  |   | 1.08  | 0.76   |   |
| Uniform Delay, d <sub>1</sub>     | 60.8  | 30.6   |   | 79.5  | 66.3   |   | 74.9  | 56.8  |   | 77.2  | 51.9   |   |
| Progression Factor                | 1.00  | 1.00   |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   |
| Incremental Delay, d <sub>2</sub> | 56.4  | 0.1  |   | 14.2  | 19.0   |   | 28.7  | 39.5  |   | 95.7  | 2.6  |   |
| Delay (s)                         | 117.1   | 30.7   |   | 93.7  | 85.3   |   | 103.6   | 96.3  |   | 172.9   | 54.6   |   |
| Level of Service                  | F   | C  |   | F   | F  |   | F   | F   |   | F   | D  |   |
| Approach Delay (s)                |   | 76.1   |   |   | 85.8   |   |   | 96.8  |   |   | 69.0   |   |
| Approach LOS                      |   | E  |   |   | F  |   |   | F   |   |   | E  |   |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 83.5   | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.04   |                      |      |
| Actuated Cycle Length (s)         | 169.5  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 108.0% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

2013 PM BUILD REC#9  
9/27/2005

| Movement               | SEL   | SET  | SER  | NWL   | NWT   | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR  |
|------------------------|-------|------|------|-------|-------|------|-------|------|------|-------|-------|------|
| Lane Configurations    |       |      |      |       |       |      |       |      |      |       |       |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0   | 4.0   |      | 4.0   | 4.0  |      | 4.0   | 4.0   |      |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00  | 0.95  |      | 1.00  | 0.91 |      | 1.00  | 0.91  |      |
| Frt                    | 1.00  | 0.95 |      | 1.00  | 0.96  |      | 1.00  | 0.98 |      | 1.00  | 0.97  |      |
| Flt Protected          | 0.95  | 1.00 |      | 0.95  | 1.00  |      | 0.95  | 1.00 |      | 0.95  | 1.00  |      |
| Satd. Flow (prot)      | 1770  | 3365 |      | 1770  | 3400  |      | 1770  | 5003 |      | 1770  | 4952  |      |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95  | 1.00  |      | 0.95  | 1.00 |      | 0.95  | 1.00  |      |
| Satd. Flow (perm)      | 1770  | 3365 |      | 1770  | 3400  |      | 1770  | 5003 |      | 1770  | 4952  |      |
| Volume (vph)           | 190   | 390  | 190  | 120   | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380  |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 190   | 390  | 190  | 120   | 450   | 160  | 160   | 1150 | 140  | 200   | 1800  | 380  |
| RTOR Reduction (vph)   | 0     | 31   | 0    | 0     | 18    | 0    | 0     | 7    | 0    | 0     | 16    | 0    |
| Lane Group Flow (vph)  | 190   | 549  | 0    | 120   | 592   | 0    | 160   | 1283 | 0    | 200   | 2164  | 0    |
| Turn Type              | Prot  |      |      | Prot  |       |      | Prot  |      |      | Prot  |       |      |
| Protected Phases       | 5     | 2    |      | 1     | 6     |      | 3     | 8    |      | 7     | 4     |      |
| Permitted Phases       |       |      |      |       |       |      |       |      |      |       |       |      |
| Actuated Green, G (s)  | 22.8  | 42.5 |      | 15.6  | 35.3  |      | 19.9  | 84.3 |      | 25.4  | 89.8  |      |
| Effective Green, g (s) | 22.8  | 44.0 |      | 15.6  | 36.8  |      | 19.9  | 85.8 |      | 25.4  | 91.3  |      |
| Actuated g/C Ratio     | 0.12  | 0.24 |      | 0.08  | 0.20  |      | 0.11  | 0.46 |      | 0.14  | 0.49  |      |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0   | 5.5   |      | 4.0   | 5.5  |      | 4.0   | 5.5   |      |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0   | 3.0   |      | 3.0   | 3.0  |      | 3.0   | 5.0   |      |
| Lane Grp Cap (vph)     | 216   | 793  |      | 148   | 670   |      | 189   | 2298 |      | 241   | 2420  |      |
| v/s Ratio Prot         | c0.11 | 0.17 |      | 0.07  | c0.18 |      | 0.09  | 0.26 |      | c0.11 | c0.44 |      |
| v/s Ratio Perm         |       |      |      |       |       |      |       |      |      |       |       |      |
| v/c Ratio              | 0.88  | 0.69 |      | 0.81  | 0.88  |      | 0.85  | 0.56 |      | 0.83  | 0.89  |      |
| Uniform Delay, d1      | 80.7  | 65.2 |      | 84.1  | 72.9  |      | 82.0  | 36.7 |      | 78.6  | 43.4  |      |
| Progression Factor     | 1.00  | 1.00 |      | 1.00  | 1.00  |      | 1.00  | 1.00 |      | 1.00  | 1.00  |      |
| Incremental Delay, d2  | 30.8  | 2.6  |      | 27.4  | 13.1  |      | 27.9  | 0.3  |      | 20.5  | 5.0   |      |
| Delay (s)              | 111.4 | 67.8 |      | 111.6 | 86.0  |      | 109.8 | 37.0 |      | 99.1  | 48.4  |      |
| Level of Service       | F     | E    |      | F     | F     |      | F     | D    |      | F     | D     |      |
| Approach Delay (s)     |       | 78.6 |      |       | 90.2  |      |       | 45.0 |      |       | 52.7  |      |
| Approach LOS           |       | E    |      |       | F     |      |       | D    |      |       | D     |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 59.5  | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 0.88  |                      |      |
| Actuated Cycle Length (s)         | 186.8 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 93.5% | ICU Level of Service | F    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC.ALL  
 9/26/2005

| Movement               | SEL   | SET  | SER  | NWL  | NWT  | NWR  | NEL  | NET   | NER  | SWL  | SWT   | SWR  |
|------------------------|-------|------|------|------|------|------|------|-------|------|------|-------|------|
| Lane Configurations    |       |      |      |      |      |      |      |       |      |      |       |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  | 4.0  | 4.0  | 4.0  | 4.0  | 4.0  | 4.0   |      | 4.0  | 4.0   |      |
| Lane Util. Factor      | 0.97  | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.91  |      | 0.97 | 0.91  |      |
| Frt                    | 1.00  | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.99  |      | 1.00 | 0.97  |      |
| Flt Protected          | 0.95  | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95 | 1.00  |      |
| Satd. Flow (prot)      | 3433  | 3539 | 1583 | 3433 | 3539 | 1583 | 3433 | 5051  |      | 3433 | 4948  |      |
| Flt Permitted          | 0.95  | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95 | 1.00  |      |
| Satd. Flow (perm)      | 3433  | 3539 | 1583 | 3433 | 3539 | 1583 | 3433 | 5051  |      | 3433 | 4948  |      |
| Volume (vph)           | 530   | 380  | 100  | 50   | 370  | 350  | 150  | 1690  | 80   | 170  | 1000  | 220  |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 |
| Adj. Flow (vph)        | 530   | 380  | 100  | 50   | 370  | 350  | 150  | 1690  | 80   | 170  | 1000  | 220  |
| RTOR Reduction (vph)   | 0     | 0    | 65   | 0    | 0    | 112  | 0    | 4     | 0    | 0    | 30    | 0    |
| Lane Group Flow (vph)  | 530   | 380  | 35   | 50   | 370  | 238  | 150  | 1766  | 0    | 170  | 1190  | 0    |
| Turn Type              | Prot  |      | Perm | Prot |      | Perm | Prot |       |      | Prot |       |      |
| Protected Phases       | 5     | 2    |      | 1    | 6    |      | 3    | 8     |      | 7    | 4     |      |
| Permitted Phases       |       |      | 2    |      |      | 6    |      |       |      |      |       |      |
| Actuated Green, G (s)  | 19.9  | 37.4 | 37.4 | 3.8  | 21.3 | 21.3 | 12.2 | 42.3  |      | 7.9  | 38.0  |      |
| Effective Green, g (s) | 19.9  | 38.9 | 38.9 | 3.8  | 22.8 | 22.8 | 12.2 | 43.8  |      | 7.9  | 39.5  |      |
| Actuated g/C Ratio     | 0.18  | 0.35 | 0.35 | 0.03 | 0.21 | 0.21 | 0.11 | 0.40  |      | 0.07 | 0.36  |      |
| Clearance Time (s)     | 4.0   | 5.5  | 5.5  | 4.0  | 5.5  | 5.5  | 4.0  | 5.5   |      | 4.0  | 5.5   |      |
| Vehicle Extension (s)  | 3.0   | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0   |      | 3.0  | 5.0   |      |
| Lane Grp Cap (vph)     | 619   | 1247 | 558  | 118  | 731  | 327  | 379  | 2004  |      | 246  | 1770  |      |
| v/s Ratio Prot         | c0.15 | 0.11 |      | 0.01 | 0.10 |      | 0.04 | c0.35 |      | 0.05 | c0.25 |      |
| v/s Ratio Perm         |       |      | 0.06 |      |      | 0.22 |      |       |      |      |       |      |
| v/c Ratio              | 0.86  | 0.30 | 0.06 | 0.42 | 0.51 | 0.73 | 0.40 | 0.88  |      | 0.69 | 0.67  |      |
| Uniform Delay, d1      | 43.9  | 25.9 | 23.7 | 52.2 | 38.8 | 40.9 | 45.7 | 30.9  |      | 50.1 | 30.0  |      |
| Progression Factor     | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.00 | 1.00  |      |
| Incremental Delay, d2  | 11.2  | 0.1  | 0.0  | 2.4  | 0.6  | 7.9  | 0.7  | 4.9   |      | 8.1  | 1.3   |      |
| Delay (s)              | 55.1  | 26.1 | 23.7 | 54.7 | 39.4 | 48.8 | 46.4 | 35.8  |      | 58.2 | 31.3  |      |
| Level of Service       | E     | C    | C    | D    | D    | D    | D    | D     |      | E    | C     |      |
| Approach Delay (s)     |       | 41.1 |      |      | 44.6 |      |      | 36.6  |      |      | 34.6  |      |
| Approach LOS           |       | D    |      |      | D    |      |      | D     |      |      | C     |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 38.2  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.92  |                      |      |
| Actuated Cycle Length (s)         | 110.4 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 81.2% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC.ALL  
9/26/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 530   | 380   | 100   | 50  | 370   | 350   | 150  | 1690  | 80  | 170   | 1000  | 220   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 530   | 380   | 100   | 50  | 370   | 350   | 150  | 1770  | 0   | 170   | 1220  | 0   |
| v/c Ratio               | 0.85  | 0.30  | 0.16  | 0.32  | 0.53  | 0.82  | 0.39   | 0.88  |   | 0.69  | 0.67  |   |
| Control Delay           | 53.3  | 26.9  | 5.5   | 60.7  | 41.4  | 34.2  | 53.1   | 35.8  |   | 66.0  | 30.2  |   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Total Delay             | 53.3  | 26.9  | 5.5   | 60.7  | 41.4  | 34.2  | 53.1   | 35.8  |   | 66.0  | 30.2  |   |
| Queue Length 50th (ft)  | 198   | 107   | 0   | 19  | 130   | 153   | 56   | 444   |   | 65  | 266   |   |
| Queue Length 95th (ft)  | #289  | 147   | 36  | 41  | 178   | 269   | 94   | 537   |   | #119  | 322   |   |
| Internal Link Dist (ft) |   | 151   |   |   | 599   |   |  | 856   |   |   | 499   |   |
| Turn Bay Length (ft)    | 250   |   | 200   | 200   |   |   | 260  |   |   | 500   |   |   |
| Base Capacity (vph)     | 684   | 1380  | 678   | 156   | 856   | 490   | 382  | 2102  |   | 255   | 1982  |   |
| 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       | 0.77  | 0.28  | 0.15  | 0.32  | 0.43  | 0.71  | 0.39   | 0.84  |   | 0.67  | 0.62  |   |

**Intersection Summary**

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

Timings  
1: THREE CHOPT RD & GASKINS RD

2013 AM BUILD REC.ALL  
9/26/2005



| Lane Group          | SEL   | SET   | SER   | NWL  | NWT   | NWR   | NEL   | NET   | SWL   | SWT   |
|---------------------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|
| Lane Configurations | ↖↗    | ↕     | ↖     | ↖↗   | ↕     | ↖     | ↖↗    | ↕↖↗   | ↖↗    | ↕↖↗   |
| Volume (vph)        | 530   | 380   | 100   | 50   | 370   | 350   | 150   | 1690  | 170   | 1000  |
| Turn Type           | Prot  |       | Perm  | Prot |       | Perm  | Prot  |       | Prot  |       |
| Protected Phases    | 5     | 2     |       | 1    | 6     |       | 3     | 8     | 7     | 4     |
| Permitted Phases    |       |       | 2     |      |       | 6     |       |       |       |       |
| Detector Phases     | 5     | 2     | 2     | 1    | 6     | 6     | 3     | 8     | 7     | 4     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0  | 3.0   | 3.0   | 3.0   | 15.0  | 3.0   | 15.0  |
| Minimum Split (s)   | 7.0   | 8.5   | 8.5   | 7.0  | 8.5   | 8.5   | 7.0   | 20.5  | 7.0   | 20.5  |
| Total Split (s)     | 26.0  | 48.7  | 48.7  | 9.0  | 31.7  | 31.7  | 13.0  | 50.3  | 12.0  | 49.3  |
| Total Split (%)     | 21.7% | 40.6% | 40.6% | 7.5% | 26.4% | 26.4% | 10.8% | 41.9% | 10.0% | 41.1% |
| Yellow Time (s)     | 3.0   | 4.0   | 4.0   | 3.0  | 4.0   | 4.0   | 3.0   | 4.0   | 3.0   | 4.0   |
| All-Red Time (s)    | 1.0   | 1.5   | 1.5   | 1.0  | 1.5   | 1.5   | 1.0   | 1.5   | 1.0   | 1.5   |
| Lead/Lag            | Lead  | Lag   | Lag   | Lead | Lag   | Lag   | Lag   | Lag   | Lead  | Lead  |
| Lead-Lag Optimize?  | Yes   | Yes   | Yes   | Yes  | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Recall Mode         | None  | None  | None  | None | Min   | Min   | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 109.8  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |        |        |        |
|------|--------|--------|--------|
| ↖ ↗  | ↕      | ↖ ↗    | ↕      |
| 9 s  | 48.7 s | 49.3 s | 13 s   |
| ↖    | ↖ ↗    | ↖ ↗    | ↖ ↗    |
| 26 s | 31.7 s | 12 s   | 50.3 s |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2013 PM BUILD REC.ALL  
 9/26/2005

| Movement               | SEL  | SET  | SER  | NWL  | NWT   | NWR  | NEL  | NET  | NER  | SWL   | SWT   | SWR  |
|------------------------|------|------|------|------|-------|------|------|------|------|-------|-------|------|
| Lane Configurations    | ↔↔   | ↑↑   | ↗    | ↔↔   | ↑↑    | ↗    | ↔↔   | ↑↑↔  |      | ↔↔    | ↑↑↔   |      |
| Ideal Flow (vphpl)     | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0  | 4.0  | 4.0  | 4.0  | 4.0   | 4.0  | 4.0  | 4.0  |      | 4.0   | 4.0   |      |
| Lane Util. Factor      | 0.97 | 0.95 | 1.00 | 0.97 | 0.95  | 1.00 | 0.97 | 0.91 |      | 0.97  | 0.91  |      |
| Fr <sub>t</sub>        | 1.00 | 1.00 | 0.85 | 1.00 | 1.00  | 0.85 | 1.00 | 0.98 |      | 1.00  | 0.97  |      |
| Flt Protected          | 0.95 | 1.00 | 1.00 | 0.95 | 1.00  | 1.00 | 0.95 | 1.00 |      | 0.95  | 1.00  |      |
| Satd. Flow (prot)      | 3433 | 3539 | 1583 | 3433 | 3539  | 1583 | 3433 | 5003 |      | 3433  | 4952  |      |
| Flt Permitted          | 0.95 | 1.00 | 1.00 | 0.95 | 1.00  | 1.00 | 0.95 | 1.00 |      | 0.95  | 1.00  |      |
| Satd. Flow (perm)      | 3433 | 3539 | 1583 | 3433 | 3539  | 1583 | 3433 | 5003 |      | 3433  | 4952  |      |
| Volume (vph)           | 190  | 390  | 190  | 120  | 450   | 160  | 160  | 1150 | 140  | 200   | 1800  | 380  |
| Peak-hour factor, PHF  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 190  | 390  | 190  | 120  | 450   | 160  | 160  | 1150 | 140  | 200   | 1800  | 380  |
| RTOR Reduction (vph)   | 0    | 0    | 121  | 0    | 0     | 131  | 0    | 12   | 0    | 0     | 26    | 0    |
| Lane Group Flow (vph)  | 190  | 390  | 69   | 120  | 450   | 29   | 160  | 1278 | 0    | 200   | 2154  | 0    |
| Turn Type              | Prot |      | Perm | Prot |       | Perm | Prot |      |      | Prot  |       |      |
| Protected Phases       | 5    | 2    |      | 1    | 6     |      | 3    | 8    |      | 7     | 4     |      |
| Permitted Phases       |      |      | 2    |      |       | 6    |      |      |      |       |       |      |
| Actuated Green, G (s)  | 9.6  | 21.4 | 21.4 | 7.7  | 19.5  | 19.5 | 8.7  | 57.3 |      | 11.0  | 59.6  |      |
| Effective Green, g (s) | 9.6  | 22.9 | 22.9 | 7.7  | 21.0  | 21.0 | 8.7  | 58.8 |      | 11.0  | 61.1  |      |
| Actuated g/C Ratio     | 0.08 | 0.20 | 0.20 | 0.07 | 0.18  | 0.18 | 0.07 | 0.51 |      | 0.09  | 0.52  |      |
| Clearance Time (s)     | 4.0  | 5.5  | 5.5  | 4.0  | 5.5   | 5.5  | 4.0  | 5.5  |      | 4.0   | 5.5   |      |
| Vehicle Extension (s)  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0   | 3.0  | 3.0  | 3.0  |      | 3.0   | 5.0   |      |
| Lane Grp Cap (vph)     | 283  | 696  | 311  | 227  | 638   | 286  | 257  | 2527 |      | 324   | 2599  |      |
| v/s Ratio Prot         | 0.06 | 0.11 |      | 0.03 | c0.13 |      | 0.05 | 0.26 |      | c0.06 | c0.44 |      |
| v/s Ratio Perm         |      |      | 0.12 |      |       | 0.10 |      |      |      |       |       |      |
| v/c Ratio              | 0.67 | 0.56 | 0.22 | 0.53 | 0.71  | 0.10 | 0.62 | 0.51 |      | 0.62  | 0.83  |      |
| Uniform Delay, d1      | 51.9 | 42.2 | 39.3 | 52.6 | 44.8  | 39.8 | 52.3 | 19.1 |      | 50.7  | 23.3  |      |
| Progression Factor     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |      | 1.00  | 1.00  |      |
| Incremental Delay, d2  | 6.1  | 1.0  | 0.4  | 2.2  | 3.6   | 0.2  | 4.6  | 0.2  |      | 3.5   | 2.6   |      |
| Delay (s)              | 58.0 | 43.2 | 39.6 | 54.8 | 48.3  | 40.0 | 56.9 | 19.3 |      | 54.2  | 25.9  |      |
| Level of Service       | E    | D    | D    | D    | D     | D    | E    | B    |      | D     | C     |      |
| Approach Delay (s)     |      | 46.0 |      |      | 47.6  |      |      | 23.5 |      |       | 28.2  |      |
| Approach LOS           |      | D    |      |      | D     |      |      | C    |      |       | C     |      |

Intersection Summary

|                                   |       |                      |     |
|-----------------------------------|-------|----------------------|-----|
| HCM Average Control Delay         | 32.1  | HCM Level of Service | C   |
| HCM Volume to Capacity ratio      | 0.74  |                      |     |
| Actuated Cycle Length (s)         | 116.4 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 79.0% | ICU Level of Service | D   |
| Analysis Period (min)             | 15    |                      |     |
| c Critical Lane Group             |       |                      |     |



| Lane Group              | SEL  | SET  | SER  | NWL  | NWT  | NWR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Volume (vph)            | 190  | 390  | 190  | 120  | 450  | 160  | 160  | 1150 | 140  | 200  | 1800 | 380  |
| Peak Hour Factor        | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lane Group Flow (vph)   | 190  | 390  | 190  | 120  | 450  | 160  | 160  | 1290 | 0    | 200  | 2180 | 0    |
| v/c Ratio               | 0.67 | 0.56 | 0.44 | 0.53 | 0.70 | 0.38 | 0.62 | 0.51 |      | 0.62 | 0.83 |      |
| Control Delay           | 63.3 | 44.6 | 13.4 | 61.4 | 49.2 | 8.6  | 63.1 | 20.2 |      | 58.0 | 26.8 |      |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |      | 0.0  | 0.0  |      |
| Total Delay             | 63.3 | 44.6 | 13.4 | 61.4 | 49.2 | 8.6  | 63.1 | 20.2 |      | 58.0 | 26.8 |      |
| Queue Length 50th (ft)  | 73   | 141  | 24   | 46   | 169  | 0    | 62   | 235  |      | 76   | 496  |      |
| Queue Length 95th (ft)  | 114  | 192  | 91   | 79   | 226  | 58   | 100  | 286  |      | 117  | 583  |      |
| Internal Link Dist (ft) |      | 151  |      |      | 599  |      |      | 856  |      |      | 499  |      |
| Turn Bay Length (ft)    | 250  |      | 200  | 200  |      |      | 260  |      |      | 500  |      |      |
| Base Capacity (vph)     | 294  | 771  | 463  | 236  | 712  | 447  | 265  | 2540 |      | 351  | 2625 |      |
| 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       | 0.65 | 0.51 | 0.41 | 0.51 | 0.63 | 0.36 | 0.60 | 0.51 |      | 0.57 | 0.83 |      |

## Intersection Summary

Timings  
1: THREE CHOPT RD & GASKINS RD

2013 PM BUILD REC.ALL  
9/26/2005



| Lane Group          | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | SWL   | SWT   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations | ↔↔    | ↑↑    | ↗     | ↔↔    | ↑↑    | ↗     | ↔↔    | ↑↑↔   | ↔↔    | ↑↑↔   |
| Volume (vph)        | 190   | 390   | 190   | 120   | 450   | 160   | 160   | 1150  | 200   | 1800  |
| Turn Type           | Prot  |       | Perm  | Prot  |       | Perm  | Prot  |       | Prot  |       |
| Protected Phases    | 5     | 2     |       | 1     | 6     |       | 3     | 8     | 7     | 4     |
| Permitted Phases    |       |       | 2     |       |       | 6     |       |       |       |       |
| Detector Phases     | 5     | 2     | 2     | 1     | 6     | 6     | 3     | 8     | 7     | 4     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 15.0  | 3.0   | 15.0  |
| Minimum Split (s)   | 7.0   | 8.5   | 8.5   | 7.0   | 8.5   | 8.5   | 7.0   | 20.5  | 7.0   | 20.5  |
| Total Split (s)     | 14.0  | 30.0  | 30.0  | 12.0  | 28.0  | 28.0  | 13.0  | 62.0  | 16.0  | 65.0  |
| Total Split (%)     | 11.7% | 25.0% | 25.0% | 10.0% | 23.3% | 23.3% | 10.8% | 51.7% | 13.3% | 54.2% |
| Yellow Time (s)     | 3.0   | 4.0   | 4.0   | 3.0   | 4.0   | 4.0   | 3.0   | 4.0   | 3.0   | 4.0   |
| All-Red Time (s)    | 1.0   | 1.5   | 1.5   | 1.0   | 1.5   | 1.5   | 1.0   | 1.5   | 1.0   | 1.5   |
| Lead/Lag            | Lag   | Lag   | Lag   | Lead  | Lead  | Lead  | Lead  | Lag   | Lead  | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | None  | None  | None  | Min   | Min   | None  | None  | None  | None  |

**Intersection Summary**

Cycle Length: 120  
 Actuated Cycle Length: 116.4  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |      |      |      |
|------|------|------|------|
| 01   | 02   | 03   | 04   |
| 12 s | 30 s | 13 s | 65 s |
| 06   | 05   | 07   | 08   |
| 28 s | 14 s | 16 s | 62 s |

**Appendix E**

**Year 2034 Analysis HCM Capacity Printouts – Year 2034 Analysis  
and Richmond Regional 2026 LRTP Financially Constrained Project List**

HCM Signalized Intersection Capacity Analysis  
 2: THREE CHOPT RD & COX RD

2034 AM NO-BUILD  
 7/14/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|-------|------|------|-------|------|------|-------|------|-------|------|------|
| Lane Configurations    | ↖     | ↖↗    |      | ↖    | ↖↗    |      | ↖    | ↖↗    |      | ↖     | ↖↗   |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0  | 4.0   |      | 4.0  | 4.0   |      | 4.0   | 4.0  |      |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00 | 0.95  |      | 1.00 | 0.95  |      | 1.00  | 0.95 |      |
| Fr't                   | 1.00  | 0.99  |      | 1.00 | 0.90  |      | 1.00 | 0.96  |      | 1.00  | 0.96 |      |
| Flt Protected          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (prot)      | 1770  | 3512  |      | 1770 | 3188  |      | 1770 | 3389  |      | 1770  | 3388 |      |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (perm)      | 1770  | 3512  |      | 1770 | 3188  |      | 1770 | 3389  |      | 1770  | 3388 |      |
| Volume (vph)           | 660   | 740   | 40   | 200  | 220   | 430  | 30   | 1040  | 410  | 160   | 200  | 80   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 660   | 740   | 40   | 200  | 220   | 430  | 30   | 1040  | 410  | 160   | 200  | 80   |
| RTOR Reduction (vph)   | 0     | 2     | 0    | 0    | 223   | 0    | 0    | 23    | 0    | 0     | 0    | 0    |
| Lane Group Flow (vph)  | 660   | 778   | 0    | 200  | 427   | 0    | 30   | 1427  | 0    | 160   | 280  | 0    |
| Turn Type              | Prot  |       |      | Prot |       |      | Prot |       |      | Prot  |      |      |
| Protected Phases       | 1     | 6     |      | 5    | 2     |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |       |      |      |       |      |      |       |      |       |      |      |
| Actuated Green, G (s)  | 25.4  | 35.6  |      | 18.8 | 29.0  |      | 5.0  | 37.5  |      | 16.8  | 49.3 |      |
| Effective Green, g (s) | 26.9  | 37.6  |      | 20.3 | 31.0  |      | 6.5  | 39.5  |      | 18.3  | 51.3 |      |
| Actuated g/C Ratio     | 0.20  | 0.29  |      | 0.15 | 0.24  |      | 0.05 | 0.30  |      | 0.14  | 0.39 |      |
| Clearance Time (s)     | 5.5   | 6.0   |      | 5.5  | 6.0   |      | 5.5  | 6.0   |      | 5.5   | 6.0  |      |
| Vehicle Extension (s)  | 3.0   | 4.5   |      | 3.0  | 4.5   |      | 3.0  | 3.0   |      | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)     | 362   | 1003  |      | 273  | 750   |      | 87   | 1016  |      | 246   | 1320 |      |
| v/s Ratio Prot         | c0.37 | 0.22  |      | 0.11 | c0.20 |      | 0.02 | c0.43 |      | c0.09 | 0.08 |      |
| v/s Ratio Perm         |       |       |      |      |       |      |      |       |      |       |      |      |
| v/c Ratio              | 1.82  | 0.78  |      | 0.73 | 0.57  |      | 0.34 | 1.40  |      | 0.65  | 0.21 |      |
| Uniform Delay, d1      | 52.4  | 43.2  |      | 53.1 | 44.5  |      | 60.5 | 46.1  |      | 53.7  | 26.8 |      |
| Progression Factor     | 1.00  | 1.00  |      | 1.00 | 1.00  |      | 1.00 | 1.00  |      | 1.00  | 1.00 |      |
| Incremental Delay, d2  | 381.1 | 4.3   |      | 9.7  | 1.4   |      | 2.4  | 187.9 |      | 6.0   | 0.1  |      |
| Delay (s)              | 433.5 | 47.4  |      | 62.8 | 45.9  |      | 62.9 | 234.0 |      | 59.7  | 26.8 |      |
| Level of Service       | F     | D     |      | E    | D     |      | E    | F     |      | E     | C    |      |
| Approach Delay (s)     |       | 224.4 |      |      | 49.9  |      |      | 230.6 |      |       | 38.8 |      |
| Approach LOS           |       | F     |      |      | D     |      |      | F     |      |       | D    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 171.9  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.25   |                      |      |
| Actuated Cycle Length (s)         | 131.7  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 120.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

2034 AM NO-BUILD  
7/14/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 660   | 740   | 40  | 200   | 220   | 430   | 30   | 1040  | 410   | 160   | 200   | 80  |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 660   | 780   | 0   | 200   | 650   | 0   | 30   | 1450  | 0   | 160   | 280   | 0   |
| v/c Ratio               | 1.79  | 0.76  |   | 0.72  | 0.66  |   | 0.25   | 1.46  |   | 0.64  | 0.21  |   |
| Control Delay           | 398.7   | 46.8  |   | 60.3  | 25.3  |   | 62.8   | 245.9   |   | 55.9  | 29.5  |   |
| Queue Delay             | 151.0   | 0.0   |   | 1.4   | 0.0   |   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Total Delay             | 549.7   | 46.8  |   | 61.7  | 25.3  |   | 62.8   | 245.9   |   | 55.9  | 29.5  |   |
| Queue Length 50th (ft)  | ~871  | 317   |   | 165   | 143   |   | 25   | ~917  |   | 133   | 90  |   |
| Queue Length 95th (ft)  | #1243   | 443   |   | 270   | 222   |   | 63   | #1205   |   | 219   | 139   |   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |  | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   |   | 200  |   |   | 200   |   |   |
| Base Capacity (vph)     | 368   | 1110  |   | 349   | 1164  |   | 311  | 994   |   | 489   | 1379  |   |
| Starvation Cap Reductn  | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Spillback Cap Reductn   | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Storage Cap Reductn     | 58  | 0   |   | 47  | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Reduced v/c Ratio       | 2.13  | 0.70  |   | 0.66  | 0.56  |   | 0.10   | 1.46  |   | 0.33  | 0.20  |   |

**Intersection Summary**

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

Timings  
2: THREE CHOPT RD & COX RD

2034 AM NO-BUILD  
7/14/2005



| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | SWL   | SWT   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |
| Volume (vph)        | 660   | 740   | 200   | 220   | 30    | 1040  | 160   | 200   |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Prot  |       |
| Protected Phases    | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Permitted Phases    |       |       |       |       |       |       |       |       |
| Detector Phases     | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Minimum Initial (s) | 3.0   | 12.0  | 3.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 9.5   | 20.0  | 9.5   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 30.5  | 46.0  | 30.5  | 46.0  | 30.5  | 40.5  | 46.0  | 56.0  |
| Total Split (%)     | 18.7% | 28.2% | 18.7% | 28.2% | 18.7% | 24.8% | 28.2% | 34.4% |
| Yellow Time (s)     | 3.5   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | Min   | None  | Min   | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 163  
 Actuated Cycle Length: 129.5  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|        |      |        |        |
|--------|------|--------|--------|
| ø1     | ø2   | ø3     | ø4     |
| 30.5 s | 46 s | 30.5 s | 56 s   |
| ø5     | ø6   | ø7     | ø8     |
| 30.5 s | 46 s | 46 s   | 40.5 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2034 PM NO-BUILD  
7/14/2005

| Movement                          | SEL  | SET   | SER  | NWL   | NWT   | NWR  | NEL  | NET   | NER  | SWL   | SWT   | SWR  |
|-----------------------------------|------|-------|------|-------|-------|------|------|-------|------|-------|-------|------|
| Lane Configurations               | ↖    | ↕↔    |      | ↖     | ↕↔    |      | ↖    | ↕↔    |      | ↖     | ↕↔    |      |
| Ideal Flow (vphpl)                | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)               | 4.0  | 4.0   |      | 4.0   | 4.0   |      | 4.0  | 4.0   |      | 4.0   | 4.0   |      |
| Lane Util. Factor                 | 1.00 | 0.95  |      | 1.00  | 0.95  |      | 1.00 | 0.95  |      | 1.00  | 0.95  |      |
| Fr <sub>t</sub>                   | 1.00 | 0.98  |      | 1.00  | 0.96  |      | 1.00 | 0.94  |      | 1.00  | 0.96  |      |
| Fl <sub>t</sub> Protected         | 0.95 | 1.00  |      | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  |      |
| Satd. Flow (prot)                 | 1770 | 3462  |      | 1770  | 3401  |      | 1770 | 3335  |      | 1770  | 3397  |      |
| Fl <sub>t</sub> Permitted         | 0.95 | 1.00  |      | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  |      |
| Satd. Flow (perm)                 | 1770 | 3462  |      | 1770  | 3401  |      | 1770 | 3335  |      | 1770  | 3397  |      |
| Volume (vph)                      | 240  | 650   | 110  | 520   | 770   | 270  | 70   | 320   | 200  | 590   | 1070  | 390  |
| Peak-hour factor, PHF             | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)                   | 240  | 650   | 110  | 520   | 770   | 270  | 70   | 320   | 200  | 590   | 1070  | 390  |
| RTOR Reduction (vph)              | 0    | 8     | 0    | 0     | 21    | 0    | 0    | 64    | 0    | 0     | 0     | 0    |
| Lane Group Flow (vph)             | 240  | 752   | 0    | 520   | 1019  | 0    | 70   | 456   | 0    | 590   | 1460  | 0    |
| Turn Type                         | Prot |       |      | Prot  |       |      | Prot |       |      | Prot  |       |      |
| Protected Phases                  | 1    | 6     |      | 5     | 2     |      | 3    | 8     |      | 7     | 4     |      |
| Permitted Phases                  |      |       |      |       |       |      |      |       |      |       |       |      |
| Actuated Green, G (s)             | 22.7 | 37.0  |      | 25.8  | 40.1  |      | 10.4 | 26.7  |      | 35.6  | 51.9  |      |
| Effective Green, g (s)            | 24.2 | 39.0  |      | 27.3  | 42.1  |      | 11.9 | 28.7  |      | 37.1  | 53.9  |      |
| Actuated g/C Ratio                | 0.16 | 0.26  |      | 0.18  | 0.28  |      | 0.08 | 0.19  |      | 0.25  | 0.36  |      |
| Clearance Time (s)                | 5.5  | 6.0   |      | 5.5   | 6.0   |      | 5.5  | 6.0   |      | 5.5   | 6.0   |      |
| Vehicle Extension (s)             | 3.0  | 4.5   |      | 3.0   | 4.5   |      | 3.0  | 3.0   |      | 3.0   | 3.0   |      |
| Lane Grp Cap (vph)                | 289  | 912   |      | 326   | 967   |      | 142  | 646   |      | 443   | 1236  |      |
| v/s Ratio Prot                    | 0.14 | c0.22 |      | c0.29 | c0.31 |      | 0.04 | c0.16 |      | c0.33 | c0.43 |      |
| v/s Ratio Perm                    |      |       |      |       |       |      |      |       |      |       |       |      |
| v/c Ratio                         | 0.83 | 0.82  |      | 1.60  | 1.05  |      | 0.49 | 0.71  |      | 1.33  | 1.18  |      |
| Uniform Delay, d <sub>1</sub>     | 60.0 | 51.3  |      | 60.4  | 53.0  |      | 65.2 | 55.7  |      | 55.5  | 47.1  |      |
| Progression Factor                | 1.00 | 1.00  |      | 1.00  | 1.00  |      | 1.00 | 1.00  |      | 1.00  | 1.00  |      |
| Incremental Delay, d <sub>2</sub> | 18.0 | 6.7   |      | 281.9 | 44.3  |      | 2.7  | 3.5   |      | 164.2 | 90.1  |      |
| Delay (s)                         | 77.9 | 58.0  |      | 342.3 | 97.3  |      | 67.9 | 59.3  |      | 219.7 | 137.2 |      |
| Level of Service                  | E    | E     |      | F     | F     |      | E    | E     |      | F     | F     |      |
| Approach Delay (s)                |      | 62.8  |      |       | 178.9 |      |      | 60.3  |      |       | 161.0 |      |
| Approach LOS                      |      | E     |      |       | F     |      |      | E     |      |       | F     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 136.1  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.19   |                      |      |
| Actuated Cycle Length (s)         | 148.1  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 111.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

2034 PM NO-BUILD  
7/14/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 240   | 650   | 110   | 520   | 770   | 270   | 70   | 320   | 200   | 590   | 1070  | 390   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 240   | 760   | 0   | 520   | 1040  | 0   | 70   | 520   | 0   | 590   | 1460  | 0   |
| v/c Ratio               | 0.82  | 0.82  |   | 1.58  | 1.04  |   | 0.44   | 0.76  |   | 1.32  | 1.17  |   |
| Control Delay           | 76.0  | 56.6  |   | 312.7   | 89.6  |   | 66.2   | 50.1  |   | 201.1   | 126.9   |   |
| Queue Delay             | 4.6   | 1.0   |   | 0.0   | 208.8   |   | 0.0  | 0.0   |   | 37.7  | 65.2  |   |
| Total Delay             | 80.6  | 57.6  |   | 312.7   | 298.3   |   | 66.2   | 50.1  |   | 238.8   | 192.1   |   |
| Queue Length 50th (ft)  | 225   | 354   |   | ~732  | ~574  |   | 66   | 217   |   | ~748  | ~921  |   |
| Queue Length 95th (ft)  | #377  | 464   |   | #1022   | #776  |   | 119  | 283   |   | #1054   | #1147   |   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |  | 963   |   |   |   | 575   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   |   | 200  |   |   | 200   |   |   |
| Base Capacity (vph)     | 315   | 979   |   | 329   | 996   |   | 289  | 920   |   | 447   | 1247  |   |
| Starvation Cap Reductn  | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Spillback Cap Reductn   | 0   | 0   |   | 0   | 0   |   | 0  | 0   |   | 0   | 0   |   |
| Storage Cap Reductn     | 34  | 69  |   | 0   | 313   |   | 0  | 0   |   | 27  | 139   |   |
| Reduced v/c Ratio       | 0.85  | 0.84  |   | 1.58  | 1.52  |   | 0.24   | 0.57  |   | 1.40  | 1.32  |   |

**Intersection Summary**

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

Timings  
2: THREE CHOPT RD & COX RD

2034 PM NO-BUILD  
7/14/2005



| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | SWL   | SWT   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations | ↵     | ↵↻    | ↵     | ↻↻    | ↵     | ↻↻    | ↵     | ↻↻    |
| Volume (vph)        | 240   | 650   | 520   | 770   | 70    | 320   | 590   | 1070  |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Prot  |       |
| Protected Phases    | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Permitted Phases    |       |       |       |       |       |       |       |       |
| Detector Phases     | 1     | 6     | 5     | 2     | 3     | 8     | 7     | 4     |
| Minimum Initial (s) | 3.0   | 12.0  | 3.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 9.5   | 20.0  | 9.5   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 30.5  | 46.0  | 30.5  | 46.0  | 30.5  | 45.5  | 41.0  | 56.0  |
| Total Split (%)     | 18.7% | 28.2% | 18.7% | 28.2% | 18.7% | 27.9% | 25.2% | 34.4% |
| Yellow Time (s)     | 3.5   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lead  | Lead  | Lag   | Lag   | Lag   | Lag   | Lead  | Lead  |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | Min   | None  | Min   | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 163  
 Actuated Cycle Length: 147  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|        |        |      |        |
|--------|--------|------|--------|
| ↵ ø1   | ↵ ø2   | ↵ ø4 | ↵ ø3   |
| 30.5 s | 46 s   | 56 s | 30.5 s |
| ↵ ø6   | ↵ ø5   | ↵ ø7 | ↵ ø8   |
| 46 s   | 30.5 s | 41 s | 45.5 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2034 AM BUILD REC#1  
9/27/2005

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement               | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Lane Configurations    |  |  |   |  |  |  |  |  |   |  |  |   |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   | 4.0  | 4.0   |   | 4.0   | 4.0   |   |
| Lane Util. Factor      | 1.00  | 0.95  |   | 1.00  | 0.95  | 1.00  | 1.00   | 0.95  |   | 1.00  | 0.95  |   |
| Frt                    | 1.00  | 0.99  |   | 1.00  | 1.00  | 0.85  | 1.00   | 0.96  |   | 1.00  | 0.96  |   |
| Flt Protected          | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  | 0.95   | 1.00  |   | 0.95  | 1.00  |   |
| Satd. Flow (prot)      | 1770  | 3512  |   | 1770  | 3539  | 1583  | 1770   | 3389  |   | 1770  | 3388  |   |
| Flt Permitted          | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  | 0.95   | 1.00  |   | 0.95  | 1.00  |   |
| Satd. Flow (perm)      | 1770  | 3512  |   | 1770  | 3539  | 1583  | 1770   | 3389  |   | 1770  | 3388  |   |
| Volume (vph)           | 660   | 740   | 40  | 200   | 220   | 430   | 30   | 1040  | 410   | 160   | 200   | 80  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 660   | 740   | 40  | 200   | 220   | 430   | 30   | 1040  | 410   | 160   | 200   | 80  |
| RTOR Reduction (vph)   | 0   | 2   | 0   | 0   | 0   | 147   | 0  | 26  | 0   | 0   | 0   | 0   |
| Lane Group Flow (vph)  | 660   | 778   | 0   | 200   | 220   | 283   | 30   | 1424  | 0   | 160   | 280   | 0   |
| Turn Type              | Prot  |   |   | Prot  |   | Perm  | Prot   |   |   | Prot  |   |   |
| Protected Phases       | 1   | 6   |   | 5   | 2   |   | 3  | 8   |   | 7   | 4   |   |
| Permitted Phases       |   |   |   |   |   | 2   |  |   |   |   |   |   |
| Actuated Green, G (s)  | 48.5  | 51.1  |   | 20.4  | 23.0  | 23.0  | 5.7  | 54.0  |   | 16.7  | 65.0  |   |
| Effective Green, g (s) | 50.0  | 53.1  |   | 21.9  | 25.0  | 25.0  | 7.2  | 56.0  |   | 18.2  | 67.0  |   |
| Actuated g/C Ratio     | 0.30  | 0.32  |   | 0.13  | 0.15  | 0.15  | 0.04   | 0.34  |   | 0.11  | 0.41  |   |
| Clearance Time (s)     | 5.5   | 6.0   |   | 5.5   | 6.0   | 6.0   | 5.5  | 6.0   |   | 5.5   | 6.0   |   |
| Vehicle Extension (s)  | 3.0   | 4.5   |   | 3.0   | 4.5   | 4.5   | 3.0  | 3.0   |   | 3.0   | 3.0   |   |
| Lane Grp Cap (vph)     | 536   | 1129  |   | 235   | 536   | 240   | 77   | 1149  |   | 195   | 1374  |   |
| v/s Ratio Prot         | c0.37   | c0.22   |   | 0.11  | 0.06  |   | 0.02   | c0.43   |   | c0.09   | 0.08  |   |
| v/s Ratio Perm         |   |   |   |   |   | 0.27  |  |   |   |   |   |   |
| v/c Ratio              | 1.23  | 0.69  |   | 0.85  | 0.41  | 1.18  | 0.39   | 1.24  |   | 0.82  | 0.20  |   |
| Uniform Delay, d1      | 57.6  | 48.9  |   | 70.1  | 63.4  | 70.1  | 76.9   | 54.6  |   | 71.9  | 31.8  |   |
| Progression Factor     | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  |   | 1.00  | 1.00  |   |
| Incremental Delay, d2  | 119.7   | 2.1   |   | 24.4  | 0.9   | 115.5   | 3.2  | 115.4   |   | 23.3  | 0.1   |   |
| Delay (s)              | 177.3   | 50.9  |   | 94.4  | 64.3  | 185.6   | 80.1   | 170.0   |   | 95.2  | 31.9  |   |
| Level of Service       | F   | D   |   | F   | E   | F   | F  | F   |   | F   | C   |   |
| Approach Delay (s)     |   | 108.8   |   |   | 132.7   |   |  | 168.1   |   |   | 54.9  |   |
| Approach LOS           |   | F   |   |   | F   |   |  | F   |   |   | D   |   |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 128.9  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.31   |                      |      |
| Actuated Cycle Length (s)         | 165.2  | Sum of lost time (s) | 20.0 |
| Intersection Capacity Utilization | 115.0% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 2: THREE CHOPT RD & COX RD

2034 PM BUILD REC#1  
 9/27/2005

| Movement               | SEL  | SET   | SER  | NWL   | NWT  | NWR  | NEL  | NET   | NER  | SWL   | SWT   | SWR  |
|------------------------|------|-------|------|-------|------|------|------|-------|------|-------|-------|------|
| Lane Configurations    |      |       |      |       |      |      |      |       |      |       |       |      |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  | 4.0  | 4.0   |      | 4.0   | 4.0   |      |
| Lane Util. Factor      | 1.00 | 0.95  |      | 1.00  | 0.95 | 1.00 | 1.00 | 0.95  |      | 1.00  | 0.95  |      |
| Fr't                   | 1.00 | 0.98  |      | 1.00  | 1.00 | 0.85 | 1.00 | 0.94  |      | 1.00  | 0.96  |      |
| Flt Protected          | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00  |      |
| Satd. Flow (prot)      | 1770 | 3462  |      | 1770  | 3539 | 1583 | 1770 | 3335  |      | 1770  | 3397  |      |
| Flt Permitted          | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00  |      |
| Satd. Flow (perm)      | 1770 | 3462  |      | 1770  | 3539 | 1583 | 1770 | 3335  |      | 1770  | 3397  |      |
| Volume (vph)           | 240  | 650   | 110  | 520   | 770  | 270  | 70   | 320   | 200  | 590   | 1070  | 390  |
| Peak-hour factor, PHF  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 240  | 650   | 110  | 520   | 770  | 270  | 70   | 320   | 200  | 590   | 1070  | 390  |
| RTOR Reduction (vph)   | 0    | 8     | 0    | 0     | 0    | 160  | 0    | 59    | 0    | 0     | 0     | 0    |
| Lane Group Flow (vph)  | 240  | 752   | 0    | 520   | 770  | 110  | 70   | 461   | 0    | 590   | 1460  | 0    |
| Turn Type              | Prot |       |      | Prot  |      | Perm | Prot |       |      | Prot  |       |      |
| Protected Phases       | 1    | 6     |      | 5     | 2    |      | 3    | 8     |      | 7     | 4     |      |
| Permitted Phases       |      |       |      |       |      | 2    |      |       |      |       |       |      |
| Actuated Green, G (s)  | 24.1 | 30.0  |      | 38.5  | 44.4 | 44.4 | 14.5 | 21.0  |      | 50.5  | 57.0  |      |
| Effective Green, g (s) | 25.6 | 32.0  |      | 40.0  | 46.4 | 46.4 | 16.0 | 23.0  |      | 52.0  | 59.0  |      |
| Actuated g/C Ratio     | 0.16 | 0.20  |      | 0.25  | 0.28 | 0.28 | 0.10 | 0.14  |      | 0.32  | 0.36  |      |
| Clearance Time (s)     | 5.5  | 6.0   |      | 5.5   | 6.0  | 6.0  | 5.5  | 6.0   |      | 5.5   | 6.0   |      |
| Vehicle Extension (s)  | 3.0  | 4.5   |      | 3.0   | 4.5  | 4.5  | 3.0  | 3.0   |      | 3.0   | 3.0   |      |
| Lane Grp Cap (vph)     | 278  | 680   |      | 434   | 1007 | 451  | 174  | 471   |      | 565   | 1230  |      |
| v/s Ratio Prot         | 0.14 | c0.22 |      | c0.29 | 0.22 |      | 0.04 | c0.16 |      | 0.33  | c0.43 |      |
| v/s Ratio Perm         |      |       |      |       |      | 0.17 |      |       |      |       |       |      |
| v/c Ratio              | 0.86 | 1.11  |      | 1.20  | 0.76 | 0.24 | 0.40 | 0.98  |      | 1.04  | 1.19  |      |
| Uniform Delay, d1      | 67.0 | 65.5  |      | 61.5  | 53.3 | 44.8 | 69.0 | 69.8  |      | 55.5  | 52.0  |      |
| Progression Factor     | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  |      | 1.00  | 1.00  |      |
| Incremental Delay, d2  | 23.1 | 67.2  |      | 109.6 | 3.9  | 0.5  | 1.5  | 35.4  |      | 49.9  | 92.6  |      |
| Delay (s)              | 90.1 | 132.7 |      | 171.1 | 57.2 | 45.3 | 70.5 | 105.2 |      | 105.4 | 144.6 |      |
| Level of Service       | F    | F     |      | F     | E    | D    | E    | F     |      | F     | F     |      |
| Approach Delay (s)     |      | 122.5 |      |       | 93.1 |      |      | 101.1 |      |       | 133.3 |      |
| Approach LOS           |      | F     |      |       | F    |      |      | F     |      |       | F     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 115.5  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.15   |                      |      |
| Actuated Cycle Length (s)         | 163.0  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 111.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 2: THREE CHOPT RD & COX RD

2034 AM BUILD REC#2  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT    | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|-------|------|------|--------|------|------|-------|------|-------|------|------|
| Lane Configurations    |       |       |      |      |        |      |      |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900   | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0  | 4.0    |      | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00 | 0.95   |      | 1.00 | 0.95  |      | 1.00  | 0.95 | 1.00 |
| Frt                    | 1.00  | 0.99  |      | 1.00 | 0.90   |      | 1.00 | 0.96  |      | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00  |      | 0.95 | 1.00   |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770  | 3512  |      | 1770 | 3188   |      | 1770 | 3389  |      | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95 | 1.00   |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770  | 3512  |      | 1770 | 3188   |      | 1770 | 3389  |      | 1770  | 3539 | 1583 |
| Volume (vph)           | 660   | 740   | 40   | 200  | 220    | 430  | 30   | 1040  | 410  | 160   | 200  | 80   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00   | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 660   | 740   | 40   | 200  | 220    | 430  | 30   | 1040  | 410  | 160   | 200  | 80   |
| RTOR Reduction (vph)   | 0     | 2     | 0    | 0    | 146    | 0    | 0    | 26    | 0    | 0     | 0    | 0    |
| Lane Group Flow (vph)  | 660   | 778   | 0    | 200  | 504    | 0    | 30   | 1424  | 0    | 160   | 200  | 80   |
| Turn Type              | Prot  |       | Prot |      | Prot   |      | Prot |       | Prot |       | Perm |      |
| Protected Phases       | 1     | 6     |      | 5    | 2      |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |       |      |      |        |      |      |       |      |       |      | 4    |
| Actuated Green, G (s)  | 48.5  | 42.4  |      | 28.1 | 22.0   |      | 5.7  | 55.0  |      | 16.7  | 66.0 | 66.0 |
| Effective Green, g (s) | 50.0  | 44.4  |      | 29.6 | 24.0   |      | 7.2  | 57.0  |      | 18.2  | 68.0 | 68.0 |
| Actuated g/C Ratio     | 0.30  | 0.27  |      | 0.18 | 0.15   |      | 0.04 | 0.35  |      | 0.11  | 0.41 | 0.41 |
| Clearance Time (s)     | 5.5   | 6.0   |      | 5.5  | 6.0    |      | 5.5  | 6.0   |      | 5.5   | 6.0  | 6.0  |
| Vehicle Extension (s)  | 3.0   | 4.5   |      | 3.0  | 4.5    |      | 3.0  | 3.0   |      | 3.0   | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 536   | 944   |      | 317  | 463    |      | 77   | 1169  |      | 195   | 1457 | 652  |
| v/s Ratio Prot         | c0.37 | 0.22  |      | 0.11 | c0.20  |      | 0.02 | c0.43 |      | c0.09 | 0.06 |      |
| v/s Ratio Perm         |       |       |      |      |        |      |      |       |      |       |      | 0.05 |
| v/c Ratio              | 1.23  | 0.82  |      | 0.63 | 1.13dr |      | 0.39 | 1.22  |      | 0.82  | 0.14 | 0.12 |
| Uniform Delay, d1      | 57.6  | 56.7  |      | 62.7 | 70.6   |      | 76.9 | 54.1  |      | 71.9  | 30.3 | 30.1 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00 | 1.00   |      | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 119.7 | 6.5   |      | 4.1  | 67.8   |      | 3.2  | 106.3 |      | 23.3  | 0.0  | 0.1  |
| Delay (s)              | 177.3 | 63.2  |      | 66.8 | 138.4  |      | 80.1 | 160.4 |      | 95.2  | 30.4 | 30.2 |
| Level of Service       | F     | E     |      | E    | F      |      | F    | F     |      | F     | C    | C    |
| Approach Delay (s)     |       | 115.5 |      |      | 121.5  |      |      | 158.8 |      |       | 53.9 |      |
| Approach LOS           |       | F     |      |      | F      |      |      | F     |      |       | D    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 125.5  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.21   |                      |      |
| Actuated Cycle Length (s)         | 165.2  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 120.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2034 PM BUILD REC#2  
9/27/2005

| Movement                          | SEL   | SET   | SER  | NWL   | NWT  | NWR  | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|-----------------------------------|-------|-------|------|-------|------|------|------|-------|------|-------|------|------|
| Lane Configurations               |       |       |      |       |      |      |      |       |      |       |      |      |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)               | 4.0   | 4.0   |      | 4.0   | 4.0  |      | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor                 | 1.00  | 0.95  |      | 1.00  | 0.95 |      | 1.00 | 0.95  |      | 1.00  | 0.95 | 1.00 |
| Fr <sub>t</sub>                   | 1.00  | 0.98  |      | 1.00  | 0.96 |      | 1.00 | 0.94  |      | 1.00  | 1.00 | 0.85 |
| Fit Protected                     | 0.95  | 1.00  |      | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)                 | 1770  | 3462  |      | 1770  | 3401 |      | 1770 | 3335  |      | 1770  | 3539 | 1583 |
| Fit Permitted                     | 0.95  | 1.00  |      | 0.95  | 1.00 |      | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)                 | 1770  | 3462  |      | 1770  | 3401 |      | 1770 | 3335  |      | 1770  | 3539 | 1583 |
| Volume (vph)                      | 240   | 650   | 110  | 520   | 770  | 270  | 70   | 320   | 200  | 590   | 1070 | 390  |
| Peak-hour factor, PHF             | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)                   | 240   | 650   | 110  | 520   | 770  | 270  | 70   | 320   | 200  | 590   | 1070 | 390  |
| RTOR Reduction (vph)              | 0     | 9     | 0    | 0     | 21   | 0    | 0    | 60    | 0    | 0     | 0    | 0    |
| Lane Group Flow (vph)             | 240   | 751   | 0    | 520   | 1019 | 0    | 70   | 460   | 0    | 590   | 1070 | 390  |
| Turn Type                         | Prot  |       | Prot |       | Prot |      | Prot |       | Prot |       | Perm |      |
| Protected Phases                  | 1     | 6     |      | 5     | 2    |      | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases                  |       |       |      |       |      |      |      |       |      |       |      | 4    |
| Actuated Green, G (s)             | 22.6  | 31.9  |      | 42.6  | 51.9 |      | 11.3 | 18.0  |      | 47.5  | 54.2 | 54.2 |
| Effective Green, g (s)            | 24.1  | 33.9  |      | 44.1  | 53.9 |      | 12.8 | 20.0  |      | 49.0  | 56.2 | 56.2 |
| Actuated g/C Ratio                | 0.15  | 0.21  |      | 0.27  | 0.33 |      | 0.08 | 0.12  |      | 0.30  | 0.34 | 0.34 |
| Clearance Time (s)                | 5.5   | 6.0   |      | 5.5   | 6.0  |      | 5.5  | 6.0   |      | 5.5   | 6.0  | 6.0  |
| Vehicle Extension (s)             | 3.0   | 4.5   |      | 3.0   | 4.5  |      | 3.0  | 3.0   |      | 3.0   | 3.0  | 3.0  |
| Lane Grp Cap (vph)                | 262   | 720   |      | 479   | 1125 |      | 139  | 409   |      | 532   | 1220 | 546  |
| v/s Ratio Prot                    | 0.14  | c0.22 |      | c0.29 | 0.31 |      | 0.04 | c0.16 |      | c0.33 | 0.30 |      |
| v/s Ratio Perm                    |       |       |      |       |      |      |      |       |      |       |      | 0.25 |
| v/c Ratio                         | 0.92  | 1.04  |      | 1.09  | 0.91 |      | 0.50 | 1.13  |      | 1.11  | 0.88 | 0.71 |
| Uniform Delay, d <sub>1</sub>     | 68.5  | 64.5  |      | 59.4  | 52.1 |      | 72.1 | 71.5  |      | 57.0  | 50.2 | 46.4 |
| Progression Factor                | 1.00  | 1.00  |      | 1.00  | 1.00 |      | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d <sub>2</sub> | 33.8  | 45.4  |      | 66.2  | 10.8 |      | 2.9  | 83.3  |      | 72.4  | 7.4  | 4.4  |
| Delay (s)                         | 102.3 | 110.0 |      | 125.7 | 62.9 |      | 74.9 | 154.8 |      | 129.4 | 57.5 | 50.8 |
| Level of Service                  | F     | F     |      | F     | E    |      | E    | F     |      | F     | E    | D    |
| Approach Delay (s)                |       | 108.1 |      |       | 83.8 |      |      | 145.3 |      |       | 76.9 |      |
| Approach LOS                      |       | F     |      |       | F    |      |      | F     |      |       | E    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 92.7   | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.11   |                      |      |
| Actuated Cycle Length (s)         | 163.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 111.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2034 AM BUILD REC.ALL  
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| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR   | NEL  | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|-------|------|------|-------|-------|------|-------|------|-------|------|------|
| Lane Configurations    |       |       |      |      |       |       |      |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   |      | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00 | 0.95  | 1.00  | 1.00 | 0.95  |      | 1.00  | 0.95 | 1.00 |
| Frt                    | 1.00  | 0.99  |      | 1.00 | 1.00  | 0.85  | 1.00 | 0.96  |      | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00  |      | 0.95 | 1.00  | 1.00  | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770  | 3512  |      | 1770 | 3539  | 1583  | 1770 | 3389  |      | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95 | 1.00  | 1.00  | 0.95 | 1.00  |      | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770  | 3512  |      | 1770 | 3539  | 1583  | 1770 | 3389  |      | 1770  | 3539 | 1583 |
| Volume (vph)           | 660   | 740   | 40   | 200  | 220   | 430   | 30   | 1040  | 410  | 160   | 200  | 80   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 660   | 740   | 40   | 200  | 220   | 430   | 30   | 1040  | 410  | 160   | 200  | 80   |
| RTOR Reduction (vph)   | 0     | 3     | 0    | 0    | 0     | 157   | 0    | 28    | 0    | 0     | 0    | 0    |
| Lane Group Flow (vph)  | 660   | 777   | 0    | 200  | 220   | 273   | 30   | 1422  | 0    | 160   | 200  | 80   |
| Turn Type              | Prot  |       |      | Prot |       | Perm  | Prot |       |      | Prot  |      | Perm |
| Protected Phases       | 1     | 6     |      | 5    | 2     |       | 3    | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |       |      |      |       | 2     |      |       |      |       |      | 4    |
| Actuated Green, G (s)  | 43.5  | 44.6  |      | 18.9 | 20.0  | 20.0  | 5.5  | 49.0  |      | 16.6  | 60.1 | 60.1 |
| Effective Green, g (s) | 45.0  | 46.6  |      | 20.4 | 22.0  | 22.0  | 7.0  | 51.0  |      | 18.1  | 62.1 | 62.1 |
| Actuated g/C Ratio     | 0.30  | 0.31  |      | 0.13 | 0.14  | 0.14  | 0.05 | 0.34  |      | 0.12  | 0.41 | 0.41 |
| Clearance Time (s)     | 5.5   | 6.0   |      | 5.5  | 6.0   | 6.0   | 5.5  | 6.0   |      | 5.5   | 6.0  | 6.0  |
| Vehicle Extension (s)  | 3.0   | 4.5   |      | 3.0  | 4.5   | 4.5   | 3.0  | 3.0   |      | 3.0   | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 524   | 1076  |      | 237  | 512   | 229   | 81   | 1136  |      | 211   | 1445 | 646  |
| v/s Ratio Prot         | c0.37 | 0.22  |      | 0.11 | 0.06  |       | 0.02 | c0.43 |      | c0.09 | 0.06 |      |
| v/s Ratio Perm         |       |       |      |      |       | 0.27  |      |       |      |       |      | 0.05 |
| v/c Ratio              | 1.26  | 0.72  |      | 0.84 | 0.43  | 1.19  | 0.37 | 1.25  |      | 0.76  | 0.14 | 0.12 |
| Uniform Delay, d1      | 53.5  | 47.0  |      | 64.3 | 59.3  | 65.0  | 70.4 | 50.5  |      | 64.9  | 28.2 | 28.0 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 131.6 | 2.8   |      | 23.0 | 1.0   | 120.6 | 2.8  | 120.7 |      | 14.4  | 0.0  | 0.1  |
| Delay (s)              | 185.1 | 49.7  |      | 87.3 | 60.3  | 185.7 | 73.3 | 171.3 |      | 79.3  | 28.3 | 28.1 |
| Level of Service       | F     | D     |      | F    | E     | F     | E    | F     |      | E     | C    | C    |
| Approach Delay (s)     |       | 111.8 |      |      | 130.1 |       |      | 169.3 |      |       | 46.8 |      |
| Approach LOS           |       | F     |      |      | F     |       |      | F     |      |       | D    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 128.9  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.30   |                      |      |
| Actuated Cycle Length (s)         | 152.1  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 115.0% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

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|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 660   | 740   | 40  | 200   | 220   | 430   | 30  | 1040  | 410   | 160   | 200   | 80  |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 660   | 780   | 0   | 200   | 220   | 430   | 30  | 1450  | 0   | 160   | 200   | 80  |
| v/c Ratio               | 1.24  | 0.71  |   | 0.83  | 0.42  | 1.11  | 0.28  | 1.23  |   | 0.86  | 0.14  | 0.12  |
| Control Delay           | 167.2   | 50.0  |   | 85.9  | 61.0  | 109.3   | 69.1  | 150.3   |   | 100.4   | 29.0  | 29.9  |
| Queue Delay             | 23.6  | 3.9   |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 190.8   | 53.9  |   | 85.9  | 61.0  | 109.3   | 69.1  | 150.3   |   | 100.4   | 29.0  | 29.9  |
| Queue Length 50th (ft)  | ~800  | 358   |   | 192   | 104   | ~315  | 29  | ~906  |   | 156   | 66  | 51  |
| Queue Length 95th (ft)  | #1044   | 436   |   | #319  | 149   | #535  | 64  | #1048   |   | #287  | 100   | 93  |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |   | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   |   | 200   |   |   | 200   |   |   |
| Base Capacity (vph)     | 532   | 1095  |   | 250   | 520   | 389   | 176   | 1182  |   | 189   | 1466  | 656   |
| 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     | 22  | 230   |   | 0   | 0   | 0   | 0   | 0   |   | 0   | 0   | 0   |
| Reduced v/c Ratio       | 1.29  | 0.90  |   | 0.80  | 0.42  | 1.11  | 0.17  | 1.23  |   | 0.85  | 0.14  | 0.12  |

Intersection Summary

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

Timings  
2: THREE CHOPT RD & COX RD

2034 AM BUILD REC.ALL  
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| Lane Group          | SEL   | SET   | NWL   | NWT   | NWR   | NEL   | NET   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations | ↖     | ↕     | ↖     | ↕     | ↗     | ↖     | ↕     | ↖     | ↕     | ↗     |
| Volume (vph)        | 660   | 740   | 200   | 220   | 430   | 30    | 1040  | 160   | 200   | 80    |
| Turn Type           | Prot  |       | Prot  |       | Perm  | Prot  |       | Prot  |       | Perm  |
| Protected Phases    | 1     | 6     | 5     | 2     |       | 3     | 8     | 7     | 4     |       |
| Permitted Phases    |       |       |       |       | 2     |       |       |       |       | 4     |
| Detector Phases     | 1     | 6     | 5     | 2     | 2     | 3     | 8     | 7     | 4     | 4     |
| Minimum Initial (s) | 3.0   | 12.0  | 3.0   | 8.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 9.5   | 20.0  | 9.5   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 49.0  | 49.7  | 25.3  | 26.0  | 26.0  | 20.0  | 55.0  | 20.0  | 55.0  | 55.0  |
| Total Split (%)     | 32.7% | 33.1% | 16.9% | 17.3% | 17.3% | 13.3% | 36.7% | 13.3% | 36.7% | 36.7% |
| Yellow Time (s)     | 3.5   | 4.0   | 3.5   | 4.0   | 4.0   | 3.5   | 4.0   | 3.5   | 4.0   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lag   | Lag   | Lead  | Lead  | Lead  | Lead  | Lead  | Lag   | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | Min   | None  | Min   | Min   | None  | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 150  
 Actuated Cycle Length: 149.8  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|        |        |      |      |
|--------|--------|------|------|
| ø2     | ø1     | ø3   | ø4   |
| 26 s   | 49 s   | 20 s | 55 s |
| ø5     | ø6     | ø8   | ø7   |
| 25.3 s | 49.7 s | 55 s | 20 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2034 PM BUILD REC.ALL  
9/27/2005

|                        |  |   |  |  |   |  |  |   |  |  |   |  |
|------------------------|---|--|---|---|--|---|---|--|---|---|--|---|
| Movement               | SEL   | SET  | SER   | NWL   | NWT  | NWR   | NEL   | NET  | NER   | SWL   | SWT  | SWR   |
| Lane Configurations    |  | <br> |   |  | <br> |  |  | <br> |   |  | <br> |  |
| Ideal Flow (vphpl)     | 1900  | 1900   | 1900  | 1900  | 1900   | 1900  | 1900  | 1900   | 1900  | 1900  | 1900   | 1900  |
| Total Lost time (s)    | 4.0   | 4.0  |   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  |   | 4.0   | 4.0  | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95   |   | 1.00  | 0.95   | 1.00  | 1.00  | 0.95   |   | 1.00  | 0.95   | 1.00  |
| Frt                    | 1.00  | 0.98   |   | 1.00  | 1.00   | 0.85  | 1.00  | 0.94   |   | 1.00  | 1.00   | 0.85  |
| Flt Protected          | 0.95  | 1.00   |   | 0.95  | 1.00   | 1.00  | 0.95  | 1.00   |   | 0.95  | 1.00   | 1.00  |
| Satd. Flow (prot)      | 1770  | 3462   |   | 1770  | 3539   | 1583  | 1770  | 3335   |   | 1770  | 3539   | 1583  |
| Flt Permitted          | 0.95  | 1.00   |   | 0.95  | 1.00   | 1.00  | 0.95  | 1.00   |   | 0.95  | 1.00   | 1.00  |
| Satd. Flow (perm)      | 1770  | 3462   |   | 1770  | 3539   | 1583  | 1770  | 3335   |   | 1770  | 3539   | 1583  |
| Volume (vph)           | 240   | 650  | 110   | 520   | 770  | 270   | 70  | 320  | 200   | 590   | 1070   | 390   |
| Peak-hour factor, PHF  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00   | 1.00  |
| Adj. Flow (vph)        | 240   | 650  | 110   | 520   | 770  | 270   | 70  | 320  | 200   | 590   | 1070   | 390   |
| RTOR Reduction (vph)   | 0   | 9  | 0   | 0   | 0  | 176   | 0   | 65   | 0   | 0   | 0  | 0   |
| Lane Group Flow (vph)  | 240   | 751  | 0   | 520   | 770  | 94  | 70  | 455  | 0   | 590   | 1070   | 390   |
| Turn Type              | Prot  |  |   | Prot  |  | Perm  | Prot  |  |   | Prot  |  | Perm  |
| Protected Phases       | 1   | 6  |   | 5   | 2  |   | 3   | 8  |   | 7   | 4  |   |
| Permitted Phases       |   |  |   |   |  | 2   |   |  |   |   |  | 4   |
| Actuated Green, G (s)  | 22.3  | 30.0   |   | 37.0  | 44.7   | 44.7  | 9.5   | 16.0   |   | 44.2  | 50.7   | 50.7  |
| Effective Green, g (s) | 24.3  | 32.0   |   | 39.0  | 46.7   | 46.7  | 11.5  | 18.0   |   | 46.2  | 52.7   | 52.7  |
| Actuated g/C Ratio     | 0.16  | 0.21   |   | 0.26  | 0.31   | 0.31  | 0.08  | 0.12   |   | 0.31  | 0.35   | 0.35  |
| Clearance Time (s)     | 6.0   | 6.0  |   | 6.0   | 6.0  | 6.0   | 6.0   | 6.0  |   | 6.0   | 6.0  | 6.0   |
| Vehicle Extension (s)  | 4.5   | 4.5  |   | 4.5   | 4.5  | 4.5   | 3.0   | 3.0  |   | 3.0   | 3.0  | 3.0   |
| Lane Grp Cap (vph)     | 284   | 733  |   | 457   | 1093   | 489   | 135   | 397  |   | 541   | 1234   | 552   |
| v/s Ratio Prot         | 0.14  | c0.22  |   | c0.29   | 0.22   |   | 0.04  | c0.16  |   | c0.33   | 0.30   |   |
| v/s Ratio Perm         |   |  |   |   |  | 0.17  |   |  |   |   |  | 0.25  |
| v/c Ratio              | 0.85  | 1.02   |   | 1.14  | 0.70   | 0.19  | 0.52  | 1.15   |   | 1.09  | 0.87   | 0.71  |
| Uniform Delay, d1      | 61.6  | 59.6   |   | 56.1  | 46.2   | 38.4  | 67.2  | 66.6   |   | 52.5  | 46.0   | 42.6  |
| Progression Factor     | 1.00  | 1.00   |   | 1.00  | 1.00   | 1.00  | 1.00  | 1.00   |   | 1.00  | 1.00   | 1.00  |
| Incremental Delay, d2  | 21.4  | 39.4   |   | 85.6  | 2.4  | 0.3   | 3.3   | 91.2   |   | 65.6  | 6.6  | 4.1   |
| Delay (s)              | 83.0  | 99.0   |   | 141.7   | 48.5   | 38.7  | 70.5  | 157.8  |   | 118.1   | 52.6   | 46.7  |
| Level of Service       | F   | F  |   | F   | D  | D   | E   | F  |   | F   | D  | D   |
| Approach Delay (s)     |   | 95.2   |   |   | 77.9   |   |   | 147.4  |   |   | 70.3   |   |
| Approach LOS           |   | F  |   |   | E  |   |   | F  |   |   | E  |   |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 86.1   | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.12   |                      |      |
| Actuated Cycle Length (s)         | 151.2  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 111.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 240   | 650   | 110   | 520   | 770   | 270   | 70   | 320   | 200   | 590   | 1070  | 390   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 240   | 760   | 0   | 520   | 770   | 270   | 70   | 520   | 0   | 590   | 1070  | 390   |
| v/c Ratio               | 0.84  | 1.02  |   | 1.13  | 0.70  | 0.40  | 0.47   | 1.12  |   | 1.11  | 0.86  | 0.70  |
| Control Delay           | 82.6  | 93.5  |   | 132.0   | 49.7  | 7.4   | 71.1   | 127.8   |   | 120.8   | 54.2  | 51.5  |
| Queue Delay             | 9.8   | 40.3  |   | 0.0   | 3.2   | 0.0   | 0.1  | 0.0   |   | 0.0   | 17.9  | 0.0   |
| Total Delay             | 92.4  | 133.8   |   | 132.0   | 52.9  | 7.4   | 71.3   | 127.8   |   | 120.8   | 72.2  | 51.5  |
| Queue Length 50th (ft)  | 230   | ~407  |   | ~588  | 352   | 11  | 66   | ~272  |   | ~658  | 528   | 338   |
| Queue Length 95th (ft)  | #368  | #541  |   | #819  | 429   | 81  | 118  | #395  |   | #896  | #690  | 484   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |  | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   |   | 200  |   |   | 200   |   |   |
| Base Capacity (vph)     | 294   | 748   |   | 460   | 1103  | 668   | 182  | 465   |   | 531   | 1243  | 556   |
| 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     | 35  | 72  |   | 0   | 231   | 0   | 5  | 0   |   | 0   | 194   | 0   |
| Reduced v/c Ratio       | 0.93  | 1.12  |   | 1.13  | 0.88  | 0.40  | 0.40   | 1.12  |   | 1.11  | 1.02  | 0.70  |

**Intersection Summary**

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

Timings  
2: THREE CHOPT RD & COX RD

2034 PM BUILD REC.ALL  
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| Lane Group          | SEL   | SET   | NWL   | NWT   | NWR   | NEL   | NET   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 240   | 650   | 520   | 770   | 270   | 70    | 320   | 590   | 1070  | 390   |
| Turn Type           | Prot  |       | Prot  |       | Perm  | Prot  |       | Prot  |       | Perm  |
| Protected Phases    | 1     | 6     | 5     | 2     |       | 3     | 8     | 7     | 4     |       |
| Permitted Phases    |       |       |       |       | 2     |       |       |       |       | 4     |
| Detector Phases     | 1     | 6     | 5     | 2     | 2     | 3     | 8     | 7     | 4     | 4     |
| Minimum Initial (s) | 12.0  | 12.0  | 8.0   | 8.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 29.0  | 36.0  | 43.0  | 50.0  | 50.0  | 20.0  | 22.0  | 49.0  | 51.0  | 51.0  |
| Total Split (%)     | 19.3% | 24.0% | 28.7% | 33.3% | 33.3% | 13.3% | 14.7% | 32.7% | 34.0% | 34.0% |
| Yellow Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lead  | Lead  | Lag   | Lag   | Lag   | Lead  | Lead  | Lag   | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | Min   | Min   | Min   | Min   | Min   | None  | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 150  
 Actuated Cycle Length: 150  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|      |      |      |      |
|------|------|------|------|
| 01   | 02   | 03   | 04   |
| 29 s | 50 s | 20 s | 51 s |
| 06   | 05   | 08   | 07   |
| 36 s | 43 s | 22 s | 49 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2034 AM BUILD REC.ALL.SPLIT  
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| Movement                          | SEL   | SET   | SER  | NWL   | NWT   | NWR   | NEL   | NET   | NER  | SWL   | SWT  | SWR   |
|-----------------------------------|-------|-------|------|-------|-------|-------|-------|-------|------|-------|------|-------|
| Lane Configurations               | ↖     | ↕     |      | ↖     | ↕     | ↗     | ↖     | ↕     |      | ↖     | ↕    | ↗     |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  | 1900  | 1900  | 1900 | 1900  | 1900 | 1900  |
| Total Lost time (s)               | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |      | 4.0   | 4.0  | 4.0   |
| Lane Util. Factor                 | 0.91  | 0.91  |      | 0.91  | 0.91  | 1.00  | 1.00  | 0.95  |      | 0.91  | 0.91 | 1.00  |
| Fr <sub>t</sub>                   | 1.00  | 0.99  |      | 1.00  | 1.00  | 0.85  | 1.00  | 0.96  |      | 1.00  | 1.00 | 0.85  |
| Fl <sub>t</sub> Protected         | 0.95  | 0.99  |      | 0.95  | 0.99  | 1.00  | 0.95  | 1.00  |      | 0.95  | 0.99 | 1.00  |
| Satd. Flow (prot)                 | 1610  | 3336  |      | 1610  | 3352  | 1583  | 1770  | 3389  |      | 1610  | 3360 | 1583  |
| Fl <sub>t</sub> Permitted         | 0.95  | 0.99  |      | 0.95  | 0.99  | 1.00  | 0.95  | 1.00  |      | 0.95  | 0.99 | 1.00  |
| Satd. Flow (perm)                 | 1610  | 3336  |      | 1610  | 3352  | 1583  | 1770  | 3389  |      | 1610  | 3360 | 1583  |
| Volume (vph)                      | 660   | 740   | 40   | 200   | 220   | 430   | 30    | 1040  | 410  | 160   | 200  | 80    |
| Peak-hour factor, PHF             | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  |
| Adj. Flow (vph)                   | 660   | 740   | 40   | 200   | 220   | 430   | 30    | 1040  | 410  | 160   | 200  | 80    |
| RTOR Reduction (vph)              | 0     | 2     | 0    | 0     | 0     | 26    | 0     | 28    | 0    | 0     | 0    | 0     |
| Lane Group Flow (vph)             | 466   | 972   | 0    | 135   | 285   | 404   | 30    | 1422  | 0    | 116   | 244  | 80    |
| Turn Type                         | Split |       |      | Split |       | pm+ov | Split |       |      | Split |      | pm+ov |
| Protected Phases                  | 6     | 6     |      | 2     | 2     | 4     | 8     | 8     |      | 4     | 4    | 6     |
| Permitted Phases                  |       |       |      |       |       | 2     |       |       |      |       |      | 4     |
| Actuated Green, G (s)             | 39.0  | 39.0  |      | 15.0  | 15.0  | 31.0  | 56.0  | 56.0  |      | 16.0  | 16.0 | 55.0  |
| Effective Green, g (s)            | 41.0  | 41.0  |      | 17.0  | 17.0  | 35.0  | 58.0  | 58.0  |      | 18.0  | 18.0 | 59.0  |
| Actuated g/C Ratio                | 0.27  | 0.27  |      | 0.11  | 0.11  | 0.23  | 0.39  | 0.39  |      | 0.12  | 0.12 | 0.39  |
| Clearance Time (s)                | 6.0   | 6.0   |      | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |      | 6.0   | 6.0  | 6.0   |
| Vehicle Extension (s)             | 4.5   | 4.5   |      | 4.5   | 4.5   | 3.0   | 3.0   | 3.0   |      | 3.0   | 3.0  | 4.5   |
| Lane Grp Cap (vph)                | 440   | 912   |      | 182   | 380   | 369   | 684   | 1310  |      | 193   | 403  | 665   |
| v/s Ratio Prot                    | 0.29  | c0.29 |      | 0.08  | 0.09  | c0.13 | 0.02  | c0.42 |      | 0.07  | 0.07 | 0.03  |
| v/s Ratio Perm                    |       |       |      |       |       | 0.12  |       |       |      |       |      | 0.02  |
| v/c Ratio                         | 1.06  | 1.07  |      | 0.74  | 0.75  | 1.09  | 0.04  | 1.09  |      | 0.60  | 0.61 | 0.12  |
| Uniform Delay, d <sub>1</sub>     | 54.5  | 54.5  |      | 64.4  | 64.4  | 57.5  | 28.7  | 46.0  |      | 62.6  | 62.6 | 29.0  |
| Progression Factor                | 1.00  | 1.00  |      | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00  |
| Incremental Delay, d <sub>2</sub> | 59.4  | 48.9  |      | 16.8  | 9.1   | 74.7  | 0.0   | 51.6  |      | 5.2   | 2.6  | 0.1   |
| Delay (s)                         | 113.9 | 103.4 |      | 81.2  | 73.5  | 132.2 | 28.7  | 97.6  |      | 67.8  | 65.2 | 29.1  |
| Level of Service                  | F     | F     |      | F     | E     | F     | C     | F     |      | E     | E    | C     |
| Approach Delay (s)                |       | 106.8 |      |       | 104.4 |       |       | 96.2  |      |       | 59.3 |       |
| Approach LOS                      |       | F     |      |       | F     |       |       | F     |      |       | E    |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 97.6   | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.08   |                      |      |
| Actuated Cycle Length (s)         | 150.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 105.8% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

2034 AM BUILD REC.ALL.SPLIT

9/29/2005



| Lane Group              | SEL   | SET  | SER  | NWL  | NWT  | NWR   | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|-------------------------|-------|------|------|------|------|-------|------|------|------|------|------|------|
| Volume (vph)            | 660   | 740  | 40   | 200  | 220  | 430   | 30   | 1040 | 410  | 160  | 200  | 80   |
| Peak Hour Factor        | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Lane Group Flow (vph)   | 466   | 974  | 0    | 135  | 285  | 430   | 30   | 1450 | 0    | 116  | 244  | 80   |
| v/c Ratio               | 1.06  | 1.07 |      | 0.74 | 0.75 | 1.09  | 0.04 | 1.08 |      | 0.60 | 0.61 | 0.12 |
| Control Delay           | 110.4 | 99.7 |      | 88.3 | 77.6 | 102.1 | 29.1 | 92.2 |      | 76.5 | 69.6 | 27.3 |
| Queue Delay             | 0.0   | 0.0  |      | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  |      | 0.0  | 0.0  | 0.0  |
| Total Delay             | 110.4 | 99.7 |      | 88.3 | 77.6 | 102.1 | 29.1 | 92.2 |      | 76.5 | 69.6 | 27.3 |
| Queue Length 50th (ft)  | ~548  | ~575 |      | 142  | 151  | ~274  | 18   | ~820 |      | 119  | 126  | 47   |
| Queue Length 95th (ft)  | #793  | #721 |      | #256 | 207  | #538  | 42   | #961 |      | 198  | 177  | 84   |
| Internal Link Dist (ft) |       | 645  |      |      | 472  |       |      | 963  |      |      | 575  |      |
| Turn Bay Length (ft)    | 300   |      |      | 200  |      | 200   | 200  |      |      | 200  |      | 200  |
| Base Capacity (vph)     | 440   | 914  |      | 182  | 380  | 395   | 684  | 1339 |      | 193  | 403  | 665  |
| 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       | 1.06  | 1.07 |      | 0.74 | 0.75 | 1.09  | 0.04 | 1.08 |      | 0.60 | 0.61 | 0.12 |

Intersection Summary

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

Timings  
2: THREE CHOPT RD & COX RD

2034 AM BUILD REC.ALL.SPLIT  
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| Lane Group          | SEL   | SET   | NWL   | NWT   | NWR   | NEL   | NET   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 660   | 740   | 200   | 220   | 430   | 30    | 1040  | 160   | 200   | 80    |
| Turn Type           | Split |       | Split |       | pm+ov | Split |       | Split |       | pm+ov |
| Protected Phases    | 6     | 6     | 2     | 2     | 4     | 8     | 8     | 4     | 4     | 6     |
| Permitted Phases    |       |       |       |       | 2     |       |       |       |       | 4     |
| Detector Phases     | 6     | 6     | 2     | 2     | 4     | 8     | 8     | 4     | 4     | 6     |
| Minimum Initial (s) | 12.0  | 12.0  | 8.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 12.0  |
| Minimum Split (s)   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 45.0  | 45.0  | 21.0  | 21.0  | 22.0  | 62.0  | 62.0  | 22.0  | 22.0  | 45.0  |
| Total Split (%)     | 30.0% | 30.0% | 14.0% | 14.0% | 14.7% | 41.3% | 41.3% | 14.7% | 14.7% | 30.0% |
| Yellow Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            |       |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?  |       |       |       |       |       |       |       |       |       |       |
| Recall Mode         | Min   | Min   | Min   | Min   | None  | None  | None  | None  | None  | Min   |

**Intersection Summary**

Cycle Length: 150  
 Actuated Cycle Length: 150  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|            |            |            |            |
|------------|------------|------------|------------|
| ø2<br>21 s | ø6<br>45 s | ø4<br>22 s | ø8<br>62 s |
|------------|------------|------------|------------|

HCM Signalized Intersection Capacity Analysis  
 2: THREE CHOPT RD & COX RD

2034 PM BUILD.ALL.SPLIT  
 9/29/2005

| Movement                          | SEL   | SET   | SER  | NWL   | NWT   | NWR   | NEL   | NET   | NER  | SWL   | SWT   | SWR   |
|-----------------------------------|-------|-------|------|-------|-------|-------|-------|-------|------|-------|-------|-------|
| Lane Configurations               |       |       |      |       |       |       |       |       |      |       |       |       |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor                 | 0.91  | 0.91  |      | 0.91  | 0.91  | 1.00  | 1.00  | 0.95  |      | 0.91  | 0.91  | 1.00  |
| Fr <sub>t</sub>                   | 1.00  | 0.98  |      | 1.00  | 1.00  | 0.85  | 1.00  | 0.94  |      | 1.00  | 1.00  | 0.85  |
| Fl <sub>t</sub> Protected         | 0.95  | 1.00  |      | 0.95  | 0.99  | 1.00  | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)                 | 1610  | 3317  |      | 1610  | 3370  | 1583  | 1770  | 3335  |      | 1610  | 3382  | 1583  |
| Fl <sub>t</sub> Permitted         | 0.95  | 1.00  |      | 0.95  | 0.99  | 1.00  | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)                 | 1610  | 3317  |      | 1610  | 3370  | 1583  | 1770  | 3335  |      | 1610  | 3382  | 1583  |
| Volume (vph)                      | 240   | 650   | 110  | 520   | 770   | 270   | 70    | 320   | 200  | 590   | 1070  | 390   |
| Peak-hour factor, PHF             | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)                   | 240   | 650   | 110  | 520   | 770   | 270   | 70    | 320   | 200  | 590   | 1070  | 390   |
| RTOR Reduction (vph)              | 0     | 10    | 0    | 0     | 0     | 74    | 0     | 69    | 0    | 0     | 0     | 0     |
| Lane Group Flow (vph)             | 240   | 750   | 0    | 416   | 874   | 196   | 70    | 451   | 0    | 535   | 1125  | 390   |
| Turn Type                         | Split |       |      | Split |       | pm+ov | Split |       |      | Split |       | pm+ov |
| Protected Phases                  | 6     | 6     |      | 2     | 2     | 4     | 8     | 8     |      | 4     | 4     | 6     |
| Permitted Phases                  |       |       |      |       |       | 2     |       |       |      |       |       | 4     |
| Actuated Green, G (s)             | 27.0  | 27.0  |      | 33.0  | 33.0  | 74.0  | 15.0  | 15.0  |      | 41.0  | 41.0  | 68.0  |
| Effective Green, g (s)            | 29.0  | 29.0  |      | 35.0  | 35.0  | 78.0  | 17.0  | 17.0  |      | 43.0  | 43.0  | 72.0  |
| Actuated g/C Ratio                | 0.21  | 0.21  |      | 0.25  | 0.25  | 0.56  | 0.12  | 0.12  |      | 0.31  | 0.31  | 0.51  |
| Clearance Time (s)                | 6.0   | 6.0   |      | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |      | 6.0   | 6.0   | 6.0   |
| Vehicle Extension (s)             | 4.5   | 4.5   |      | 4.5   | 4.5   | 3.0   | 3.0   | 3.0   |      | 3.0   | 3.0   | 4.5   |
| Lane Grp Cap (vph)                | 334   | 687   |      | 403   | 843   | 882   | 215   | 405   |      | 495   | 1039  | 859   |
| v/s Ratio Prot                    | 0.15  | c0.23 |      | 0.26  | c0.26 | 0.07  | 0.04  | c0.14 |      | 0.33  | c0.33 | 0.09  |
| v/s Ratio Perm                    |       |       |      |       |       | 0.06  |       |       |      |       |       | 0.15  |
| v/c Ratio                         | 0.72  | 1.09  |      | 1.03  | 1.04  | 0.22  | 0.33  | 1.11  |      | 1.08  | 1.08  | 0.45  |
| Uniform Delay, d <sub>1</sub>     | 51.7  | 55.5  |      | 52.5  | 52.5  | 15.7  | 56.3  | 61.5  |      | 48.5  | 48.5  | 21.5  |
| Progression Factor                | 1.00  | 1.00  |      | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |      | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d <sub>2</sub> | 8.2   | 62.3  |      | 53.4  | 40.9  | 0.1   | 0.9   | 78.9  |      | 64.0  | 53.1  | 0.7   |
| Delay (s)                         | 59.9  | 117.8 |      | 105.9 | 93.4  | 15.8  | 57.1  | 140.4 |      | 112.5 | 101.6 | 22.2  |
| Level of Service                  | E     | F     |      | F     | F     | B     | E     | F     |      | F     | F     | C     |
| Approach Delay (s)                |       | 103.9 |      |       | 83.3  |       |       | 130.5 |      |       | 89.4  |       |
| Approach LOS                      |       | F     |      |       | F     |       |       | F     |      |       | F     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 95.0   | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.08   |                      |      |
| Actuated Cycle Length (s)         | 140.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 103.0% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |

c Critical Lane Group

Queues  
2: THREE CHOPT RD & COX RD

2034 PM BUILD.ALL.SPLIT  
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|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 240   | 650   | 110   | 520   | 770   | 270   | 70   | 320   | 200   | 590   | 1070  | 390   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 240   | 760   | 0   | 416   | 874   | 270   | 70   | 520   | 0   | 535   | 1125  | 390   |
| v/c Ratio               | 0.72  | 1.09  |   | 1.03  | 1.04  | 0.28  | 0.33   | 1.10  |   | 1.08  | 1.08  | 0.45  |
| Control Delay           | 65.0  | 112.0   |   | 104.1   | 91.5  | 3.8   | 60.9   | 117.4   |   | 109.5   | 98.6  | 21.6  |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   |   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 65.0  | 112.0   |   | 104.1   | 91.5  | 3.8   | 60.9   | 117.4   |   | 109.5   | 98.6  | 21.6  |
| Queue Length 50th (ft)  | 226   | ~423  |   | ~446  | ~470  | 24  | 59   | ~246  |   | ~597  | ~628  | 208   |
| Queue Length 95th (ft)  | 335   | #561  |   | #676  | #610  | 49  | 110  | #366  |   | #846  | #774  | 295   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |  | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   | 200   | 200  |   |   | 200   |   | 200   |
| Base Capacity (vph)     | 334   | 696   |   | 403   | 843   | 955   | 215  | 474   |   | 495   | 1039  | 859   |
| 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       | 0.72  | 1.09  |   | 1.03  | 1.04  | 0.28  | 0.33   | 1.10  |   | 1.08  | 1.08  | 0.45  |

**Intersection Summary**

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

Timings  
2: THREE CHOPT RD & COX RD

2034 PM BUILD.ALL.SPLIT  
9/29/2005

| Lane Group          | SEL   | SET   | NWL   | NWT   | NWR   | NEL   | NET   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 240   | 650   | 520   | 770   | 270   | 70    | 320   | 590   | 1070  | 390   |
| Turn Type           | Split |       | Split |       | pm+ov | Split |       | Split |       | pm+ov |
| Protected Phases    | 6     | 6     | 2     | 2     | 4     | 8     | 8     | 4     | 4     | 6     |
| Permitted Phases    |       |       |       |       | 2     |       |       |       |       | 4     |
| Detector Phases     | 6     | 6     | 2     | 2     | 4     | 8     | 8     | 4     | 4     | 6     |
| Minimum Initial (s) | 12.0  | 12.0  | 8.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 12.0  |
| Minimum Split (s)   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 33.0  | 33.0  | 39.0  | 39.0  | 47.0  | 21.0  | 21.0  | 47.0  | 47.0  | 33.0  |
| Total Split (%)     | 23.6% | 23.6% | 27.9% | 27.9% | 33.6% | 15.0% | 15.0% | 33.6% | 33.6% | 23.6% |
| Yellow Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            |       |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?  |       |       |       |       |       |       |       |       |       |       |
| Recall Mode         | Min   | Min   | Min   | Min   | None  | None  | None  | None  | None  | Min   |

**Intersection Summary**  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Natural Cycle: 140  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|      |      |      |      |
|------|------|------|------|
| ø2   | ø6   | ø4   | ø8   |
| 39 s | 33 s | 47 s | 21 s |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 AM NO-BUILD  
 7/14/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|-------|------|------|-------|------|-------|-------|------|-------|------|------|
| Lane Configurations    |       |       |      |      |       |      |       |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0  | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00 | 0.95  |      | 1.00  | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 |
| Frt                    | 1.00  | 0.97  |      | 1.00 | 0.93  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 1770  | 3429  |      | 1770 | 3281  |      | 1770  | 3539  | 1583 | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 1770  | 3429  |      | 1770 | 3281  |      | 1770  | 3539  | 1583 | 1770  | 3539 | 1583 |
| Volume (vph)           | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430 | 320  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430 | 320  |
| RTOR Reduction (vph)   | 0     | 12    | 0    | 0    | 101   | 0    | 0     | 0     | 17   | 0     | 0    | 99   |
| Lane Group Flow (vph)  | 810   | 708   | 0    | 70   | 989   | 0    | 230   | 2570  | 103  | 240   | 1430 | 221  |
| Turn Type              | Prot  |       |      | Prot |       |      | Prot  |       | Perm | Prot  |      | Perm |
| Protected Phases       | 5     | 2     |      | 1    | 6     |      | 3     | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |       |      |      |       |      |       |       | 8    |       |      | 4    |
| Actuated Green, G (s)  | 40.0  | 53.5  |      | 11.5 | 25.0  |      | 20.0  | 65.0  | 65.0 | 20.0  | 65.0 | 65.0 |
| Effective Green, g (s) | 40.0  | 55.0  |      | 11.5 | 26.5  |      | 20.0  | 66.5  | 66.5 | 20.0  | 66.5 | 66.5 |
| Actuated g/C Ratio     | 0.24  | 0.33  |      | 0.07 | 0.16  |      | 0.12  | 0.39  | 0.39 | 0.12  | 0.39 | 0.39 |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0  | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)     | 419   | 1116  |      | 120  | 514   |      | 209   | 1393  | 623  | 209   | 1393 | 623  |
| v/s Ratio Prot         | c0.46 | 0.21  |      | 0.04 | c0.33 |      | 0.13  | c0.73 |      | c0.14 | 0.40 |      |
| v/s Ratio Perm         |       |       |      |      |       |      |       |       | 0.08 |       |      | 0.20 |
| v/c Ratio              | 1.93  | 0.63  |      | 0.58 | 1.92  |      | 1.10  | 1.84  | 0.17 | 1.15  | 1.03 | 0.35 |
| Uniform Delay, d1      | 64.5  | 48.5  |      | 76.4 | 71.2  |      | 74.5  | 51.2  | 33.2 | 74.5  | 51.2 | 36.1 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00 | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 428.6 | 1.2   |      | 7.0  | 422.9 |      | 91.7  | 383.0 | 0.1  | 108.0 | 31.1 | 0.7  |
| Delay (s)              | 493.1 | 49.6  |      | 83.5 | 494.1 |      | 166.2 | 434.3 | 33.4 | 182.5 | 82.4 | 36.8 |
| Level of Service       | F     | D     |      | F    | F     |      | F     | F     | C    | F     | F    | D    |
| Approach Delay (s)     |       | 284.4 |      |      | 469.3 |      |       | 396.7 |      |       | 87.1 |      |
| Approach LOS           |       | F     |      |      | F     |      |       | F     |      |       | F    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 304.1  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.82   |                      |      |
| Actuated Cycle Length (s)         | 169.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 175.0% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 810   | 570   | 150   | 70  | 560   | 530   | 230  | 2570  | 120   | 240   | 1430  | 320   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 810   | 720   | 0   | 70  | 1090  | 0   | 230  | 2570  | 120   | 240   | 1430  | 320   |
| v/c Ratio               | 1.93  | 0.64  |   | 0.58  | 1.77  |   | 1.10   | 1.84  | 0.19  | 1.15  | 1.03  | 0.44  |
| Control Delay           | 460.9   | 50.9  |   | 78.6  | 385.9   |   | 156.7  | 413.0   | 26.4  | 170.1   | 80.7  | 19.5  |
| Queue Delay             | 252.4   | 0.0   |   | 0.0   | 0.0   |   | 41.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 713.3   | 50.9  |   | 78.7  | 385.9   |   | 198.1  | 413.0   | 26.4  | 170.1   | 80.7  | 19.5  |
| Queue Length 50th (ft)  | ~1377   | 350   |   | 77  | ~887  |   | ~287   | ~2260   | 65  | ~310  | ~885  | 123   |
| Queue Length 95th (ft)  | #1636   | 441   |   | 133   | #1031   |   | #473   | #2369   | 116   | #498  | #1024   | 213   |
| Internal Link Dist (ft) |   | 151   |   |   | 599   |   |  | 856   |   |   |   | 499   |
| Turn Bay Length (ft)    | 250   |   |   | 200   |   |   | 260  |   | 200   | 500   |   |   |
| Base Capacity (vph)     | 419   | 1127  |   | 243   | 616   |   | 209  | 1393  | 640   | 209   | 1393  | 722   |
| 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     | 203   | 0   |   | 5   | 0   |   | 18   | 0   | 0   | 0   | 0   | 0   |
| Reduced v/c Ratio       | 3.75  | 0.64  |   | 0.29  | 1.77  |   | 1.20   | 1.84  | 0.19  | 1.15  | 1.03  | 0.44  |

#### Intersection Summary

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

Timings  
1: THREE CHOPT RD & GASKINS RD

2034 AM NO-BUILD  
7/14/2005

| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |  |  |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |  |  |
| Volume (vph)        | 810   | 570   | 70    | 560   | 230   | 2570  | 120   | 240   | 1430  | 320   |  |  |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Perm  | Prot  |       | Perm  |  |  |
| Protected Phases    | 5     | 2     | 1     | 6     | 3     | 8     |       | 7     | 4     |       |  |  |
| Permitted Phases    |       |       |       |       |       |       | 8     |       |       | 4     |  |  |
| Detector Phases     | 5     | 2     | 1     | 6     | 3     | 8     | 8     | 7     | 4     | 4     |  |  |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 15.0  | 15.0  | 3.0   | 15.0  | 15.0  |  |  |
| Minimum Split (s)   | 7.0   | 8.5   | 7.0   | 8.5   | 7.0   | 20.5  | 20.5  | 7.0   | 20.5  | 20.5  |  |  |
| Total Split (s)     | 44.0  | 45.5  | 29.0  | 30.5  | 24.0  | 70.5  | 70.5  | 24.0  | 70.5  | 70.5  |  |  |
| Total Split (%)     | 26.0% | 26.9% | 17.2% | 18.0% | 14.2% | 41.7% | 41.7% | 14.2% | 41.7% | 41.7% |  |  |
| Yellow Time (s)     | 3.0   | 4.0   | 3.0   | 4.0   | 3.0   | 4.0   | 4.0   | 3.0   | 4.0   | 4.0   |  |  |
| All-Red Time (s)    | 1.0   | 1.5   | 1.0   | 1.5   | 1.0   | 1.5   | 1.5   | 1.0   | 1.5   | 1.5   |  |  |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |  |  |
| Lead-Lag Optimize?  | Yes   |  |  |
| Recall Mode         | None  | None  | None  | Min   | None  | None  | None  | None  | None  | None  |  |  |

**Intersection Summary**  
 Cycle Length: 169  
 Actuated Cycle Length: 169  
 Natural Cycle: 150  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |        |      |        |
|------|--------|------|--------|
|      |        |      |        |
| 29 s | 45.5 s | 24 s | 70.5 s |
|      |        |      |        |
| 44 s | 30.5 s | 24 s | 70.5 s |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 PM NO-BUILD  
 7/14/2005

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement               | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Lane Configurations    |  |  |   |  |  |   |  |  |  |  |  |  |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95  |   | 1.00  | 0.95  |   | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Frt                    | 1.00  | 0.95  |   | 1.00  | 0.96  |   | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00  |   | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3364  |   | 1770  | 3401  |   | 1770  | 3539  | 1583  | 1770  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00  |   | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3364  |   | 1770  | 3401  |   | 1770  | 3539  | 1583  | 1770  | 3539  | 1583  |
| Volume (vph)           | 290   | 590   | 290   | 180   | 680   | 240   | 240   | 1750  | 210   | 300   | 2730  | 580   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 290   | 590   | 290   | 180   | 680   | 240   | 240   | 1750  | 210   | 300   | 2730  | 580   |
| RTOR Reduction (vph)   | 0   | 30  | 0   | 0   | 18  | 0   | 0   | 0   | 38  | 0   | 0   | 82  |
| Lane Group Flow (vph)  | 290   | 850   | 0   | 180   | 902   | 0   | 240   | 1750  | 172   | 300   | 2730  | 498   |
| Turn Type              | Prot  |   |   | Prot  |   |   | Prot  |   | Perm  | Prot  |   | Perm  |
| Protected Phases       | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases       |   |   |   |   |   |   |   |   | 8   |   |   | 4   |
| Actuated Green, G (s)  | 30.0  | 36.2  |   | 23.8  | 30.0  |   | 25.0  | 90.0  | 90.0  | 25.0  | 90.0  | 90.0  |
| Effective Green, g (s) | 30.0  | 37.7  |   | 23.8  | 31.5  |   | 25.0  | 91.5  | 91.5  | 25.0  | 91.5  | 91.5  |
| Actuated g/C Ratio     | 0.15  | 0.19  |   | 0.12  | 0.16  |   | 0.13  | 0.47  | 0.47  | 0.13  | 0.47  | 0.47  |
| Clearance Time (s)     | 4.0   | 5.5   |   | 4.0   | 5.5   |   | 4.0   | 5.5   | 5.5   | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 274   | 654   |   | 217   | 552   |   | 228   | 1669  | 747   | 228   | 1669  | 747   |
| v/s Ratio Prot         | c0.16   | c0.26   |   | 0.10  | c0.27   |   | 0.14  | 0.49  |   | c0.17   | c0.77   |   |
| v/s Ratio Perm         |   |   |   |   |   |   |   |   | 0.13  |   |   | 0.37  |
| v/c Ratio              | 1.06  | 1.30  |   | 0.83  | 1.63  |   | 1.05  | 1.05  | 0.23  | 1.32  | 1.64  | 0.67  |
| Uniform Delay, d1      | 82.0  | 78.2  |   | 83.1  | 81.2  |   | 84.5  | 51.2  | 30.4  | 84.5  | 51.2  | 39.5  |
| Progression Factor     | 1.00  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 70.6  | 146.0   |   | 22.3  | 293.2   |   | 74.1  | 36.0  | 0.2   | 169.7   | 288.8   | 3.0   |
| Delay (s)              | 152.6   | 224.2   |   | 105.4   | 374.4   |   | 158.6   | 87.2  | 30.5  | 254.2   | 340.1   | 42.5  |
| Level of Service       | F   | F   |   | F   | F   |   | F   | F   | C   | F   | F   | D   |
| Approach Delay (s)     |   | 206.4   |   |   | 330.4   |   |   | 89.6  |   |   | 285.1   |   |
| Approach LOS           |   | F   |   |   | F   |   |   | F   |   |   | F   |   |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 226.7  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.53   |                      |      |
| Actuated Cycle Length (s)         | 194.0  | Sum of lost time (s) | 20.0 |
| Intersection Capacity Utilization | 144.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Queues  
1: THREE CHOPT RD & GASKINS RD

2034 PM NO-BUILD  
7/14/2005



| Lane Group              | SEL   | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT   | SWR  |
|-------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Volume (vph)            | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210  | 300   | 2730  | 580  |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Lane Group Flow (vph)   | 290   | 880   | 0    | 180   | 920   | 0    | 240   | 1750  | 210  | 300   | 2730  | 580  |
| v/c Ratio               | 1.06  | 1.29  |      | 0.83  | 1.61  |      | 1.05  | 1.05  | 0.27 | 1.32  | 1.64  | 0.70 |
| Control Delay           | 144.8 | 194.6 |      | 95.6  | 327.3 |      | 150.7 | 84.7  | 20.7 | 229.0 | 322.2 | 33.8 |
| Queue Delay             | 292.4 | 0.0   |      | 76.6  | 0.0   |      | 159.4 | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  |
| Total Delay             | 437.2 | 194.6 |      | 172.2 | 327.3 |      | 310.1 | 84.7  | 20.7 | 229.0 | 322.2 | 33.8 |
| Queue Length 50th (ft)  | ~404  | ~735  |      | 228   | ~873  |      | ~332  | ~1271 | 103  | ~491  | ~2633 | 439  |
| Queue Length 95th (ft)  | #615  | #945  |      | 316   | #1016 |      | #530  | #1398 | 168  | #705  | #2716 | 597  |
| Internal Link Dist (ft) |       | 151   |      |       | 599   |      |       | 856   |      |       | 499   |      |
| Turn Bay Length (ft)    | 250   |       |      | 200   |       |      | 260   |       | 200  | 500   |       |      |
| Base Capacity (vph)     | 274   | 683   |      | 265   | 571   |      | 228   | 1669  | 785  | 228   | 1669  | 829  |
| 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     | 107   | 0     |      | 106   | 0     |      | 61    | 0     | 0    | 0     | 0     | 0    |
| Reduced v/c Ratio       | 1.74  | 1.29  |      | 1.13  | 1.61  |      | 1.44  | 1.05  | 0.27 | 1.32  | 1.64  | 0.70 |

**Intersection Summary**

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

Timings  
1: THREE CHOPT RD & GASKINS RD

2034 PM NO-BUILD  
7/14/2005



| Lane Group          | SEL   | SET   | NWL   | NWT   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations | ↖     | ↕     | ↗     | ↕     | ↖     | ↕     | ↗     | ↖     | ↕     | ↗     |
| Volume (vph)        | 290   | 590   | 180   | 680   | 240   | 1750  | 210   | 300   | 2730  | 580   |
| Turn Type           | Prot  |       | Prot  |       | Prot  |       | Perm  | Prot  |       | Perm  |
| Protected Phases    | 5     | 2     | 1     | 6     | 3     | 8     |       | 7     | 4     |       |
| Permitted Phases    |       |       |       |       |       |       | 8     |       |       | 4     |
| Detector Phases     | 5     | 2     | 1     | 6     | 3     | 8     | 8     | 7     | 4     | 4     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 15.0  | 15.0  | 3.0   | 15.0  | 15.0  |
| Minimum Split (s)   | 7.0   | 8.5   | 7.0   | 8.5   | 7.0   | 20.5  | 20.5  | 7.0   | 20.5  | 20.5  |
| Total Split (s)     | 34.0  | 35.5  | 34.0  | 35.5  | 29.0  | 95.5  | 95.5  | 29.0  | 95.5  | 95.5  |
| Total Split (%)     | 17.5% | 18.3% | 17.5% | 18.3% | 14.9% | 49.2% | 49.2% | 14.9% | 49.2% | 49.2% |
| Yellow Time (s)     | 3.0   | 4.0   | 3.0   | 4.0   | 3.0   | 4.0   | 4.0   | 3.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 1.0   | 1.5   | 1.0   | 1.5   | 1.0   | 1.5   | 1.5   | 1.0   | 1.5   | 1.5   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | None  | None  | Min   | None  | None  | None  | None  | None  | None  |

Intersection Summary

Cycle Length: 194  
 Actuated Cycle Length: 194  
 Natural Cycle: 150  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |        |      |        |
|------|--------|------|--------|
| ↖ ø1 | ↕ ø2   | ↗ ø3 | ↖ ø4   |
| 34 s | 35.5 s | 29 s | 95.5 s |
| ↖ ø5 | ↕ ø6   | ↗ ø7 | ↖ ø8   |
| 34 s | 35.5 s | 29 s | 95.5 s |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 AM BUILD REC#3  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT   | SWR  |
|------------------------|-------|-------|------|------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations    |       |       |      |      |       |      |       |       |      |       |       |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0  | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00 | 0.95  |      | 1.00  | 0.95  | 1.00 | 0.97  | 0.95  | 1.00 |
| Fr't                   | 1.00  | 0.97  |      | 1.00 | 0.93  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 |
| Flt Protected          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (prot)      | 1770  | 3429  |      | 1770 | 3281  |      | 1770  | 3539  | 1583 | 3433  | 3539  | 1583 |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (perm)      | 1770  | 3429  |      | 1770 | 3281  |      | 1770  | 3539  | 1583 | 3433  | 3539  | 1583 |
| Volume (vph)           | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430  | 320  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430  | 320  |
| RTOR Reduction (vph)   | 0     | 14    | 0    | 0    | 58    | 0    | 0     | 0     | 17   | 0     | 0     | 99   |
| Lane Group Flow (vph)  | 810   | 706   | 0    | 70   | 1032  | 0    | 230   | 2570  | 103  | 240   | 1430  | 221  |
| Turn Type              | Prot  |       |      | Prot |       |      | Prot  |       | Perm | Prot  |       | Perm |
| Protected Phases       | 5     | 2     |      | 1    | 6     |      | 3     | 8     |      | 7     | 4     |      |
| Permitted Phases       |       |       |      |      |       |      |       |       | 8    |       |       | 4    |
| Actuated Green, G (s)  | 42.0  | 61.4  |      | 11.1 | 30.5  |      | 13.0  | 70.5  | 70.5 | 7.0   | 64.5  | 64.5 |
| Effective Green, g (s) | 42.0  | 62.9  |      | 11.1 | 32.0  |      | 13.0  | 72.0  | 72.0 | 7.0   | 66.0  | 66.0 |
| Actuated g/C Ratio     | 0.25  | 0.37  |      | 0.07 | 0.19  |      | 0.08  | 0.43  | 0.43 | 0.04  | 0.39  | 0.39 |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0  | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5   | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 5.0   | 5.0  |
| Lane Grp Cap (vph)     | 440   | 1276  |      | 116  | 621   |      | 136   | 1508  | 674  | 142   | 1382  | 618  |
| v/s Ratio Prot         | c0.46 | 0.21  |      | 0.04 | c0.33 |      | c0.13 | c0.73 |      | 0.07  | 0.40  |      |
| v/s Ratio Perm         |       |       |      |      |       |      |       |       | 0.08 |       |       | 0.20 |
| v/c Ratio              | 1.84  | 0.55  |      | 0.60 | 1.66  |      | 1.69  | 1.70  | 0.15 | 1.69  | 1.03  | 0.36 |
| Uniform Delay, d1      | 63.5  | 41.9  |      | 76.8 | 68.5  |      | 78.0  | 48.5  | 29.8 | 81.0  | 51.5  | 36.5 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00 | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Incremental Delay, d2  | 387.2 | 0.5   |      | 8.6  | 304.7 |      | 340.6 | 319.8 | 0.1  | 339.0 | 33.7  | 0.7  |
| Delay (s)              | 450.7 | 42.5  |      | 85.4 | 373.2 |      | 418.6 | 368.3 | 29.9 | 420.0 | 85.2  | 37.2 |
| Level of Service       | F     | D     |      | F    | F     |      | F     | F     | C    | F     | F     | D    |
| Approach Delay (s)     |       | 258.6 |      |      | 355.8 |      |       | 358.3 |      |       | 117.8 |      |
| Approach LOS           |       | F     |      |      | F     |      |       | F     |      |       | F     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 274.9  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.73   |                      |      |
| Actuated Cycle Length (s)         | 169.0  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 168.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC#3  
9/27/2005

| Movement               | SEL   | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
|------------------------|-------|-------|------|-------|-------|------|-------|-------|-------|-------|-------|-------|
| Lane Configurations    |       |       |      |       |       |      |       |       |       |       |       |       |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00  | 0.95  |      | 1.00  | 0.95  | 1.00  | 0.97  | 0.95  | 1.00  |
| Frt                    | 1.00  | 0.95  |      | 1.00  | 0.96  |      | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3364  |      | 1770  | 3401  |      | 1770  | 3539  | 1583  | 3433  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3364  |      | 1770  | 3401  |      | 1770  | 3539  | 1583  | 3433  | 3539  | 1583  |
| Volume (vph)           | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210   | 300   | 2730  | 580   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210   | 300   | 2730  | 580   |
| RTOR Reduction (vph)   | 0     | 31    | 0    | 0     | 19    | 0    | 0     | 0     | 38    | 0     | 0     | 83    |
| Lane Group Flow (vph)  | 290   | 849   | 0    | 180   | 901   | 0    | 240   | 1750  | 172   | 300   | 2730  | 497   |
| Turn Type              | Prot  |       |      | Prot  |       |      | Prot  |       | Perm  | Prot  |       | Perm  |
| Protected Phases       | 5     | 2     |      | 1     | 6     |      | 3     | 8     |       | 7     | 4     |       |
| Permitted Phases       |       |       |      |       |       |      |       |       | 8     |       |       | 4     |
| Actuated Green, G (s)  | 21.0  | 43.5  |      | 13.0  | 35.5  |      | 18.0  | 100.5 | 100.5 | 18.0  | 100.5 | 100.5 |
| Effective Green, g (s) | 21.0  | 45.0  |      | 13.0  | 37.0  |      | 18.0  | 102.0 | 102.0 | 18.0  | 102.0 | 102.0 |
| Actuated g/C Ratio     | 0.11  | 0.23  |      | 0.07  | 0.19  |      | 0.09  | 0.53  | 0.53  | 0.09  | 0.53  | 0.53  |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0   | 5.5   |      | 4.0   | 5.5   | 5.5   | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0   | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 192   | 780   |      | 119   | 649   |      | 164   | 1861  | 832   | 319   | 1861  | 832   |
| v/s Ratio Prot         | c0.16 | 0.26  |      | 0.10  | c0.27 |      | c0.14 | 0.49  |       | 0.09  | c0.77 |       |
| v/s Ratio Perm         |       |       |      |       |       |      |       |       | 0.13  |       |       | 0.37  |
| v/c Ratio              | 1.51  | 1.09  |      | 1.51  | 1.39  |      | 1.46  | 0.94  | 0.21  | 0.94  | 1.47  | 0.60  |
| Uniform Delay, d1      | 86.5  | 74.5  |      | 90.5  | 78.5  |      | 88.0  | 43.1  | 24.5  | 87.5  | 46.0  | 31.8  |
| Progression Factor     | 1.00  | 1.00  |      | 1.00  | 1.00  |      | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 254.7 | 58.8  |      | 269.0 | 184.4 |      | 238.8 | 10.0  | 0.1   | 35.0  | 213.1 | 1.8   |
| Delay (s)              | 341.2 | 133.3 |      | 359.5 | 262.9 |      | 326.8 | 53.2  | 24.6  | 122.4 | 259.1 | 33.6  |
| Level of Service       | F     | F     |      | F     | F     |      | F     | D     | C     | F     | F     | C     |
| Approach Delay (s)     |       | 184.8 |      |       | 278.7 |      |       | 80.3  |       |       | 211.5 |       |
| Approach LOS           |       | F     |      |       | F     |      |       | F     |       |       | F     |       |

| Intersection Summary              |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 181.1  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.46   |                      |      |
| Actuated Cycle Length (s)         | 194.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 144.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

2034 AM BUILD REC#4  
9/27/2005

| Movement                          | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT   | SWR  |
|-----------------------------------|-------|-------|------|------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations               |       |       |      |      |       |      |       |       |      |       |       |      |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)               | 4.0   | 4.0   |      | 4.0  | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  |
| Lane Util. Factor                 | 1.00  | 0.95  |      | 1.00 | 0.95  |      | 0.97  | 0.95  | 1.00 | 1.00  | 0.95  | 1.00 |
| Fr <sub>t</sub>                   | 1.00  | 0.97  |      | 1.00 | 0.93  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 |
| Fl <sub>t</sub> Protected         | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (prot)                 | 1770  | 3429  |      | 1770 | 3281  |      | 3433  | 3539  | 1583 | 1770  | 3539  | 1583 |
| Fl <sub>t</sub> Permitted         | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (perm)                 | 1770  | 3429  |      | 1770 | 3281  |      | 3433  | 3539  | 1583 | 1770  | 3539  | 1583 |
| Volume (vph)                      | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430  | 320  |
| Peak-hour factor, PHF             | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)                   | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430  | 320  |
| RTOR Reduction (vph)              | 0     | 14    | 0    | 0    | 101   | 0    | 0     | 0     | 17   | 0     | 0     | 99   |
| Lane Group Flow (vph)             | 810   | 706   | 0    | 70   | 989   | 0    | 230   | 2570  | 103  | 240   | 1430  | 221  |
| Turn Type                         | Prot  |       |      | Prot |       |      | Prot  |       | Perm | Prot  |       | Perm |
| Protected Phases                  | 5     | 2     |      | 1    | 6     |      | 3     | 8     |      | 7     | 4     |      |
| Permitted Phases                  |       |       |      |      |       |      |       |       | 8    |       |       | 4    |
| Actuated Green, G (s)             | 41.0  | 56.4  |      | 11.1 | 26.5  |      | 12.0  | 69.5  | 69.5 | 13.0  | 70.5  | 70.5 |
| Effective Green, g (s)            | 41.0  | 57.9  |      | 11.1 | 28.0  |      | 12.0  | 71.0  | 71.0 | 13.0  | 72.0  | 72.0 |
| Actuated g/C Ratio                | 0.24  | 0.34  |      | 0.07 | 0.17  |      | 0.07  | 0.42  | 0.42 | 0.08  | 0.43  | 0.43 |
| Clearance Time (s)                | 4.0   | 5.5   |      | 4.0  | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5   | 5.5  |
| Vehicle Extension (s)             | 3.0   | 3.0   |      | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 5.0   | 5.0  |
| Lane Grp Cap (vph)                | 429   | 1175  |      | 116  | 544   |      | 244   | 1487  | 665  | 136   | 1508  | 674  |
| v/s Ratio Prot                    | c0.46 | 0.21  |      | 0.04 | c0.33 |      | 0.07  | c0.73 |      | c0.14 | 0.40  |      |
| v/s Ratio Perm                    |       |       |      |      |       |      |       |       | 0.08 |       |       | 0.20 |
| v/c Ratio                         | 1.89  | 0.60  |      | 0.60 | 1.82  |      | 0.94  | 1.73  | 0.16 | 1.76  | 0.95  | 0.33 |
| Uniform Delay, d <sub>1</sub>     | 64.0  | 46.0  |      | 76.8 | 70.5  |      | 78.2  | 49.0  | 30.4 | 78.0  | 46.7  | 32.4 |
| Progression Factor                | 1.00  | 1.00  |      | 1.00 | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Incremental Delay, d <sub>2</sub> | 408.4 | 0.9   |      | 8.6  | 375.4 |      | 41.8  | 330.6 | 0.1  | 372.3 | 13.1  | 0.6  |
| Delay (s)                         | 472.4 | 46.9  |      | 85.4 | 445.9 |      | 120.0 | 379.6 | 30.5 | 450.3 | 59.9  | 32.9 |
| Level of Service                  | F     | D     |      | F    | F     |      | F     | F     | C    | F     | E     | C    |
| Approach Delay (s)                |       | 272.1 |      |      | 424.1 |      |       | 344.8 |      |       | 102.6 |      |
| Approach LOS                      |       | F     |      |      | F     |      |       | F     |      |       | F     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 278.9  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.82   |                      |      |
| Actuated Cycle Length (s)         | 169.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 175.0% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC#4  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR   |
|------------------------|-------|-------|------|-------|-------|------|-------|------|------|-------|-------|-------|
| Lane Configurations    |       |       |      |       |       |      |       |      |      |       |       |       |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00  | 0.95  |      | 0.97  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  |
| Fr't                   | 1.00  | 0.95  |      | 1.00  | 0.96  |      | 1.00  | 1.00 | 0.85 | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3364  |      | 1770  | 3401  |      | 3433  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3364  |      | 1770  | 3401  |      | 3433  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Volume (vph)           | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750 | 210  | 300   | 2730  | 580   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750 | 210  | 300   | 2730  | 580   |
| RTOR Reduction (vph)   | 0     | 31    | 0    | 0     | 18    | 0    | 0     | 0    | 38   | 0     | 0     | 83    |
| Lane Group Flow (vph)  | 290   | 849   | 0    | 180   | 902   | 0    | 240   | 1750 | 172  | 300   | 2730  | 497   |
| Turn Type              | Prot  |       |      | Prot  |       |      | Prot  |      | Perm | Prot  |       | Perm  |
| Protected Phases       | 5     | 2     |      | 1     | 6     |      | 3     | 8    |      | 7     | 4     |       |
| Permitted Phases       |       |       |      |       |       |      |       |      | 8    |       |       | 4     |
| Actuated Green, G (s)  | 22.0  | 45.5  |      | 14.0  | 37.5  |      | 10.0  | 92.5 | 92.5 | 23.0  | 105.5 | 105.5 |
| Effective Green, g (s) | 22.0  | 47.0  |      | 14.0  | 39.0  |      | 10.0  | 94.0 | 94.0 | 23.0  | 107.0 | 107.0 |
| Actuated g/C Ratio     | 0.11  | 0.24  |      | 0.07  | 0.20  |      | 0.05  | 0.48 | 0.48 | 0.12  | 0.55  | 0.55  |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0   | 5.5   |      | 4.0   | 5.5  | 5.5  | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0  | 3.0  | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 201   | 815   |      | 128   | 684   |      | 177   | 1715 | 767  | 210   | 1952  | 873   |
| v/s Ratio Prot         | c0.16 | 0.26  |      | 0.10  | c0.27 |      | 0.07  | 0.49 |      | c0.17 | c0.77 |       |
| v/s Ratio Perm         |       |       |      |       |       |      |       |      | 0.13 |       |       | 0.37  |
| v/c Ratio              | 1.44  | 1.04  |      | 1.41  | 1.32  |      | 1.36  | 1.02 | 0.22 | 1.43  | 1.40  | 0.57  |
| Uniform Delay, d1      | 86.0  | 73.5  |      | 90.0  | 77.5  |      | 92.0  | 50.0 | 28.9 | 85.5  | 43.5  | 28.4  |
| Progression Factor     | 1.00  | 1.00  |      | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 225.1 | 42.9  |      | 222.8 | 153.4 |      | 192.4 | 27.0 | 0.1  | 218.1 | 182.5 | 1.4   |
| Delay (s)              | 311.1 | 116.4 |      | 312.8 | 230.9 |      | 284.4 | 77.0 | 29.1 | 303.6 | 226.0 | 29.9  |
| Level of Service       | F     | F     |      | F     | F     |      | F     | E    | C    | F     | F     | C     |
| Approach Delay (s)     |       | 164.6 |      |       | 244.3 |      |       | 95.1 |      |       | 201.0 |       |
| Approach LOS           |       | F     |      |       | F     |      |       | F    |      |       | F     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 172.8  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.39   |                      |      |
| Actuated Cycle Length (s)         | 194.0  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 138.2% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 AM BUILD REC#5  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|------|------|
| Lane Configurations    |       |       |      |       |       |      |       |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  |
| Lane Util. Factor      | 0.97  | 0.95  |      | 1.00  | 0.95  |      | 1.00  | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 |
| Fr't                   | 1.00  | 0.97  |      | 1.00  | 0.93  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 |
| Flt Protected          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)      | 3433  | 3429  |      | 1770  | 3281  |      | 1770  | 3539  | 1583 | 1770  | 3539 | 1583 |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (perm)      | 3433  | 3429  |      | 1770  | 3281  |      | 1770  | 3539  | 1583 | 1770  | 3539 | 1583 |
| Volume (vph)           | 810   | 570   | 150  | 70    | 560   | 530  | 230   | 2570  | 120  | 240   | 1430 | 320  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 810   | 570   | 150  | 70    | 560   | 530  | 230   | 2570  | 120  | 240   | 1430 | 320  |
| RTOR Reduction (vph)   | 0     | 14    | 0    | 0     | 101   | 0    | 0     | 0     | 17   | 0     | 0    | 99   |
| Lane Group Flow (vph)  | 810   | 706   | 0    | 70    | 989   | 0    | 230   | 2570  | 103  | 240   | 1430 | 221  |
| Turn Type              | Prot  |       |      | Prot  |       |      | Prot  |       | Perm | Prot  |      | Perm |
| Protected Phases       | 5     | 2     |      | 1     | 6     |      | 3     | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |       |      |       |       |      |       |       | 8    |       |      | 4    |
| Actuated Green, G (s)  | 25.0  | 47.7  |      | 8.8   | 31.5  |      | 23.0  | 78.5  | 78.5 | 15.0  | 70.5 | 70.5 |
| Effective Green, g (s) | 25.0  | 49.2  |      | 8.8   | 33.0  |      | 23.0  | 80.0  | 80.0 | 15.0  | 72.0 | 72.0 |
| Actuated g/C Ratio     | 0.15  | 0.29  |      | 0.05  | 0.20  |      | 0.14  | 0.47  | 0.47 | 0.09  | 0.43 | 0.43 |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0   | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)     | 508   | 998   |      | 92    | 641   |      | 241   | 1675  | 749  | 157   | 1508 | 674  |
| v/s Ratio Prot         | c0.24 | 0.21  |      | 0.04  | c0.33 |      | 0.13  | c0.73 |      | c0.14 | 0.40 |      |
| v/s Ratio Perm         |       |       |      |       |       |      |       |       | 0.08 |       |      | 0.20 |
| v/c Ratio              | 1.59  | 0.71  |      | 0.76  | 1.54  |      | 0.95  | 1.53  | 0.14 | 1.53  | 0.95 | 0.33 |
| Uniform Delay, d1      | 72.0  | 53.5  |      | 79.1  | 68.0  |      | 72.5  | 44.5  | 25.1 | 77.0  | 46.7 | 32.4 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00  | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Incremental Delay, d2  | 276.7 | 2.3   |      | 30.3  | 252.3 |      | 45.0  | 243.5 | 0.1  | 267.4 | 13.1 | 0.6  |
| Delay (s)              | 348.7 | 55.8  |      | 109.4 | 320.3 |      | 117.5 | 288.0 | 25.2 | 344.4 | 59.9 | 32.9 |
| Level of Service       | F     | E     |      | F     | F     |      | F     | F     | C    | F     | E    | C    |
| Approach Delay (s)     |       | 210.9 |      |       | 307.6 |      |       | 263.8 |      |       | 89.8 |      |
| Approach LOS           |       | F     |      |       | F     |      |       | F     |      |       | F    |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 214.3  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.58   |                      |      |
| Actuated Cycle Length (s)         | 169.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 153.3% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC#5  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR   |
|------------------------|-------|-------|------|-------|-------|------|-------|------|------|-------|-------|-------|
| Lane Configurations    | ↖↗    | ↕     |      | ↖     | ↕     |      | ↖     | ↕    | ↗    | ↖     | ↕     | ↗     |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 0.97  | 0.95  |      | 1.00  | 0.95  |      | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  |
| Frt                    | 1.00  | 0.95  |      | 1.00  | 0.96  |      | 1.00  | 1.00 | 0.85 | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 3433  | 3364  |      | 1770  | 3401  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 3433  | 3364  |      | 1770  | 3401  |      | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Volume (vph)           | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750 | 210  | 300   | 2730  | 580   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750 | 210  | 300   | 2730  | 580   |
| RTOR Reduction (vph)   | 0     | 31    | 0    | 0     | 18    | 0    | 0     | 0    | 38   | 0     | 0     | 82    |
| Lane Group Flow (vph)  | 290   | 849   | 0    | 180   | 902   | 0    | 240   | 1750 | 172  | 300   | 2730  | 498   |
| Turn Type              | Prot  |       |      | Prot  |       |      | Prot  |      | Perm | Prot  |       | Perm  |
| Protected Phases       | 5     | 2     |      | 1     | 6     |      | 3     | 8    |      | 7     | 4     |       |
| Permitted Phases       |       |       |      |       |       |      |       |      | 8    |       |       | 4     |
| Actuated Green, G (s)  | 12.0  | 35.5  |      | 14.0  | 37.5  |      | 19.0  | 93.5 | 93.5 | 32.0  | 106.5 | 106.5 |
| Effective Green, g (s) | 12.0  | 37.0  |      | 14.0  | 39.0  |      | 19.0  | 95.0 | 95.0 | 32.0  | 108.0 | 108.0 |
| Actuated g/C Ratio     | 0.06  | 0.19  |      | 0.07  | 0.20  |      | 0.10  | 0.49 | 0.49 | 0.16  | 0.56  | 0.56  |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0   | 5.5   |      | 4.0   | 5.5  | 5.5  | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0  | 3.0  | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 212   | 642   |      | 128   | 684   |      | 173   | 1733 | 775  | 292   | 1970  | 881   |
| v/s Ratio Prot         | 0.08  | 0.26  |      | c0.10 | c0.27 |      | c0.14 | 0.49 |      | 0.17  | c0.77 |       |
| v/s Ratio Perm         |       |       |      |       |       |      |       |      | 0.13 |       |       | 0.37  |
| v/c Ratio              | 1.37  | 1.32  |      | 1.41  | 1.32  |      | 1.39  | 1.01 | 0.22 | 1.03  | 1.39  | 0.56  |
| Uniform Delay, d1      | 91.0  | 78.5  |      | 90.0  | 77.5  |      | 87.5  | 49.5 | 28.3 | 81.0  | 43.0  | 27.8  |
| Progression Factor     | 1.00  | 1.00  |      | 1.00  | 1.00  |      | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 192.7 | 156.0 |      | 222.8 | 153.4 |      | 205.8 | 24.0 | 0.1  | 59.9  | 176.8 | 1.4   |
| Delay (s)              | 283.7 | 234.5 |      | 312.8 | 230.9 |      | 293.3 | 73.5 | 28.5 | 140.9 | 219.8 | 29.2  |
| Level of Service       | F     | F     |      | F     | F     |      | F     | E    | C    | F     | F     | C     |
| Approach Delay (s)     |       | 246.7 |      |       | 244.3 |      |       | 93.2 |      |       | 182.6 |       |
| Approach LOS           |       | F     |      |       | F     |      |       | F    |      |       | F     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 176.0  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.36   |                      |      |
| Actuated Cycle Length (s)         | 194.0  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 137.7% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 AM BUILD REC#6  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT   | SWR  |
|------------------------|-------|-------|------|------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations    | ↙     | ↑↑    |      | ↙↙   | ↑↑    |      | ↙     | ↑↑    | ↙    | ↙     | ↑↑    | ↙    |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0  | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  |      | 0.97 | 0.95  |      | 1.00  | 0.95  | 1.00 | 1.00  | 0.95  | 1.00 |
| Frnt                   | 1.00  | 0.97  |      | 1.00 | 0.93  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 |
| Flt Protected          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (prot)      | 1770  | 3429  |      | 3433 | 3281  |      | 1770  | 3539  | 1583 | 1770  | 3539  | 1583 |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (perm)      | 1770  | 3429  |      | 3433 | 3281  |      | 1770  | 3539  | 1583 | 1770  | 3539  | 1583 |
| Volume (vph)           | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430  | 320  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430  | 320  |
| RTOR Reduction (vph)   | 0     | 14    | 0    | 0    | 101   | 0    | 0     | 0     | 17   | 0     | 0     | 99   |
| Lane Group Flow (vph)  | 810   | 706   | 0    | 70   | 989   | 0    | 230   | 2570  | 103  | 240   | 1430  | 221  |
| Turn Type              | Prot  |       |      | Prot |       |      | Prot  |       | Perm | Prot  |       | Perm |
| Protected Phases       | 5     | 2     |      | 1    | 6     |      | 3     | 8     |      | 7     | 4     |      |
| Permitted Phases       |       |       |      |      |       |      |       |       | 8    |       |       | 4    |
| Actuated Green, G (s)  | 41.0  | 60.6  |      | 6.9  | 26.5  |      | 20.0  | 69.5  | 69.5 | 13.0  | 62.5  | 62.5 |
| Effective Green, g (s) | 41.0  | 62.1  |      | 6.9  | 28.0  |      | 20.0  | 71.0  | 71.0 | 13.0  | 64.0  | 64.0 |
| Actuated g/C Ratio     | 0.24  | 0.37  |      | 0.04 | 0.17  |      | 0.12  | 0.42  | 0.42 | 0.08  | 0.38  | 0.38 |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0  | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5   | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 5.0   | 5.0  |
| Lane Grp Cap (vph)     | 429   | 1260  |      | 140  | 544   |      | 209   | 1487  | 665  | 136   | 1340  | 599  |
| v/s Ratio Prot         | c0.46 | 0.21  |      | 0.02 | c0.33 |      | 0.13  | c0.73 |      | c0.14 | 0.40  |      |
| v/s Ratio Perm         |       |       |      |      |       |      |       |       | 0.08 |       |       | 0.20 |
| v/c Ratio              | 1.89  | 0.56  |      | 0.50 | 1.82  |      | 1.10  | 1.73  | 0.16 | 1.76  | 1.07  | 0.37 |
| Uniform Delay, d1      | 64.0  | 42.6  |      | 79.4 | 70.5  |      | 74.5  | 49.0  | 30.4 | 78.0  | 52.5  | 37.9 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00 | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Incremental Delay, d2  | 408.4 | 0.6   |      | 2.8  | 375.4 |      | 91.7  | 330.6 | 0.1  | 372.3 | 44.7  | 0.8  |
| Delay (s)              | 472.4 | 43.2  |      | 82.2 | 445.9 |      | 166.2 | 379.6 | 30.5 | 450.3 | 97.2  | 38.7 |
| Level of Service       | F     | D     |      | F    | F     |      | F     | F     | C    | F     | F     | D    |
| Approach Delay (s)     |       | 270.4 |      |      | 423.9 |      |       | 348.4 |      |       | 130.4 |      |
| Approach LOS           |       | F     |      |      | F     |      |       | F     |      |       | F     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 287.1  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.82   |                      |      |
| Actuated Cycle Length (s)         | 169.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 175.0% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC#6  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT   | SWR   |
|------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|-------|
| Lane Configurations    |       |       |      |       |       |      |       |       |      |       |       |       |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95  |      | 0.97  | 0.95  |      | 1.00  | 0.95  | 1.00 | 1.00  | 0.95  | 1.00  |
| Frt                    | 1.00  | 0.95  |      | 1.00  | 0.96  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3364  |      | 3433  | 3401  |      | 1770  | 3539  | 1583 | 1770  | 3539  | 1583  |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3364  |      | 3433  | 3401  |      | 1770  | 3539  | 1583 | 1770  | 3539  | 1583  |
| Volume (vph)           | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210  | 300   | 2730  | 580   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210  | 300   | 2730  | 580   |
| RTOR Reduction (vph)   | 0     | 31    | 0    | 0     | 19    | 0    | 0     | 0     | 38   | 0     | 0     | 83    |
| Lane Group Flow (vph)  | 290   | 849   | 0    | 180   | 901   | 0    | 240   | 1750  | 172  | 300   | 2730  | 497   |
| Turn Type              | Prot  |       |      | Prot  |       |      | Prot  |       | Perm | Prot  |       | Perm  |
| Protected Phases       | 5     | 2     |      | 1     | 6     |      | 3     | 8     |      | 7     | 4     |       |
| Permitted Phases       |       |       |      |       |       |      |       |       | 8    |       |       | 4     |
| Actuated Green, G (s)  | 21.0  | 46.5  |      | 10.0  | 35.5  |      | 18.0  | 88.5  | 88.5 | 30.0  | 100.5 | 100.5 |
| Effective Green, g (s) | 21.0  | 48.0  |      | 10.0  | 37.0  |      | 18.0  | 90.0  | 90.0 | 30.0  | 102.0 | 102.0 |
| Actuated g/C Ratio     | 0.11  | 0.25  |      | 0.05  | 0.19  |      | 0.09  | 0.46  | 0.46 | 0.15  | 0.53  | 0.53  |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0   | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 192   | 832   |      | 177   | 649   |      | 164   | 1642  | 734  | 274   | 1861  | 832   |
| v/s Ratio Prot         | c0.16 | 0.26  |      | 0.05  | c0.27 |      | c0.14 | 0.49  |      | 0.17  | c0.77 |       |
| v/s Ratio Perm         |       |       |      |       |       |      |       |       | 0.13 |       |       | 0.37  |
| v/c Ratio              | 1.51  | 1.02  |      | 1.02  | 1.39  |      | 1.46  | 1.07  | 0.23 | 1.09  | 1.47  | 0.60  |
| Uniform Delay, d1      | 86.5  | 73.0  |      | 92.0  | 78.5  |      | 88.0  | 52.0  | 31.3 | 82.0  | 46.0  | 31.8  |
| Progression Factor     | 1.00  | 1.00  |      | 1.00  | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 254.7 | 36.5  |      | 72.1  | 184.4 |      | 238.8 | 42.1  | 0.2  | 82.1  | 213.1 | 1.8   |
| Delay (s)              | 341.2 | 109.5 |      | 164.1 | 262.9 |      | 326.8 | 94.1  | 31.4 | 164.1 | 259.1 | 33.6  |
| Level of Service       | F     | F     |      | F     | F     |      | F     | F     | C    | F     | F     | C     |
| Approach Delay (s)     |       | 166.9 |      |       | 246.7 |      |       | 113.5 |      |       | 215.0 |       |
| Approach LOS           |       | F     |      |       | F     |      |       | F     |      |       | F     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 184.7  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.46   |                      |      |
| Actuated Cycle Length (s)         | 194.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 144.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 AM BUILD REC#7  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT   | SWR  |
|------------------------|-------|-------|------|------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations    |       |       |      |      |       |      |       |       |      |       |       |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  | 1.00 | 1.00 | 0.95  |      | 1.00  | 0.95  | 1.00 | 1.00  | 0.95  | 1.00 |
| Frt                    | 1.00  | 1.00  | 0.85 | 1.00 | 0.93  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 |
| Flt Protected          | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (prot)      | 1770  | 3539  | 1583 | 1770 | 3281  |      | 1770  | 3539  | 1583 | 1770  | 3539  | 1583 |
| Flt Permitted          | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (perm)      | 1770  | 3539  | 1583 | 1770 | 3281  |      | 1770  | 3539  | 1583 | 1770  | 3539  | 1583 |
| Volume (vph)           | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430  | 320  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 810   | 570   | 150  | 70   | 560   | 530  | 230   | 2570  | 120  | 240   | 1430  | 320  |
| RTOR Reduction (vph)   | 0     | 0     | 94   | 0    | 101   | 0    | 0     | 0     | 17   | 0     | 0     | 99   |
| Lane Group Flow (vph)  | 810   | 570   | 56   | 70   | 989   | 0    | 230   | 2570  | 103  | 240   | 1430  | 221  |
| Turn Type              | Prot  |       | Perm | Prot |       |      | Prot  |       | Perm | Prot  |       | Perm |
| Protected Phases       | 5     | 2     |      | 1    | 6     |      | 3     | 8     |      | 7     | 4     |      |
| Permitted Phases       |       |       | 2    |      |       |      |       |       | 8    |       |       | 4    |
| Actuated Green, G (s)  | 41.0  | 56.4  | 56.4 | 11.1 | 26.5  |      | 20.0  | 69.5  | 69.5 | 13.0  | 62.5  | 62.5 |
| Effective Green, g (s) | 41.0  | 57.9  | 57.9 | 11.1 | 28.0  |      | 20.0  | 71.0  | 71.0 | 13.0  | 64.0  | 64.0 |
| Actuated g/C Ratio     | 0.24  | 0.34  | 0.34 | 0.07 | 0.17  |      | 0.12  | 0.42  | 0.42 | 0.08  | 0.38  | 0.38 |
| Clearance Time (s)     | 4.0   | 5.5   | 5.5  | 4.0  | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5   | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0   | 3.0  | 3.0  | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 5.0   | 5.0  |
| Lane Grp Cap (vph)     | 429   | 1212  | 542  | 116  | 544   |      | 209   | 1487  | 665  | 136   | 1340  | 599  |
| v/s Ratio Prot         | c0.46 | 0.16  |      | 0.04 | c0.33 |      | 0.13  | c0.73 |      | c0.14 | 0.40  |      |
| v/s Ratio Perm         |       |       | 0.09 |      |       |      |       |       | 0.08 |       |       | 0.20 |
| v/c Ratio              | 1.89  | 0.47  | 0.10 | 0.60 | 1.82  |      | 1.10  | 1.73  | 0.16 | 1.76  | 1.07  | 0.37 |
| Uniform Delay, d1      | 64.0  | 43.5  | 37.9 | 76.8 | 70.5  |      | 74.5  | 49.0  | 30.4 | 78.0  | 52.5  | 37.9 |
| Progression Factor     | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Incremental Delay, d2  | 408.4 | 0.3   | 0.1  | 8.6  | 375.4 |      | 91.7  | 330.6 | 0.1  | 372.3 | 44.7  | 0.8  |
| Delay (s)              | 472.4 | 43.8  | 37.9 | 85.4 | 445.9 |      | 166.2 | 379.6 | 30.5 | 450.3 | 97.2  | 38.7 |
| Level of Service       | F     | D     | D    | F    | F     |      | F     | F     | C    | F     | F     | D    |
| Approach Delay (s)     |       | 270.1 |      |      | 424.1 |      |       | 348.4 |      |       | 130.4 |      |
| Approach LOS           |       | F     |      |      | F     |      |       | F     |      |       | F     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 287.1  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.82   |                      |      |
| Actuated Cycle Length (s)         | 169.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 175.0% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC#7  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT   | SWR   |
|------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|-------|
| Lane Configurations    |       |       |      |       |       |      |       |       |      |       |       |       |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor      | 1.00  | 0.95  | 1.00 | 1.00  | 0.95  |      | 1.00  | 0.95  | 1.00 | 1.00  | 0.95  | 1.00  |
| Frt                    | 1.00  | 1.00  | 0.85 | 1.00  | 0.96  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85  |
| Fit Protected          | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)      | 1770  | 3539  | 1583 | 1770  | 3401  |      | 1770  | 3539  | 1583 | 1770  | 3539  | 1583  |
| Fit Permitted          | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)      | 1770  | 3539  | 1583 | 1770  | 3401  |      | 1770  | 3539  | 1583 | 1770  | 3539  | 1583  |
| Volume (vph)           | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210  | 300   | 2730  | 580   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210  | 300   | 2730  | 580   |
| RTOR Reduction (vph)   | 0     | 0     | 130  | 0     | 19    | 0    | 0     | 0     | 38   | 0     | 0     | 83    |
| Lane Group Flow (vph)  | 290   | 590   | 160  | 180   | 901   | 0    | 240   | 1750  | 172  | 300   | 2730  | 497   |
| Turn Type              | Prot  |       | Perm | Prot  |       |      | Prot  |       | Perm | Prot  |       | Perm  |
| Protected Phases       | 5     | 2     |      | 1     | 6     |      | 3     | 8     |      | 7     | 4     |       |
| Permitted Phases       |       |       | 2    |       |       |      |       |       | 8    |       |       | 4     |
| Actuated Green, G (s)  | 21.0  | 36.5  | 36.5 | 20.0  | 35.5  |      | 18.0  | 88.5  | 88.5 | 30.0  | 100.5 | 100.5 |
| Effective Green, g (s) | 21.0  | 38.0  | 38.0 | 20.0  | 37.0  |      | 18.0  | 90.0  | 90.0 | 30.0  | 102.0 | 102.0 |
| Actuated g/C Ratio     | 0.11  | 0.20  | 0.20 | 0.10  | 0.19  |      | 0.09  | 0.46  | 0.46 | 0.15  | 0.53  | 0.53  |
| Clearance Time (s)     | 4.0   | 5.5   | 5.5  | 4.0   | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0   | 3.0  | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)     | 192   | 693   | 310  | 182   | 649   |      | 164   | 1642  | 734  | 274   | 1861  | 832   |
| v/s Ratio Prot         | c0.16 | 0.17  |      | 0.10  | c0.27 |      | c0.14 | 0.49  |      | 0.17  | c0.77 |       |
| v/s Ratio Perm         |       |       | 0.18 |       |       |      |       |       | 0.13 |       |       | 0.37  |
| v/c Ratio              | 1.51  | 0.85  | 0.52 | 0.99  | 1.39  |      | 1.46  | 1.07  | 0.23 | 1.09  | 1.47  | 0.60  |
| Uniform Delay, d1      | 86.5  | 75.3  | 69.8 | 86.9  | 78.5  |      | 88.0  | 52.0  | 31.3 | 82.0  | 46.0  | 31.8  |
| Progression Factor     | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2  | 254.7 | 9.9   | 1.4  | 62.8  | 184.4 |      | 238.8 | 42.1  | 0.2  | 82.1  | 213.1 | 1.8   |
| Delay (s)              | 341.2 | 85.1  | 71.2 | 149.7 | 262.9 |      | 326.8 | 94.1  | 31.4 | 164.1 | 259.1 | 33.6  |
| Level of Service       | F     | F     | E    | F     | F     |      | F     | F     | C    | F     | F     | C     |
| Approach Delay (s)     |       | 145.2 |      |       | 244.4 |      |       | 113.5 |      |       | 215.0 |       |
| Approach LOS           |       | F     |      |       | F     |      |       | F     |      |       | F     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 181.2  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.46   |                      |      |
| Actuated Cycle Length (s)         | 194.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 144.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

2034 AM BUILD REC#8  
9/27/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR   | NEL   | NET   | NER  | SWL   | SWT   | SWR  |
|------------------------|-------|-------|------|------|-------|-------|-------|-------|------|-------|-------|------|
| Lane Configurations    |       |       |      |      |       |       |       |       |      |       |       |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00 | 0.95  | 1.00  | 1.00  | 0.95  | 1.00 | 1.00  | 0.95  | 1.00 |
| Frt                    | 1.00  | 0.97  |      | 1.00 | 1.00  | 0.85  | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 |
| Flt Protected          | 0.95  | 1.00  |      | 0.95 | 1.00  | 1.00  | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (prot)      | 1770  | 3429  |      | 1770 | 3539  | 1583  | 1770  | 3539  | 1583 | 1770  | 3539  | 1583 |
| Flt Permitted          | 0.95  | 1.00  |      | 0.95 | 1.00  | 1.00  | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 |
| Satd. Flow (perm)      | 1770  | 3429  |      | 1770 | 3539  | 1583  | 1770  | 3539  | 1583 | 1770  | 3539  | 1583 |
| Volume (vph)           | 810   | 570   | 150  | 70   | 560   | 530   | 230   | 2570  | 120  | 240   | 1430  | 320  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 810   | 570   | 150  | 70   | 560   | 530   | 230   | 2570  | 120  | 240   | 1430  | 320  |
| RTOR Reduction (vph)   | 0     | 14    | 0    | 0    | 0     | 104   | 0     | 0     | 17   | 0     | 0     | 99   |
| Lane Group Flow (vph)  | 810   | 706   | 0    | 70   | 560   | 426   | 230   | 2570  | 103  | 240   | 1430  | 221  |
| Turn Type              | Prot  |       |      | Prot |       | Perm  | Prot  |       | Perm | Prot  |       | Perm |
| Protected Phases       | 5     | 2     |      | 1    | 6     |       | 3     | 8     |      | 7     | 4     |      |
| Permitted Phases       |       |       |      |      |       | 6     |       |       | 8    |       |       | 4    |
| Actuated Green, G (s)  | 42.0  | 54.4  |      | 11.1 | 23.5  | 23.5  | 20.0  | 71.5  | 71.5 | 13.0  | 64.5  | 64.5 |
| Effective Green, g (s) | 42.0  | 55.9  |      | 11.1 | 25.0  | 25.0  | 20.0  | 73.0  | 73.0 | 13.0  | 66.0  | 66.0 |
| Actuated g/C Ratio     | 0.25  | 0.33  |      | 0.07 | 0.15  | 0.15  | 0.12  | 0.43  | 0.43 | 0.08  | 0.39  | 0.39 |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0  | 5.5   | 5.5   | 4.0   | 5.5   | 5.5  | 4.0   | 5.5   | 5.5  |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0  | 3.0   | 5.0   | 5.0  |
| Lane Grp Cap (vph)     | 440   | 1134  |      | 116  | 524   | 234   | 209   | 1529  | 684  | 136   | 1382  | 618  |
| v/s Ratio Prot         | c0.46 | 0.21  |      | 0.04 | 0.16  |       | 0.13  | c0.73 |      | c0.14 | 0.40  |      |
| v/s Ratio Perm         |       |       |      |      |       | 0.33  |       |       | 0.08 |       |       | 0.20 |
| v/c Ratio              | 1.84  | 0.62  |      | 0.60 | 1.07  | 1.82  | 1.10  | 1.68  | 0.15 | 1.76  | 1.03  | 0.36 |
| Uniform Delay, d1      | 63.5  | 47.7  |      | 76.8 | 72.0  | 72.0  | 74.5  | 48.0  | 29.2 | 78.0  | 51.5  | 36.5 |
| Progression Factor     | 1.00  | 1.00  |      | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 |
| Incremental Delay, d2  | 387.2 | 1.1   |      | 8.6  | 58.9  | 385.7 | 91.7  | 309.3 | 0.1  | 372.3 | 33.7  | 0.7  |
| Delay (s)              | 450.7 | 48.7  |      | 85.4 | 130.9 | 457.7 | 166.2 | 357.3 | 29.3 | 450.3 | 85.2  | 37.2 |
| Level of Service       | F     | D     |      | F    | F     | F     | F     | F     | C    | F     | F     | D    |
| Approach Delay (s)     |       | 261.5 |      |      | 277.5 |       |       | 328.7 |      |       | 121.5 |      |
| Approach LOS           |       | F     |      |      | F     |       |       | F     |      |       | F     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 253.1  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.83   |                      |      |
| Actuated Cycle Length (s)         | 169.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 158.7% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC#8  
 9/27/2005



| Movement                          | SEL   | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR   |
|-----------------------------------|-------|-------|------|-------|-------|------|-------|------|------|-------|-------|-------|
| Lane Configurations               | ↖     | ↕↗    |      | ↖     | ↕↗    | ↗    | ↖     | ↕↗   | ↗    | ↖     | ↕↗    | ↗     |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor                 | 1.00  | 0.95  |      | 1.00  | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  |
| Fr <sub>t</sub>                   | 1.00  | 0.95  |      | 1.00  | 1.00  | 0.85 | 1.00  | 1.00 | 0.85 | 1.00  | 1.00  | 0.85  |
| Fl <sub>t</sub> Protected         | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)                 | 1770  | 3364  |      | 1770  | 3539  | 1583 | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Fl <sub>t</sub> Permitted         | 0.95  | 1.00  |      | 0.95  | 1.00  | 1.00 | 0.95  | 1.00 | 1.00 | 0.95  | 1.00  | 1.00  |
| Satd. Flow (perm)                 | 1770  | 3364  |      | 1770  | 3539  | 1583 | 1770  | 3539 | 1583 | 1770  | 3539  | 1583  |
| Volume (vph)                      | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750 | 210  | 300   | 2730  | 580   |
| Peak-hour factor, PHF             | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)                   | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750 | 210  | 300   | 2730  | 580   |
| RTOR Reduction (vph)              | 0     | 31    | 0    | 0     | 0     | 137  | 0     | 0    | 38   | 0     | 0     | 82    |
| Lane Group Flow (vph)             | 290   | 849   | 0    | 180   | 680   | 103  | 240   | 1750 | 172  | 300   | 2730  | 498   |
| Turn Type                         | Prot  |       |      | Prot  |       | Perm | Prot  |      | Perm | Prot  |       | Perm  |
| Protected Phases                  | 5     | 2     |      | 1     | 6     |      | 3     | 8    |      | 7     | 4     |       |
| Permitted Phases                  |       |       |      |       |       | 6    |       |      | 8    |       |       | 4     |
| Actuated Green, G (s)             | 23.0  | 35.5  |      | 14.0  | 26.5  | 26.5 | 19.0  | 93.5 | 93.5 | 32.0  | 106.5 | 106.5 |
| Effective Green, g (s)            | 23.0  | 37.0  |      | 14.0  | 28.0  | 28.0 | 19.0  | 95.0 | 95.0 | 32.0  | 108.0 | 108.0 |
| Actuated g/C Ratio                | 0.12  | 0.19  |      | 0.07  | 0.14  | 0.14 | 0.10  | 0.49 | 0.49 | 0.16  | 0.56  | 0.56  |
| Clearance Time (s)                | 4.0   | 5.5   |      | 4.0   | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  | 4.0   | 5.5   | 5.5   |
| Vehicle Extension (s)             | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0  | 3.0   | 3.0  | 3.0  | 3.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)                | 210   | 642   |      | 128   | 511   | 228  | 173   | 1733 | 775  | 292   | 1970  | 881   |
| v/s Ratio Prot                    | c0.16 | c0.26 |      | 0.10  | 0.19  |      | c0.14 | 0.49 |      | 0.17  | c0.77 |       |
| v/s Ratio Perm                    |       |       |      |       |       | 0.15 |       |      | 0.13 |       |       | 0.37  |
| v/c Ratio                         | 1.38  | 1.32  |      | 1.41  | 1.33  | 0.45 | 1.39  | 1.01 | 0.22 | 1.03  | 1.39  | 0.56  |
| Uniform Delay, d <sub>1</sub>     | 85.5  | 78.5  |      | 90.0  | 83.0  | 76.0 | 87.5  | 49.5 | 28.3 | 81.0  | 43.0  | 27.8  |
| Progression Factor                | 1.00  | 1.00  |      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d <sub>2</sub> | 198.3 | 156.0 |      | 222.8 | 161.9 | 1.4  | 205.8 | 24.0 | 0.1  | 59.9  | 176.8 | 1.4   |
| Delay (s)                         | 283.8 | 234.5 |      | 312.8 | 244.9 | 77.4 | 293.3 | 73.5 | 28.5 | 140.9 | 219.8 | 29.2  |
| Level of Service                  | F     | F     |      | F     | F     | E    | F     | E    | C    | F     | F     | C     |
| Approach Delay (s)                |       | 246.7 |      |       | 219.4 |      |       | 93.2 |      |       | 182.6 |       |
| Approach LOS                      |       | F     |      |       | F     |      |       | F    |      |       | F     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 172.6  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.37   |                      |      |
| Actuated Cycle Length (s)         | 194.0  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 137.7% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 AM BUILD REC#9  
 9/27/2005

| Movement               | SEL   | SET  | SER  | NWL   | NWT   | NWR  | NEL   | NET   | NER  | SWL   | SWT  | SWR  |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|-------|------|------|
| Lane Configurations    |       |      |      |       |       |      |       |       |      |       |      |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  |      | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0  |      |
| Lane Util. Factor      | 1.00  | 0.95 |      | 1.00  | 0.95  |      | 0.97  | 0.91  |      | 0.97  | 0.91 |      |
| Flt                    | 1.00  | 0.97 |      | 1.00  | 0.93  |      | 1.00  | 0.99  |      | 1.00  | 0.97 |      |
| Flt Protected          | 0.95  | 1.00 |      | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (prot)      | 1770  | 3429 |      | 1770  | 3281  |      | 3433  | 5051  |      | 3433  | 4946 |      |
| Flt Permitted          | 0.95  | 1.00 |      | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00 |      |
| Satd. Flow (perm)      | 1770  | 3429 |      | 1770  | 3281  |      | 3433  | 5051  |      | 3433  | 4946 |      |
| Volume (vph)           | 810   | 570  | 150  | 70    | 560   | 530  | 230   | 2570  | 120  | 240   | 1430 | 320  |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 |
| Adj. Flow (vph)        | 810   | 570  | 150  | 70    | 560   | 530  | 230   | 2570  | 120  | 240   | 1430 | 320  |
| RTOR Reduction (vph)   | 0     | 14   | 0    | 0     | 70    | 0    | 0     | 3     | 0    | 0     | 21   | 0    |
| Lane Group Flow (vph)  | 810   | 706  | 0    | 70    | 1020  | 0    | 230   | 2687  | 0    | 240   | 1729 | 0    |
| Turn Type              | Prot  |      | Prot |       | Prot  |      | Prot  |       | Prot |       |      |      |
| Protected Phases       | 5     | 2    |      | 1     | 6     |      | 3     | 8     |      | 7     | 4    |      |
| Permitted Phases       |       |      |      |       |       |      |       |       |      |       |      |      |
| Actuated Green, G (s)  | 49.0  | 71.4 |      | 11.1  | 33.5  |      | 11.0  | 59.5  |      | 8.0   | 56.5 |      |
| Effective Green, g (s) | 49.0  | 72.9 |      | 11.1  | 35.0  |      | 11.0  | 61.0  |      | 8.0   | 58.0 |      |
| Actuated g/C Ratio     | 0.29  | 0.43 |      | 0.07  | 0.21  |      | 0.07  | 0.36  |      | 0.05  | 0.34 |      |
| Clearance Time (s)     | 4.0   | 5.5  |      | 4.0   | 5.5   |      | 4.0   | 5.5   |      | 4.0   | 5.5  |      |
| Vehicle Extension (s)  | 3.0   | 3.0  |      | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 5.0  |      |
| Lane Grp Cap (vph)     | 513   | 1479 |      | 116   | 679   |      | 223   | 1823  |      | 163   | 1697 |      |
| v/s Ratio Prot         | c0.46 | 0.21 |      | 0.04  | c0.33 |      | 0.07  | c0.53 |      | c0.07 | 0.35 |      |
| v/s Ratio Perm         |       |      |      |       |       |      |       |       |      |       |      |      |
| v/c Ratio              | 1.58  | 0.48 |      | 0.60  | 1.50  |      | 1.03  | 1.47  |      | 1.47  | 1.02 |      |
| Uniform Delay, d1      | 60.0  | 34.4 |      | 76.8  | 67.0  |      | 79.0  | 54.0  |      | 80.5  | 55.5 |      |
| Progression Factor     | 1.00  | 1.00 |      | 1.00  | 1.00  |      | 1.00  | 1.00  |      | 1.00  | 1.00 |      |
| Incremental Delay, d2  | 269.8 | 0.2  |      | 8.6   | 233.8 |      | 68.7  | 216.3 |      | 242.7 | 26.7 |      |
| Delay (s)              | 329.8 | 34.7 |      | 85.4  | 300.8 |      | 147.7 | 270.3 |      | 323.2 | 82.2 |      |
| Level of Service       | F     | C    |      | F     | F     |      | F     | F     |      | F     | F    |      |
| Approach Delay (s)     | 190.9 |      |      | 287.8 |       |      | 260.6 |       |      | 111.3 |      |      |
| Approach LOS           | F     |      |      | F     |       |      | F     |       |      | F     |      |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 211.6  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.54   |                      |      |
| Actuated Cycle Length (s)         | 169.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 149.9% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC#9  
 9/27/2005

| Movement               | SEL   | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET  | NER  | SWL   | SWT   | SWR  |
|------------------------|-------|-------|------|-------|-------|------|-------|------|------|-------|-------|------|
| Lane Configurations    |       |       |      |       |       |      |       |      |      |       |       |      |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0   |      | 4.0   | 4.0   |      | 4.0   | 4.0  |      | 4.0   | 4.0   |      |
| Lane Util. Factor      | 1.00  | 0.95  |      | 1.00  | 0.95  |      | 1.00  | 0.91 |      | 1.00  | 0.91  |      |
| Frt                    | 1.00  | 0.95  |      | 1.00  | 0.96  |      | 1.00  | 0.98 |      | 1.00  | 0.97  |      |
| Fit Protected          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00 |      | 0.95  | 1.00  |      |
| Satd. Flow (prot)      | 1770  | 3364  |      | 1770  | 3401  |      | 1770  | 5004 |      | 1770  | 4952  |      |
| Fit Permitted          | 0.95  | 1.00  |      | 0.95  | 1.00  |      | 0.95  | 1.00 |      | 0.95  | 1.00  |      |
| Satd. Flow (perm)      | 1770  | 3364  |      | 1770  | 3401  |      | 1770  | 5004 |      | 1770  | 4952  |      |
| Volume (vph)           | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750 | 210  | 300   | 2730  | 580  |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 |
| Adj. Flow (vph)        | 290   | 590   | 290  | 180   | 680   | 240  | 240   | 1750 | 210  | 300   | 2730  | 580  |
| RTOR Reduction (vph)   | 0     | 31    | 0    | 0     | 18    | 0    | 0     | 8    | 0    | 0     | 17    | 0    |
| Lane Group Flow (vph)  | 290   | 849   | 0    | 180   | 902   | 0    | 240   | 1952 | 0    | 300   | 3293  | 0    |
| Turn Type              | Prot  |       |      | Prot  |       |      | Prot  |      |      | Prot  |       |      |
| Protected Phases       | 5     | 2     |      | 1     | 6     |      | 3     | 8    |      | 7     | 4     |      |
| Permitted Phases       |       |       |      |       |       |      |       |      |      |       |       |      |
| Actuated Green, G (s)  | 23.0  | 47.5  |      | 14.0  | 38.5  |      | 19.0  | 80.5 |      | 33.0  | 94.5  |      |
| Effective Green, g (s) | 23.0  | 49.0  |      | 14.0  | 40.0  |      | 19.0  | 82.0 |      | 33.0  | 96.0  |      |
| Actuated g/C Ratio     | 0.12  | 0.25  |      | 0.07  | 0.21  |      | 0.10  | 0.42 |      | 0.17  | 0.49  |      |
| Clearance Time (s)     | 4.0   | 5.5   |      | 4.0   | 5.5   |      | 4.0   | 5.5  |      | 4.0   | 5.5   |      |
| Vehicle Extension (s)  | 3.0   | 3.0   |      | 3.0   | 3.0   |      | 3.0   | 3.0  |      | 3.0   | 5.0   |      |
| Lane Grp Cap (vph)     | 210   | 850   |      | 128   | 701   |      | 173   | 2115 |      | 301   | 2450  |      |
| v/s Ratio Prot         | c0.16 | 0.26  |      | 0.10  | c0.27 |      | c0.14 | 0.39 |      | 0.17  | c0.67 |      |
| v/s Ratio Perm         |       |       |      |       |       |      |       |      |      |       |       |      |
| v/c Ratio              | 1.38  | 1.00  |      | 1.41  | 1.29  |      | 1.39  | 0.92 |      | 1.00  | 1.34  |      |
| Uniform Delay, d1      | 85.5  | 72.5  |      | 90.0  | 77.0  |      | 87.5  | 53.0 |      | 80.4  | 49.0  |      |
| Progression Factor     | 1.00  | 1.00  |      | 1.00  | 1.00  |      | 1.00  | 1.00 |      | 1.00  | 1.00  |      |
| Incremental Delay, d2  | 198.3 | 30.2  |      | 222.8 | 139.5 |      | 205.8 | 7.4  |      | 50.6  | 157.6 |      |
| Delay (s)              | 283.8 | 102.7 |      | 312.8 | 216.5 |      | 293.3 | 60.4 |      | 131.1 | 206.6 |      |
| Level of Service       | F     | F     |      | F     | F     |      | F     | E    |      | F     | F     |      |
| Approach Delay (s)     |       | 147.6 |      |       | 232.3 |      |       | 85.8 |      |       | 200.3 |      |
| Approach LOS           |       | F     |      |       | F     |      |       | F    |      |       | F     |      |

| Intersection Summary              |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 165.9  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.35   |                      |      |
| Actuated Cycle Length (s)         | 194.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 134.8% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

2034 AM BUILD REC.ALL  
9/27/2005

|                        |    |    |  |    |    |  |    |    |  |    |    |  |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement               | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Lane Configurations    |   |   |  |   |   |  |   |    |   |   |    |   |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |   | 4.0   | 4.0   |   |
| Lane Util. Factor      | 0.97  | 0.95  | 1.00  | 0.97  | 0.95  | 1.00  | 0.97  | 0.91  |   | 0.97  | 0.91  |   |
| Frt                    | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  | 1.00  | 0.99  |   | 1.00  | 0.97  |   |
| Flt Protected          | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |   | 0.95  | 1.00  |   |
| Satd. Flow (prot)      | 3433  | 3539  | 1583  | 3433  | 3539  | 1583  | 3433  | 5051  |   | 3433  | 4946  |   |
| Flt Permitted          | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |   | 0.95  | 1.00  |   |
| Satd. Flow (perm)      | 3433  | 3539  | 1583  | 3433  | 3539  | 1583  | 3433  | 5051  |   | 3433  | 4946  |   |
| Volume (vph)           | 810   | 570   | 150   | 70  | 560   | 530   | 230   | 2570  | 120   | 240   | 1430  | 320   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj. Flow (vph)        | 810   | 570   | 150   | 70  | 560   | 530   | 230   | 2570  | 120   | 240   | 1430  | 320   |
| RTOR Reduction (vph)   | 0   | 0   | 96  | 0   | 0   | 86  | 0   | 4   | 0   | 0   | 30  | 0   |
| Lane Group Flow (vph)  | 810   | 570   | 54  | 70  | 560   | 444   | 230   | 2686  | 0   | 240   | 1720  | 0   |
| Turn Type              | Prot  |   | Perm  | Prot  |   | Perm  | Prot  |   |   | Prot  |   |   |
| Protected Phases       | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases       |   |   | 2   |   |   | 6   |   |   |   |   |   |   |
| Actuated Green, G (s)  | 21.8  | 42.3  | 42.3  | 4.0   | 24.5  | 24.5  | 10.0  | 48.5  |   | 7.0   | 45.5  |   |
| Effective Green, g (s) | 21.8  | 43.8  | 43.8  | 4.0   | 26.0  | 26.0  | 10.0  | 50.0  |   | 7.0   | 47.0  |   |
| Actuated g/C Ratio     | 0.18  | 0.36  | 0.36  | 0.03  | 0.22  | 0.22  | 0.08  | 0.41  |   | 0.06  | 0.39  |   |
| Clearance Time (s)     | 4.0   | 5.5   | 5.5   | 4.0   | 5.5   | 5.5   | 4.0   | 5.5   |   | 4.0   | 5.5   |   |
| Vehicle Extension (s)  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |   | 3.0   | 5.0   |   |
| Lane Grp Cap (vph)     | 620   | 1283  | 574   | 114   | 762   | 341   | 284   | 2091  |   | 199   | 1924  |   |
| v/s Ratio Prot         | c0.24   | 0.16  |   | 0.02  | 0.16  |   | 0.07  | c0.53   |   | c0.07   | 0.35  |   |
| v/s Ratio Perm         |   |   | 0.09  |   |   | 0.33  |   |   |   |   |   |   |
| v/c Ratio              | 1.31  | 0.44  | 0.09  | 0.61  | 0.73  | 1.30  | 0.81  | 1.28  |   | 1.21  | 0.89  |   |
| Uniform Delay, d1      | 49.5  | 29.3  | 25.4  | 57.6  | 44.2  | 47.4  | 54.5  | 35.4  |   | 56.9  | 34.6  |   |
| Progression Factor     | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 1.00  | 1.00  |   |
| Incremental Delay, d2  | 149.3   | 0.2   | 0.1   | 9.4   | 3.7   | 155.4   | 15.5  | 131.8   |   | 130.4   | 6.2   |   |
| Delay (s)              | 198.8   | 29.5  | 25.5  | 67.1  | 47.9  | 202.8   | 70.0  | 167.2   |   | 187.3   | 40.8  |   |
| Level of Service       | F   | C   | C   | E   | D   | F   | E   | F   |   | F   | D   |   |
| Approach Delay (s)     |   | 118.8   |   |   | 119.8   |   |   | 159.5   |   |   | 58.4  |   |
| Approach LOS           |   | F   |   |   | F   |   |   | F   |   |   | E   |   |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 118.8  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.35   |                      |      |
| Actuated Cycle Length (s)         | 120.8  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 118.2% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 810   | 570   | 150   | 70  | 560   | 530   | 230   | 2570  | 120   | 240   | 1430  | 320   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 810   | 570   | 150   | 70  | 560   | 530   | 230   | 2690  | 0   | 240   | 1750  | 0   |
| v/c Ratio               | 1.35  | 0.44  | 0.22  | 0.50  | 0.73  | 1.24  | 0.80  | 1.28  |   | 1.20  | 0.89  |   |
| Control Delay           | 206.1   | 30.7  | 5.1   | 68.7  | 50.2  | 156.8   | 75.3  | 159.6   |   | 175.6   | 39.9  |   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   | 0.0   | 0.0   |   |
| Total Delay             | 206.1   | 30.7  | 5.1   | 68.7  | 50.2  | 156.8   | 75.3  | 159.6   |   | 175.6   | 39.9  |   |
| Queue Length 50th (ft)  | ~423  | 178   | 0   | 27  | 214   | ~439  | 91  | ~970  |   | ~115  | 447   |   |
| Queue Length 95th (ft)  | #547  | 232   | 44  | 53  | 278   | #657  | #155  | #1061   |   | #201  | 516   |   |
| Internal Link Dist (ft) |   | 151   |   |   | 599   |   |   | 856   |   |   | 499   |   |
| Turn Bay Length (ft)    | 250   |   | 200   | 200   |   |   | 260   |   |   | 500   |   |   |
| Base Capacity (vph)     | 601   | 1292  | 673   | 141   | 767   | 429   | 286   | 2108  |   | 200   | 1968  |   |
| 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       | 1.35  | 0.44  | 0.22  | 0.50  | 0.73  | 1.24  | 0.80  | 1.28  |   | 1.20  | 0.89  |   |

**Intersection Summary**

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

Timings  
1: THREE CHOPT RD & GASKINS RD

2034 AM BUILD REC.ALL  
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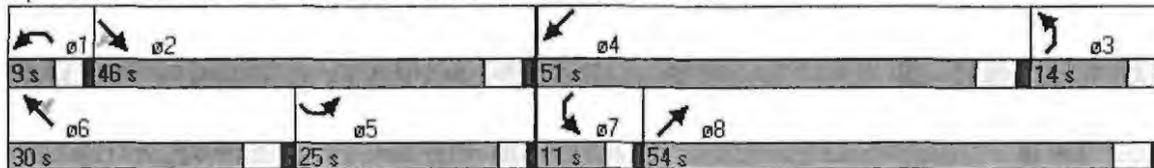


| Lane Group          | SEL   | SET   | SER   | NWL  | NWT   | NWR   | NEL   | NET   | SWL  | SWT   |
|---------------------|-------|-------|-------|------|-------|-------|-------|-------|------|-------|
| Lane Configurations | ↔↔    | ↑↑    | ↗     | ↔↔   | ↑↑    | ↗     | ↔↔    | ↑↑↑   | ↔↔   | ↑↑↑   |
| Volume (vph)        | 810   | 570   | 150   | 70   | 560   | 530   | 230   | 2570  | 240  | 1430  |
| Turn Type           | Prot  |       | Perm  | Prot |       | Perm  | Prot  |       | Prot |       |
| Protected Phases    | 5     | 2     |       | 1    | 6     |       | 3     | 8     | 7    | 4     |
| Permitted Phases    |       |       | 2     |      |       | 6     |       |       |      |       |
| Detector Phases     | 5     | 2     | 2     | 1    | 6     | 6     | 3     | 8     | 7    | 4     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0  | 3.0   | 3.0   | 3.0   | 15.0  | 3.0  | 15.0  |
| Minimum Split (s)   | 7.0   | 8.5   | 8.5   | 7.0  | 8.5   | 8.5   | 7.0   | 20.5  | 7.0  | 20.5  |
| Total Split (s)     | 25.0  | 46.0  | 46.0  | 9.0  | 30.0  | 30.0  | 14.0  | 54.0  | 11.0 | 51.0  |
| Total Split (%)     | 20.8% | 38.3% | 38.3% | 7.5% | 25.0% | 25.0% | 11.7% | 45.0% | 9.2% | 42.5% |
| Yellow Time (s)     | 3.0   | 4.0   | 4.0   | 3.0  | 4.0   | 4.0   | 3.0   | 4.0   | 3.0  | 4.0   |
| All-Red Time (s)    | 1.0   | 1.5   | 1.5   | 1.0  | 1.5   | 1.5   | 1.0   | 1.5   | 1.0  | 1.5   |
| Lead/Lag            | Lag   | Lag   | Lag   | Lead | Lead  | Lead  | Lag   | Lag   | Lead | Lead  |
| Lead-Lag Optimize?  | Yes   | Yes   | Yes   | Yes  | Yes   | Yes   | Yes   | Yes   | Yes  | Yes   |
| Recall Mode         | None  | None  | None  | None | Min   | Min   | None  | None  | None | None  |

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Natural Cycle: 120  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD



HCM Signalized Intersection Capacity Analysis  
 1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC.ALL  
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| Movement               | SEL   | SET  | SER  | NWL  | NWT   | NWR  | NEL   | NET  | NER  | SWL  | SWT   | SWR  |
|------------------------|-------|------|------|------|-------|------|-------|------|------|------|-------|------|
| Lane Configurations    | ↔↔    | ↑↑   | ↗    | ↔↔   | ↑↑    | ↗    | ↔↔    | ↑↑↔  |      | ↔↔   | ↑↑↔   |      |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 4.0  | 4.0  | 4.0  | 4.0   | 4.0  | 4.0   | 4.0  |      | 4.0  | 4.0   |      |
| Lane Util. Factor      | 0.97  | 0.95 | 1.00 | 0.97 | 0.95  | 1.00 | 0.97  | 0.91 |      | 0.97 | 0.91  |      |
| Frt                    | 1.00  | 1.00 | 0.85 | 1.00 | 1.00  | 0.85 | 1.00  | 0.98 |      | 1.00 | 0.97  |      |
| Flt Protected          | 0.95  | 1.00 | 1.00 | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 |      | 0.95 | 1.00  |      |
| Satd. Flow (prot)      | 3433  | 3539 | 1583 | 3433 | 3539  | 1583 | 3433  | 5004 |      | 3433 | 4952  |      |
| Flt Permitted          | 0.95  | 1.00 | 1.00 | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 |      | 0.95 | 1.00  |      |
| Satd. Flow (perm)      | 3433  | 3539 | 1583 | 3433 | 3539  | 1583 | 3433  | 5004 |      | 3433 | 4952  |      |
| Volume (vph)           | 290   | 590  | 290  | 180  | 680   | 240  | 240   | 1750 | 210  | 300  | 2730  | 580  |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 |
| Adj. Flow (vph)        | 290   | 590  | 290  | 180  | 680   | 240  | 240   | 1750 | 210  | 300  | 2730  | 580  |
| RTOR Reduction (vph)   | 0     | 0    | 67   | 0    | 0     | 190  | 0     | 10   | 0    | 0    | 24    | 0    |
| Lane Group Flow (vph)  | 290   | 590  | 223  | 180  | 680   | 50   | 240   | 1950 | 0    | 300  | 3286  | 0    |
| Turn Type              | Prot  |      | Perm | Prot |       | Perm | Prot  |      |      | Prot |       |      |
| Protected Phases       | 5     | 2    |      | 1    | 6     |      | 3     | 8    |      | 7    | 4     |      |
| Permitted Phases       |       |      | 2    |      |       | 6    |       |      |      |      |       |      |
| Actuated Green, G (s)  | 10.0  | 25.8 | 25.8 | 8.7  | 24.5  | 24.5 | 8.0   | 69.9 |      | 16.6 | 78.5  |      |
| Effective Green, g (s) | 10.0  | 27.3 | 27.3 | 8.7  | 26.0  | 26.0 | 8.0   | 71.4 |      | 16.6 | 80.0  |      |
| Actuated g/C Ratio     | 0.07  | 0.20 | 0.20 | 0.06 | 0.19  | 0.19 | 0.06  | 0.51 |      | 0.12 | 0.57  |      |
| Clearance Time (s)     | 4.0   | 5.5  | 5.5  | 4.0  | 5.5   | 5.5  | 4.0   | 5.5  |      | 4.0  | 5.5   |      |
| Vehicle Extension (s)  | 3.0   | 3.0  | 3.0  | 3.0  | 3.0   | 3.0  | 3.0   | 3.0  |      | 3.0  | 5.0   |      |
| Lane Grp Cap (vph)     | 245   | 690  | 309  | 213  | 657   | 294  | 196   | 2552 |      | 407  | 2830  |      |
| v/s Ratio Prot         | c0.08 | 0.17 |      | 0.05 | c0.19 |      | c0.07 | 0.39 |      | 0.09 | c0.67 |      |
| v/s Ratio Perm         |       |      | 0.18 |      |       | 0.15 |       |      |      |      |       |      |
| v/c Ratio              | 1.18  | 0.86 | 0.72 | 0.85 | 1.04  | 0.17 | 1.22  | 0.76 |      | 0.74 | 1.16  |      |
| Uniform Delay, d1      | 65.0  | 54.4 | 52.8 | 65.0 | 57.0  | 47.9 | 66.0  | 27.5 |      | 59.6 | 30.0  |      |
| Progression Factor     | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 |      | 1.00 | 1.00  |      |
| Incremental Delay, d2  | 116.3 | 10.1 | 8.1  | 25.2 | 44.5  | 0.3  | 137.8 | 1.4  |      | 6.8  | 76.9  |      |
| Delay (s)              | 181.3 | 64.6 | 60.9 | 90.2 | 101.5 | 48.2 | 203.8 | 28.9 |      | 66.4 | 106.9 |      |
| Level of Service       | F     | E    | E    | F    | F     | D    | F     | C    |      | E    | F     |      |
| Approach Delay (s)     |       | 92.6 |      |      | 88.0  |      |       | 48.0 |      |      | 103.5 |      |
| Approach LOS           |       | F    |      |      | F     |      |       | D    |      |      | F     |      |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 84.7   | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.15   |                      |      |
| Actuated Cycle Length (s)         | 140.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 112.9% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Queues  
1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC.ALL  
9/27/2005

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 290   | 590   | 290   | 180   | 680   | 240   | 240  | 1750  | 210   | 300   | 2730  | 580   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 290   | 590   | 290   | 180   | 680   | 240   | 240  | 1960  | 0   | 300   | 3310  | 0   |
| v/c Ratio               | 1.18  | 0.86  | 0.77  | 0.85  | 1.04  | 0.50  | 1.22   | 0.77  |   | 0.74  | 1.16  |   |
| Control Delay           | 170.2   | 65.9  | 51.4  | 96.1  | 99.2  | 10.3  | 190.4  | 30.1  |   | 66.5  | 105.2   |   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   |   | 0.0   | 0.0   |   |
| Total Delay             | 170.2   | 65.9  | 51.4  | 96.1  | 99.2  | 10.3  | 190.4  | 30.1  |   | 66.5  | 105.2   |   |
| Queue Length 50th (ft)  | ~162  | 274   | 182   | 85  | ~349  | 5   | ~138   | 513   |   | 137   | ~1299   |   |
| Queue Length 95th (ft)  | #259  | #350  | #309  | #160  | #476  | 82  | #227   | 589   |   | 186   | #1370   |   |
| Internal Link Dist (ft) |   | 151   |   |   | 599   |   |  | 856   |   |   | 499   |   |
| Turn Bay Length (ft)    | 250   |   |   | 200   |   |   | 260  |   |   | 500   |   |   |
| Base Capacity (vph)     | 245   | 705   | 382   | 213   | 657   | 484   | 196  | 2561  |   | 458   | 2854  |   |
| 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       | 1.18  | 0.84  | 0.76  | 0.85  | 1.04  | 0.50  | 1.22   | 0.77  |   | 0.66  | 1.16  |   |

**Intersection Summary**

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

Timings  
1: THREE CHOPT RD & GASKINS RD

2034 PM BUILD REC.ALL  
9/27/2005



| Lane Group          | SEL   | SET   | SER   | NWL  | NWT   | NWR   | NEL  | NET   | SWL   | SWT   |
|---------------------|-------|-------|-------|------|-------|-------|------|-------|-------|-------|
| Lane Configurations | ↔↔    | ↑↑    | ↗     | ↔↔   | ↑↑    | ↗     | ↔↔   | ↔↔↔   | ↔↔    | ↔↔↔   |
| Volume (vph)        | 290   | 590   | 290   | 180  | 680   | 240   | 240  | 1750  | 300   | 2730  |
| Turn Type           | Prot  |       | Perm  | Prot |       | Perm  | Prot |       | Prot  |       |
| Protected Phases    | 5     | 2     |       | 1    | 6     |       | 3    | 8     | 7     | 4     |
| Permitted Phases    |       |       | 2     |      |       | 6     |      |       |       |       |
| Detector Phases     | 5     | 2     | 2     | 1    | 6     | 6     | 3    | 8     | 7     | 4     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0  | 3.0   | 3.0   | 3.0  | 15.0  | 3.0   | 15.0  |
| Minimum Split (s)   | 7.0   | 8.5   | 8.5   | 7.0  | 8.5   | 8.5   | 7.0  | 20.5  | 7.0   | 20.5  |
| Total Split (s)     | 14.0  | 32.0  | 32.0  | 12.0 | 30.0  | 30.0  | 12.0 | 73.0  | 23.0  | 84.0  |
| Total Split (%)     | 10.0% | 22.9% | 22.9% | 8.6% | 21.4% | 21.4% | 8.6% | 52.1% | 16.4% | 60.0% |
| Yellow Time (s)     | 3.0   | 4.0   | 4.0   | 3.0  | 4.0   | 4.0   | 3.0  | 4.0   | 3.0   | 4.0   |
| All-Red Time (s)    | 1.0   | 1.5   | 1.5   | 1.0  | 1.5   | 1.5   | 1.0  | 1.5   | 1.0   | 1.5   |
| Lead/Lag            | Lead  | Lead  | Lead  | Lag  | Lag   | Lag   | Lag  | Lag   | Lead  | Lead  |
| Lead-Lag Optimize?  | Yes   | Yes   | Yes   | Yes  | Yes   | Yes   | Yes  | Yes   | Yes   | Yes   |
| Recall Mode         | None  | None  | None  | None | Min   | Min   | None | None  | None  | None  |

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Natural Cycle: 140  
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |      |      |      |
|------|------|------|------|
| ø2   | ø1   | ø4   | ø3   |
| 32 s | 12 s | 84 s | 12 s |
| ø5   | ø6   | ø7   | ø8   |
| 14 s | 30 s | 23 s | 73 s |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

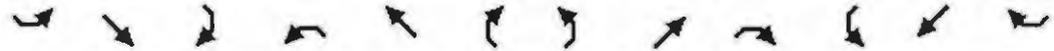
MAX DESIGN  
2034 AM BUILD  
7/19/2005

| Movement               | SEL   | SET   | SER  | NWL  | NWT   | NWR   | NEL  | NET   | NER  | SWL  | SWT   | SWR   |
|------------------------|-------|-------|------|------|-------|-------|------|-------|------|------|-------|-------|
| Lane Configurations    | ↖↗    | ↑↑↑   | ↗    | ↖    | ↑↑↑   | ↗     | ↖↗   | ↑↑↑   | ↗    | ↖↗   | ↑↑↑   | ↗     |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900 | 1900  | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   |
| Lane Util. Factor      | 0.97  | 0.91  | 1.00 | 1.00 | 0.91  | 1.00  | 0.97 | 0.91  | 1.00 | 0.97 | 0.91  | 1.00  |
| Frt                    | 1.00  | 1.00  | 0.85 | 1.00 | 1.00  | 0.85  | 1.00 | 1.00  | 0.85 | 1.00 | 1.00  | 0.85  |
| Flt Protected          | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  | 1.00  | 0.95 | 1.00  | 1.00 | 0.95 | 1.00  | 1.00  |
| Satd. Flow (prot)      | 3433  | 5085  | 1583 | 1770 | 5085  | 1583  | 3433 | 5085  | 1583 | 3433 | 5085  | 1583  |
| Flt Permitted          | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  | 1.00  | 0.95 | 1.00  | 1.00 | 0.95 | 1.00  | 1.00  |
| Satd. Flow (perm)      | 3433  | 5085  | 1583 | 1770 | 5085  | 1583  | 3433 | 5085  | 1583 | 3433 | 5085  | 1583  |
| Volume (vph)           | 810   | 570   | 150  | 70   | 560   | 530   | 230  | 2570  | 120  | 240  | 1430  | 320   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  |
| Adj. Flow (vph)        | 810   | 570   | 150  | 70   | 560   | 530   | 230  | 2570  | 120  | 240  | 1430  | 320   |
| RTOR Reduction (vph)   | 0     | 0     | 46   | 0    | 0     | 1     | 0    | 0     | 28   | 0    | 0     | 10    |
| Lane Group Flow (vph)  | 810   | 570   | 104  | 70   | 560   | 529   | 230  | 2570  | 92   | 240  | 1430  | 310   |
| Turn Type              | Prot  | pm+ov |      | Prot | pm+ov |       | Prot | pm+ov |      | Prot | pm+ov |       |
| Protected Phases       | 5     | 2     | 3    | 1    | 6     | 7     | 3    | 8     | 1    | 7    | 4     | 5     |
| Permitted Phases       |       |       | 2    |      |       | 6     |      |       | 8    |      |       | 4     |
| Actuated Green, G (s)  | 28.5  | 33.2  | 47.6 | 9.8  | 14.5  | 37.5  | 14.4 | 63.5  | 73.3 | 23.0 | 72.1  | 100.6 |
| Effective Green, g (s) | 30.0  | 34.7  | 49.1 | 11.3 | 16.0  | 39.0  | 14.4 | 65.0  | 76.3 | 23.0 | 73.6  | 103.6 |
| Actuated g/C Ratio     | 0.20  | 0.23  | 0.33 | 0.08 | 0.11  | 0.26  | 0.10 | 0.43  | 0.51 | 0.15 | 0.49  | 0.69  |
| Clearance Time (s)     | 5.5   | 5.5   | 4.0  | 5.5  | 5.5   | 4.0   | 4.0  | 5.5   | 5.5  | 4.0  | 5.5   | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0   | 3.0  | 3.0  | 3.0   | 3.0   | 3.0  | 3.0   | 3.0  | 3.0  | 5.0   | 3.0   |
| Lane Grp Cap (vph)     | 687   | 1176  | 560  | 133  | 542   | 412   | 330  | 2204  | 805  | 526  | 2495  | 1136  |
| v/s Ratio Prot         | c0.24 | 0.11  | 0.03 | 0.04 | 0.11  | c0.20 | 0.07 | c0.51 | 0.01 | 0.07 | 0.28  | 0.06  |
| v/s Ratio Perm         |       |       | 0.07 |      |       | 0.14  |      |       | 0.06 |      |       | 0.15  |
| v/c Ratio              | 1.18  | 0.48  | 0.19 | 0.53 | 1.03  | 1.28  | 0.70 | 1.17  | 0.11 | 0.46 | 0.57  | 0.27  |
| Uniform Delay, d1      | 60.0  | 49.9  | 36.1 | 66.8 | 67.0  | 55.5  | 65.7 | 42.5  | 19.2 | 57.8 | 27.1  | 8.8   |
| Progression Factor     | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  |
| Incremental Delay, d2  | 95.2  | 0.3   | 0.2  | 3.7  | 47.5  | 145.4 | 6.3  | 80.1  | 0.1  | 0.6  | 0.5   | 0.1   |
| Delay (s)              | 155.2 | 50.2  | 36.3 | 70.5 | 114.5 | 200.9 | 72.0 | 122.6 | 19.3 | 58.4 | 27.6  | 9.0   |
| Level of Service       | F     | D     | D    | E    | F     | F     | E    | F     | B    | E    | C     | A     |
| Approach Delay (s)     |       | 104.4 |      |      | 151.3 |       |      | 114.3 |      |      | 28.3  |       |
| Approach LOS           |       | F     |      |      | F     |       |      | F     |      |      | C     |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 95.5   | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.20   |                      |      |
| Actuated Cycle Length (s)         | 150.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 115.6% | ICU Level of Service | H    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

Queues  
1: THREE CHOPT RD & GASKINS RD



| Lane Group              | SEL   | SET  | SER  | NWL  | NWT   | NWR   | NEL  | NET   | NER  | SWL  | SWT  | SWR  |
|-------------------------|-------|------|------|------|-------|-------|------|-------|------|------|------|------|
| Volume (vph)            | 810   | 570  | 150  | 70   | 560   | 530   | 230  | 2570  | 120  | 240  | 1430 | 320  |
| Peak Hour Factor        | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |
| Lane Group Flow (vph)   | 810   | 570  | 150  | 70   | 560   | 530   | 230  | 2570  | 120  | 240  | 1430 | 320  |
| v/c Ratio               | 1.18  | 0.48 | 0.25 | 0.53 | 1.03  | 1.29  | 0.70 | 1.17  | 0.14 | 0.46 | 0.57 | 0.28 |
| Control Delay           | 145.9 | 51.8 | 19.4 | 77.8 | 111.3 | 176.4 | 73.8 | 118.7 | 5.5  | 61.0 | 28.4 | 7.5  |
| Queue Delay             | 0.0   | 0.1  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 145.9 | 51.9 | 19.4 | 77.8 | 111.3 | 176.4 | 73.8 | 118.7 | 5.5  | 61.0 | 28.4 | 7.5  |
| Queue Length 50th (ft)  | ~488  | 180  | 55   | 67   | ~214  | ~483  | 113  | ~1090 | 16   | 111  | 361  | 92   |
| Queue Length 95th (ft)  | #618  | 222  | 111  | 121  | #300  | #718  | 160  | #1173 | 35   | 157  | 413  | 137  |
| Internal Link Dist (ft) |       | 574  |      |      | 599   |       |      | 856   |      |      | 499  |      |
| Turn Bay Length (ft)    | 250   |      | 200  | 200  |       | 200   | 260  |       | 200  | 500  |      |      |
| Base Capacity (vph)     | 687   | 1176 | 615  | 145  | 542   | 412   | 362  | 2204  | 839  | 526  | 2495 | 1144 |
| Starvation Cap Reductn  | 0     | 0    | 0    | 0    | 0     | 0     | 0    | 0     | 0    | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0     | 0    | 0    | 0    | 0     | 0     | 0    | 0     | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0     | 57   | 0    | 0    | 0     | 0     | 0    | 0     | 7    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 1.18  | 0.51 | 0.24 | 0.48 | 1.03  | 1.29  | 0.64 | 1.17  | 0.14 | 0.46 | 0.57 | 0.28 |

**Intersection Summary**

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

Timings  
1: THREE CHOPT RD & GASKINS RD

MAX  
2034 AM BUILD  
7/19/2005



| Lane Group          | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations | ↖↖    | ↗↗↗   | ↖     | ↖     | ↗↗↗   | ↖     | ↖↖    | ↗↗↗   | ↖     | ↖↖    | ↗↗↗   | ↖     |
| Volume (vph)        | 810   | 570   | 150   | 70    | 560   | 530   | 230   | 2570  | 120   | 240   | 1430  | 320   |
| Turn Type           | Prot  |       | pm+ov |
| Protected Phases    | 5     | 2     | 3     | 1     | 6     | 7     | 3     | 8     | 1     | 7     | 4     | 5     |
| Permitted Phases    |       |       | 2     |       |       | 6     |       |       | 8     |       |       | 4     |
| Detector Phases     | 5     | 2     | 3     | 1     | 6     | 7     | 3     | 8     | 1     | 7     | 4     | 5     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 15.0  | 3.0   | 3.0   | 15.0  | 3.0   |
| Minimum Split (s)   | 8.5   | 8.5   | 7.0   | 8.5   | 8.5   | 7.0   | 7.0   | 20.5  | 8.5   | 7.0   | 20.5  | 8.5   |
| Total Split (s)     | 34.0  | 37.6  | 20.0  | 16.4  | 20.0  | 27.0  | 20.0  | 69.0  | 16.4  | 27.0  | 76.0  | 34.0  |
| Total Split (%)     | 22.7% | 25.1% | 13.3% | 10.9% | 13.3% | 18.0% | 13.3% | 46.0% | 10.9% | 18.0% | 50.7% | 22.7% |
| Yellow Time (s)     | 4.0   | 4.0   | 3.0   | 4.0   | 4.0   | 3.0   | 3.0   | 4.0   | 4.0   | 3.0   | 4.0   | 4.0   |
| All-Red Time (s)    | 1.5   | 1.5   | 1.0   | 1.5   | 1.5   | 1.0   | 1.0   | 1.5   | 1.5   | 1.0   | 1.5   | 1.5   |
| Lead/Lag            | Lead  | Lag   | Lead  | Lead  | Lag   | Lag   | Lead  | Lead  | Lead  | Lag   | Lag   | Lead  |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | Min   | None  | None  | Min   | Min   | None  | None  | None  | Min   | None  | None  | Min   |

Intersection Summary

Cycle Length: 150  
 Actuated Cycle Length: 150  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|        |        |      |      |
|--------|--------|------|------|
| ø1     | ø2     | ø3   | ø4   |
| 16.4 s | 37.6 s | 20 s | 76 s |
| ø5     | ø6     | ø8   | ø7   |
| 34 s   | 20 s   | 69 s | 27 s |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

MAX. DESIGN  
2034 AM BUILD  
7/21/2005

| Movement               | SEL   | SET   | SER   | NWL  | NWT  | NWR   | NEL  | NET   | NER   | SWL  | SWT  | SWR   |
|------------------------|-------|-------|-------|------|------|-------|------|-------|-------|------|------|-------|
| Lane Configurations    | ↖↗    | ↕     | ↖     | ↖↗   | ↕    | ↖     | ↖    | ↕     | ↖     | ↖↗   | ↕    | ↖     |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900 | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   |
| Lane Util. Factor      | 0.97  | 0.95  | 1.00  | 0.97 | 0.95 | 1.00  | 1.00 | 0.95  | 1.00  | 0.97 | 0.95 | 1.00  |
| Frt                    | 1.00  | 1.00  | 0.85  | 1.00 | 1.00 | 0.85  | 1.00 | 1.00  | 0.85  | 1.00 | 1.00 | 0.85  |
| Flt Protected          | 0.95  | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  | 0.95 | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  |
| Satd. Flow (prot)      | 3433  | 3539  | 1583  | 3433 | 3539 | 1583  | 1770 | 3539  | 1583  | 3433 | 3539 | 1583  |
| Flt Permitted          | 0.95  | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  | 0.95 | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  |
| Satd. Flow (perm)      | 3433  | 3539  | 1583  | 3433 | 3539 | 1583  | 1770 | 3539  | 1583  | 3433 | 3539 | 1583  |
| Volume (vph)           | 660   | 740   | 40    | 200  | 220  | 430   | 30   | 1040  | 410   | 160  | 200  | 80    |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |
| Adj. Flow (vph)        | 660   | 740   | 40    | 200  | 220  | 430   | 30   | 1040  | 410   | 160  | 200  | 80    |
| RTOR Reduction (vph)   | 0     | 0     | 27    | 0    | 0    | 5     | 0    | 0     | 107   | 0    | 0    | 0     |
| Lane Group Flow (vph)  | 660   | 740   | 13    | 200  | 220  | 425   | 30   | 1040  | 303   | 160  | 200  | 80    |
| Turn Type              | Prot  |       | pt+ov | Prot |      | pm+ov | Prot |       | pm+ov | Prot |      | pm+ov |
| Protected Phases       | 1     | 6     | 6 3   | 5    | 2    | 7     | 3    | 8     | 5     | 7    | 4    | 1     |
| Permitted Phases       |       |       |       |      |      | 2     |      |       | 8     |      |      | 4     |
| Actuated Green, G (s)  | 17.1  | 20.7  | 26.6  | 8.4  | 12.0 | 25.7  | 5.9  | 24.2  | 32.6  | 13.7 | 32.0 | 49.1  |
| Effective Green, g (s) | 18.6  | 22.7  | 30.1  | 9.9  | 14.0 | 29.2  | 7.4  | 26.2  | 36.1  | 15.2 | 34.0 | 52.6  |
| Actuated g/C Ratio     | 0.21  | 0.25  | 0.33  | 0.11 | 0.16 | 0.32  | 0.08 | 0.29  | 0.40  | 0.17 | 0.38 | 0.58  |
| Clearance Time (s)     | 5.5   | 6.0   |       | 5.5  | 6.0  | 5.5   | 5.5  | 6.0   | 5.5   | 5.5  | 6.0  | 5.5   |
| Vehicle Extension (s)  | 3.0   | 4.5   |       | 3.0  | 4.5  | 3.0   | 3.0  | 3.0   | 3.0   | 3.0  | 3.0  | 3.0   |
| Lane Grp Cap (vph)     | 709   | 893   | 529   | 378  | 551  | 514   | 146  | 1030  | 635   | 580  | 1337 | 925   |
| v/s Ratio Prot         | c0.19 | c0.21 | 0.03  | 0.06 | 0.06 | c0.14 | 0.02 | c0.29 | 0.07  | 0.05 | 0.06 | 0.02  |
| v/s Ratio Perm         |       |       |       |      |      | 0.13  |      |       | 0.19  |      |      | 0.03  |
| v/c Ratio              | 0.93  | 0.83  | 0.03  | 0.53 | 0.40 | 0.83  | 0.21 | 1.01  | 0.48  | 0.28 | 0.15 | 0.09  |
| Uniform Delay, d1      | 35.1  | 31.8  | 20.1  | 37.8 | 34.2 | 28.1  | 38.6 | 31.9  | 20.0  | 32.6 | 18.5 | 8.2   |
| Progression Factor     | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |
| Incremental Delay, d2  | 18.9  | 7.0   | 0.0   | 1.3  | 0.8  | 10.5  | 0.7  | 30.4  | 0.6   | 0.3  | 0.1  | 0.0   |
| Delay (s)              | 54.0  | 38.8  | 20.1  | 39.2 | 35.0 | 38.6  | 39.3 | 62.3  | 20.5  | 32.9 | 18.5 | 8.2   |
| Level of Service       | D     | D     | C     | D    | D    | D     | D    | E     | C     | C    | B    | A     |
| Approach Delay (s)     |       | 45.2  |       |      | 37.8 |       |      | 50.3  |       |      | 21.9 |       |
| Approach LOS           |       | D     |       |      | D    |       |      | D     |       |      | C    |       |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 43.1  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.89  |                      |      |
| Actuated Cycle Length (s)         | 90.0  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 84.2% | ICU Level of Service | E    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 660   | 740   | 40  | 200   | 220   | 430   | 30   | 1040  | 410   | 160   | 200   | 80  |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 660   | 740   | 40  | 200   | 220   | 430   | 30   | 1040  | 410   | 160   | 200   | 80  |
| v/c Ratio               | 0.92  | 0.82  | 0.07  | 0.52  | 0.40  | 0.82  | 0.18   | 1.04  | 0.56  | 0.27  | 0.15  | 0.08  |
| Control Delay           | 55.4  | 39.8  | 3.8   | 42.6  | 35.2  | 26.9  | 37.7   | 73.3  | 9.5   | 33.3  | 19.7  | 5.2   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 55.4  | 39.8  | 3.8   | 42.6  | 35.2  | 26.9  | 37.7   | 73.3  | 9.5   | 33.3  | 19.7  | 5.2   |
| Queue Length 50th (ft)  | 191   | 208   | 0   | 56  | 60  | 109   | 16   | ~345  | 47  | 40  | 40  | 10  |
| Queue Length 95th (ft)  | #313  | #286  | 13  | 90  | 92  | #183  | 42   | #469  | 91  | 69  | 66  | 22  |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |  | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   | 200   | 200  |   | 200   | 200   |   | 200   |
| Base Capacity (vph)     | 718   | 910   | 649   | 389   | 624   | 535   | 288  | 997   | 732   | 613   | 1356  | 952   |
| Starvation Cap Reductn  | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Spillback Cap Reductn   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Storage Cap Reductn     | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Reduced v/c Ratio       | 0.92  | 0.81  | 0.06  | 0.51  | 0.35  | 0.80  | 0.10   | 1.04  | 0.56  | 0.26  | 0.15  | 0.08  |

**Intersection Summary**

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

MAX.

2034 AM BUILD

7/21/2005

Timings  
2: THREE CHOPT RD & COX RD

| Lane Group          | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 660   | 740   | 40    | 200   | 220   | 430   | 30    | 1040  | 410   | 160   | 200   | 80    |
| Turn Type           | Prot  |       | pt+ov | Prot  |       | pm+ov | Prot  |       | pm+ov | Prot  |       | pm+ov |
| Protected Phases    | 1     | 6     | 6 3   | 5     | 2     | 7     | 3     | 8     | 5     | 7     | 4     | 1     |
| Permitted Phases    |       |       |       |       |       | 2     |       |       | 8     |       |       | 4     |
| Detector Phases     | 1     | 6     | 6 3   | 5     | 2     | 7     | 3     | 8     | 5     | 7     | 4     | 1     |
| Minimum Initial (s) | 3.0   | 12.0  |       | 3.0   | 8.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Minimum Split (s)   | 9.5   | 20.0  |       | 9.5   | 20.0  | 20.0  | 20.0  | 20.0  | 9.5   | 20.0  | 20.0  | 9.5   |
| Total Split (s)     | 21.0  | 26.9  | 46.9  | 14.1  | 20.0  | 20.0  | 20.0  | 29.0  | 14.1  | 20.0  | 29.0  | 21.0  |
| Total Split (%)     | 23.3% | 29.9% | 52.1% | 15.7% | 22.2% | 22.2% | 22.2% | 32.2% | 15.7% | 22.2% | 32.2% | 23.3% |
| Yellow Time (s)     | 3.5   | 4.0   |       | 3.5   | 4.0   | 3.5   | 3.5   | 4.0   | 3.5   | 3.5   | 4.0   | 3.5   |
| All-Red Time (s)    | 2.0   | 2.0   |       | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lag   | Lead  |       | Lag   | Lead  | Lead  | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   | Yes   |       | Yes   |
| Recall Mode         | None  | Min   |       | None  | Min   | None  |

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 88.8

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|        |        |      |      |
|--------|--------|------|------|
| 02     | 01     | 03   | 04   |
| 20 s   | 21 s   | 20 s | 29 s |
| 06     | 05     | 07   | 08   |
| 26.9 s | 14.1 s | 20 s | 29 s |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

MAX-DESIGN  
2034 PM BUILD  
7/21/2005

| Movement               | SEL  | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET   | NER  | SWL  | SWT   | SWR  |
|------------------------|------|-------|------|-------|-------|------|-------|-------|------|------|-------|------|
| Lane Configurations    | ↖↗   | ↖↖↗   | ↗    | ↖     | ↖↖↗   | ↗    | ↖↗    | ↖↖↗   | ↗    | ↖↗   | ↖↖↗   | ↗    |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 4.0  | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   | 4.0  |
| Lane Util. Factor      | 0.97 | 0.91  | 1.00 | 1.00  | 0.91  | 1.00 | 0.97  | 0.91  | 1.00 | 0.97 | 0.91  | 1.00 |
| Frt                    | 1.00 | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 | 1.00 | 1.00  | 0.85 |
| Flt Protected          | 0.95 | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  | 1.00 |
| Satd. Flow (prot)      | 3433 | 5085  | 1583 | 1770  | 5085  | 1583 | 3433  | 5085  | 1583 | 3433 | 5085  | 1583 |
| Flt Permitted          | 0.95 | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  | 1.00 |
| Satd. Flow (perm)      | 3433 | 5085  | 1583 | 1770  | 5085  | 1583 | 3433  | 5085  | 1583 | 3433 | 5085  | 1583 |
| Volume (vph)           | 290  | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210  | 300  | 2730  | 580  |
| Peak-hour factor, PHF  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 |
| Adj. Flow (vph)        | 290  | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210  | 300  | 2730  | 580  |
| RTOR Reduction (vph)   | 0    | 0     | 13   | 0     | 0     | 5    | 0     | 0     | 12   | 0    | 0     | 2    |
| Lane Group Flow (vph)  | 290  | 590   | 277  | 180   | 680   | 235  | 240   | 1750  | 198  | 300  | 2730  | 578  |
| Turn Type              | Prot | pm+ov |      | Prot  | pm+ov |      | Prot  | pm+ov |      | Prot | pm+ov |      |
| Protected Phases       | 5    | 2     | 3    | 1     | 6     | 7    | 3     | 8     | 1    | 7    | 4     | 5    |
| Permitted Phases       |      | 2     |      |       | 6     |      |       | 8     |      |      | 4     |      |
| Actuated Green, G (s)  | 9.0  | 12.5  | 19.5 | 10.0  | 13.5  | 26.4 | 7.0   | 45.6  | 55.6 | 12.9 | 51.5  | 60.5 |
| Effective Green, g (s) | 9.0  | 14.0  | 21.0 | 10.0  | 15.0  | 27.9 | 7.0   | 47.1  | 57.1 | 12.9 | 53.0  | 62.0 |
| Actuated g/C Ratio     | 0.09 | 0.14  | 0.21 | 0.10  | 0.15  | 0.28 | 0.07  | 0.47  | 0.57 | 0.13 | 0.53  | 0.62 |
| Clearance Time (s)     | 4.0  | 5.5   | 4.0  | 4.0   | 5.5   | 4.0  | 4.0   | 5.5   | 4.0  | 4.0  | 5.5   | 4.0  |
| Vehicle Extension (s)  | 3.0  | 3.0   | 3.0  | 3.0   | 3.0   | 3.0  | 3.0   | 3.0   | 3.0  | 3.0  | 5.0   | 3.0  |
| Lane Grp Cap (vph)     | 309  | 712   | 332  | 177   | 763   | 442  | 240   | 2395  | 904  | 443  | 2695  | 981  |
| v/s Ratio Prot         | 0.08 | 0.12  | 0.06 | c0.10 | c0.13 | 0.07 | c0.07 | 0.34  | 0.02 | 0.09 | c0.54 | 0.05 |
| v/s Ratio Perm         |      |       | 0.12 |       |       | 0.08 |       |       | 0.11 |      |       | 0.31 |
| v/c Ratio              | 0.94 | 0.83  | 0.83 | 1.02  | 0.89  | 0.53 | 1.00  | 0.73  | 0.22 | 0.68 | 1.01  | 0.59 |
| Uniform Delay, d1      | 45.2 | 41.8  | 37.8 | 45.0  | 41.7  | 30.5 | 46.5  | 21.3  | 10.5 | 41.6 | 23.5  | 11.4 |
| Progression Factor     | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 |
| Incremental Delay, d2  | 34.9 | 7.9   | 16.2 | 72.1  | 12.7  | 1.2  | 58.1  | 1.2   | 0.1  | 4.1  | 20.6  | 0.9  |
| Delay (s)              | 80.1 | 49.7  | 54.0 | 117.1 | 54.4  | 31.7 | 104.6 | 22.5  | 10.6 | 45.6 | 44.1  | 12.3 |
| Level of Service       | F    | D     | D    | F     | D     | C    | F     | C     | B    | D    | D     | B    |
| Approach Delay (s)     |      | 58.3  |      |       | 59.7  |      |       | 30.3  |      |      | 39.1  |      |
| Approach LOS           |      | E     |      |       | E     |      |       | C     |      |      | D     |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 42.3  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.96  |                      |      |
| Actuated Cycle Length (s)         | 100.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 94.3% | ICU Level of Service | F    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
1: THREE CHOPT RD & GASKINS RD

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 290   | 590   | 290   | 180   | 680   | 240   | 240  | 1750  | 210   | 300   | 2730  | 580   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 290   | 590   | 290   | 180   | 680   | 240   | 240  | 1750  | 210   | 300   | 2730  | 580   |
| v/c Ratio               | 0.94  | 0.83  | 0.84  | 1.02  | 0.89  | 0.54  | 1.00   | 0.73  | 0.23  | 0.68  | 1.01  | 0.59  |
| Control Delay           | 84.2  | 53.0  | 46.8  | 118.5   | 57.1  | 23.4  | 106.2  | 23.8  | 5.3   | 47.8  | 44.8  | 10.8  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 84.2  | 53.0  | 46.8  | 118.5   | 57.1  | 23.4  | 106.2  | 23.8  | 5.3   | 47.8  | 44.8  | 10.8  |
| Queue Length 50th (ft)  | 96  | 135   | 127   | ~119  | 157   | 92  | 80   | 325   | 23  | 94  | ~632  | 107   |
| Queue Length 95th (ft)  | #177  | #191  | #235  | #257  | #225  | 149   | #160   | 385   | 40  | 138   | #768  | 204   |
| Internal Link Dist (ft) |   | 574   |   |   | 599   |   |  | 856   |   |   | 499   |   |
| Turn Bay Length (ft)    | 250   |   | 200   | 200   |   | 200   | 260  |   | 200   | 500   |   |   |
| Base Capacity (vph)     | 309   | 712   | 346   | 177   | 763   | 459   | 240  | 2395  | 916   | 476   | 2695  | 983   |
| Starvation Cap Reductn  | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Spillback Cap Reductn   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Storage Cap Reductn     | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 11  | 0   | 0   | 0   |
| Reduced v/c Ratio       | 0.94  | 0.83  | 0.84  | 1.02  | 0.89  | 0.52  | 1.00   | 0.73  | 0.23  | 0.63  | 1.01  | 0.59  |

**Intersection Summary**

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

Timings  
1: THREE CHOPT RD & GASKINS RD

| Lane Group          | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 290   | 590   | 290   | 180   | 680   | 240   | 240   | 1750  | 210   | 300   | 2730  | 580   |
| Turn Type           | Prot  |       | pm+ov |
| Protected Phases    | 5     | 2     | 3     | 1     | 6     | 7     | 3     | 8     | 1     | 7     | 4     | 5     |
| Permitted Phases    |       |       | 2     |       |       | 6     |       |       | 8     |       |       | 4     |
| Detector Phases     | 5     | 2     | 3     | 1     | 6     | 7     | 3     | 8     | 1     | 7     | 4     | 5     |
| Minimum Initial (s) | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 15.0  | 3.0   | 3.0   | 15.0  | 3.0   |
| Minimum Split (s)   | 7.0   | 8.5   | 7.0   | 7.0   | 8.5   | 7.0   | 7.0   | 20.5  | 7.0   | 7.0   | 20.5  | 7.0   |
| Total Split (s)     | 13.0  | 18.0  | 11.0  | 14.0  | 19.0  | 18.0  | 11.0  | 50.0  | 14.0  | 18.0  | 57.0  | 13.0  |
| Total Split (%)     | 13.0% | 18.0% | 11.0% | 14.0% | 19.0% | 18.0% | 11.0% | 50.0% | 14.0% | 18.0% | 57.0% | 13.0% |
| Yellow Time (s)     | 3.0   | 4.0   | 3.0   | 3.0   | 4.0   | 3.0   | 3.0   | 4.0   | 3.0   | 3.0   | 4.0   | 3.0   |
| All-Red Time (s)    | 1.0   | 1.5   | 1.0   | 1.0   | 1.5   | 1.0   | 1.0   | 1.5   | 1.0   | 1.0   | 1.5   | 1.0   |
| Lead/Lag            | Lag   | Lead  | Lead  | Lag   | Lead  | Lead  | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | None  | None  | None  | None  | Min   | None  |

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 100  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: THREE CHOPT RD & GASKINS RD

|      |      |      |      |
|------|------|------|------|
| 02   | 01   | 03   | 04   |
| 18 s | 14 s | 11 s | 57 s |
| 06   | 05   | 07   | 08   |
| 19 s | 13 s | 18 s | 50 s |

HCM Signalized Intersection Capacity Analysis

2: THREE CHOPT RD & COX RD

| Movement               | SEL  | SET  | SER   | NWL   | NWT   | NWR   | NEL  | NET   | NER   | SWL  | SWT   | SWR   |
|------------------------|------|------|-------|-------|-------|-------|------|-------|-------|------|-------|-------|
| Lane Configurations    |      |      |       |       |       |       |      |       |       |      |       |       |
| Ideal Flow (vphpl)     | 1900 | 1900 | 1900  | 1900  | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  |
| Total Lost time (s)    | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   |
| Lane Util. Factor      | 0.97 | 0.95 | 1.00  | 0.97  | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 0.97 | 0.95  | 1.00  |
| Frt                    | 1.00 | 1.00 | 0.85  | 1.00  | 1.00  | 0.85  | 1.00 | 1.00  | 0.85  | 1.00 | 1.00  | 0.85  |
| Flt Protected          | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  | 1.00  | 0.95 | 1.00  | 1.00  | 0.95 | 1.00  | 1.00  |
| Satd. Flow (prot)      | 3433 | 3539 | 1583  | 3433  | 3539  | 1583  | 1770 | 3539  | 1583  | 3433 | 3539  | 1583  |
| Flt Permitted          | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  | 1.00  | 0.95 | 1.00  | 1.00  | 0.95 | 1.00  | 1.00  |
| Satd. Flow (perm)      | 3433 | 3539 | 1583  | 3433  | 3539  | 1583  | 1770 | 3539  | 1583  | 3433 | 3539  | 1583  |
| Volume (vph)           | 240  | 650  | 110   | 520   | 770   | 270   | 70   | 320   | 200   | 590  | 1070  | 390   |
| Peak-hour factor, PHF  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  |
| Adj. Flow (vph)        | 240  | 650  | 110   | 520   | 770   | 270   | 70   | 320   | 200   | 590  | 1070  | 390   |
| RTOR Reduction (vph)   | 0    | 0    | 7     | 0     | 0     | 81    | 0    | 0     | 19    | 0    | 0     | 0     |
| Lane Group Flow (vph)  | 240  | 650  | 103   | 520   | 770   | 189   | 70   | 320   | 181   | 590  | 1070  | 390   |
| Turn Type              | Prot |      | pm+ov | Prot  |       | pm+ov | Prot |       | pm+ov | Prot |       | pm+ov |
| Protected Phases       | 1    | 6    | 7     | 5     | 2     | 3     | 7    | 4     | 5     | 3    | 8     | 1     |
| Permitted Phases       |      |      | 6     |       |       | 2     |      |       | 4     |      |       | 8     |
| Actuated Green, G (s)  | 13.8 | 19.8 | 28.9  | 14.0  | 20.0  | 42.4  | 9.1  | 15.3  | 29.3  | 22.4 | 28.6  | 42.4  |
| Effective Green, g (s) | 15.8 | 21.8 | 32.4  | 16.0  | 22.0  | 45.9  | 10.6 | 17.3  | 33.3  | 23.9 | 30.6  | 46.4  |
| Actuated g/C Ratio     | 0.17 | 0.23 | 0.34  | 0.17  | 0.23  | 0.48  | 0.11 | 0.18  | 0.35  | 0.25 | 0.32  | 0.49  |
| Clearance Time (s)     | 6.0  | 6.0  | 5.5   | 6.0   | 6.0   | 5.5   | 5.5  | 6.0   | 6.0   | 5.5  | 6.0   | 6.0   |
| Vehicle Extension (s)  | 4.5  | 4.5  | 3.0   | 4.5   | 4.5   | 3.0   | 3.0  | 4.5   | 4.5   | 3.0  | 4.5   | 4.5   |
| Lane Grp Cap (vph)     | 571  | 812  | 540   | 578   | 820   | 831   | 197  | 644   | 622   | 864  | 1140  | 773   |
| v/s Ratio Prot         | 0.07 | 0.18 | 0.02  | c0.15 | c0.22 | 0.08  | 0.04 | c0.09 | 0.05  | 0.17 | c0.30 | 0.08  |
| v/s Ratio Perm         |      |      | 0.05  |       |       | 0.09  |      |       | 0.07  |      |       | 0.16  |
| v/c Ratio              | 0.42 | 0.80 | 0.19  | 0.90  | 0.94  | 0.23  | 0.36 | 0.50  | 0.29  | 0.68 | 0.94  | 0.50  |
| Uniform Delay, d1      | 35.5 | 34.5 | 22.1  | 38.7  | 35.8  | 14.3  | 39.0 | 34.9  | 22.3  | 32.1 | 31.3  | 16.5  |
| Progression Factor     | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  |
| Incremental Delay, d2  | 0.9  | 6.3  | 0.2   | 17.5  | 18.5  | 0.1   | 1.1  | 1.0   | 0.4   | 2.2  | 14.5  | 0.9   |
| Delay (s)              | 36.4 | 40.9 | 22.2  | 56.2  | 54.3  | 14.4  | 40.1 | 36.0  | 22.8  | 34.4 | 45.8  | 17.4  |
| Level of Service       | D    | D    | C     | E     | D     | B     | D    | D     | C     | C    | D     | B     |
| Approach Delay (s)     |      | 37.7 |       |       | 48.0  |       |      | 32.0  |       |      | 37.1  |       |
| Approach LOS           |      | D    |       |       | D     |       |      | C     |       |      | D     |       |

Intersection Summary

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 39.9  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.84  |                      |      |
| Actuated Cycle Length (s)         | 95.0  | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 79.6% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

Queues  
2: THREE CHOPT RD & COX RD

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group              | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
| Volume (vph)            | 240   | 650   | 110   | 520   | 770   | 270   | 70  | 320   | 200   | 590   | 1070  | 390   |
| Peak Hour Factor        | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Lane Group Flow (vph)   | 240   | 650   | 110   | 520   | 770   | 270   | 70  | 320   | 200   | 590   | 1070  | 390   |
| v/c Ratio               | 0.42  | 0.80  | 0.20  | 0.90  | 0.94  | 0.30  | 0.36  | 0.50  | 0.31  | 0.68  | 0.94  | 0.50  |
| Control Delay           | 38.6  | 43.4  | 11.4  | 59.7  | 57.0  | 6.5   | 41.4  | 36.6  | 18.2  | 37.3  | 48.0  | 11.5  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 37.0  | 0.5   | 0.0   | 0.0   | 0.0   | 4.0   | 25.1  | 0.0   |
| Total Delay             | 38.6  | 43.4  | 11.4  | 59.7  | 94.0  | 7.0   | 41.4  | 36.6  | 18.2  | 41.3  | 73.1  | 11.5  |
| Queue Length 50th (ft)  | 67  | 195   | 24  | 160   | 242   | 33  | 40  | 92  | 69  | 166   | 328   | 86  |
| Queue Length 95th (ft)  | 110   | #296  | 49  | #272  | #386  | 86  | 83  | 134   | 122   | 239   | #486  | 132   |
| Internal Link Dist (ft) |   | 645   |   |   | 472   |   |   | 963   |   |   | 575   |   |
| Turn Bay Length (ft)    | 300   |   |   | 200   |   | 200   | 200   |   |   | 200   |   | 200   |
| Base Capacity (vph)     | 577   | 818   | 603   | 578   | 820   | 907   | 282   | 781   | 639   | 866   | 1140  | 775   |
| Starvation Cap Reductn  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Spillback Cap Reductn   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Storage Cap Reductn     | 0   | 0   | 0   | 0   | 108   | 309   | 0   | 0   | 0   | 194   | 122   | 0   |
| Reduced v/c Ratio       | 0.42  | 0.79  | 0.18  | 0.90  | 1.08  | 0.45  | 0.25  | 0.41  | 0.31  | 0.88  | 1.05  | 0.50  |

Intersection Summary

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

Timings  
2: THREE CHOPT RD & COX RD

| Lane Group          | SEL   | SET   | SER   | NWL   | NWT   | NWR   | NEL   | NET   | NER   | SWL   | SWT   | SWR   |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations |       |       |       |       |       |       |       |       |       |       |       |       |
| Volume (vph)        | 240   | 650   | 110   | 520   | 770   | 270   | 70    | 320   | 200   | 590   | 1070  | 390   |
| Turn Type           | Prot  |       | pm+ov |
| Protected Phases    | 1     | 6     | 7     | 5     | 2     | 3     | 7     | 4     | 5     | 3     | 8     | 1     |
| Permitted Phases    |       |       | 6     |       |       | 2     |       |       | 4     |       |       | 8     |
| Detector Phases     | 1     | 6     | 7     | 5     | 2     | 3     | 7     | 4     | 5     | 3     | 8     | 1     |
| Minimum Initial (s) | 12.0  | 12.0  | 3.0   | 8.0   | 8.0   | 3.0   | 3.0   | 8.0   | 8.0   | 3.0   | 12.0  | 12.0  |
| Minimum Split (s)   | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| Total Split (s)     | 20.0  | 26.0  | 20.0  | 20.0  | 26.0  | 28.0  | 20.0  | 26.0  | 20.0  | 28.0  | 34.0  | 20.0  |
| Total Split (%)     | 20.0% | 26.0% | 20.0% | 20.0% | 26.0% | 28.0% | 20.0% | 26.0% | 20.0% | 28.0% | 34.0% | 20.0% |
| Yellow Time (s)     | 4.0   | 4.0   | 3.5   | 4.0   | 4.0   | 3.5   | 3.5   | 4.0   | 4.0   | 3.5   | 4.0   | 4.0   |
| All-Red Time (s)    | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lead/Lag            | Lag   | Lead  | Lead  | Lag   | Lead  | Lag   | Lead  | Lead  | Lag   | Lag   | Lag   | Lag   |
| Lead-Lag Optimize?  | Yes   |
| Recall Mode         | Min   | Min   | None  | Min   | Min   | None  | None  | Min   | Min   | None  | Min   | Min   |

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 95.1  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: THREE CHOPT RD & COX RD

|      |      |      |      |
|------|------|------|------|
| ø2   | ø1   | ø4   | ø3   |
| 26 s | 20 s | 26 s | 28 s |
| ø6   | ø5   | ø7   | ø8   |
| 26 s | 20 s | 20 s | 34 s |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

ULTRA  
2034 AM BUILD  
7/26/2005

| Movement               | SEL   | SET  | SER   | NWL  | NWT  | NWR   | NEL  | NET   | NER   | SWL  | SWT  | SWR   |
|------------------------|-------|------|-------|------|------|-------|------|-------|-------|------|------|-------|
| Lane Configurations    |       |      |       |      |      |       |      |       |       |      |      |       |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900 | 1900  |
| Total Lost time (s)    | 4.0   | 4.0  | 4.0   | 4.0  | 4.0  | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   |
| Lane Util. Factor      | 0.97  | 0.86 | 1.00  | 1.00 | 0.86 | 1.00  | 0.97 | 0.81  | 1.00  | 0.97 | 0.81 | 1.00  |
| Frt                    | 1.00  | 1.00 | 0.85  | 1.00 | 1.00 | 0.85  | 1.00 | 1.00  | 0.85  | 1.00 | 1.00 | 0.85  |
| Flt Protected          | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 | 1.00  | 0.95 | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  |
| Satd. Flow (prot)      | 3433  | 6408 | 1583  | 1770 | 6408 | 1583  | 3433 | 7544  | 1583  | 3433 | 7544 | 1583  |
| Flt Permitted          | 0.95  | 1.00 | 1.00  | 0.95 | 1.00 | 1.00  | 0.95 | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  |
| Satd. Flow (perm)      | 3433  | 6408 | 1583  | 1770 | 6408 | 1583  | 3433 | 7544  | 1583  | 3433 | 7544 | 1583  |
| Volume (vph)           | 810   | 570  | 150   | 70   | 560  | 530   | 230  | 2570  | 120   | 240  | 1430 | 320   |
| Peak-hour factor, PHF  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |
| Adj. Flow (vph)        | 810   | 570  | 150   | 70   | 560  | 530   | 230  | 2570  | 120   | 240  | 1430 | 320   |
| RTOR Reduction (vph)   | 0     | 0    | 51    | 0    | 0    | 2     | 0    | 0     | 56    | 0    | 0    | 13    |
| Lane Group Flow (vph)  | 810   | 570  | 99    | 70   | 560  | 528   | 230  | 2570  | 64    | 240  | 1430 | 307   |
| Turn Type              | Prot  |      | pm+ov | Prot |      | pm+ov | Prot |       | pm+ov | Prot |      | pm+ov |
| Protected Phases       | 5     | 2    | 3     | 1    | 6    | 7     | 3    | 8     | 1     | 7    | 4    | 5     |
| Permitted Phases       |       |      | 2     |      |      | 6     |      |       | 8     |      |      | 4     |
| Actuated Green, G (s)  | 24.2  | 25.5 | 36.8  | 7.9  | 9.2  | 30.2  | 11.3 | 35.1  | 43.0  | 21.0 | 44.8 | 69.0  |
| Effective Green, g (s) | 25.7  | 27.0 | 38.3  | 9.4  | 10.7 | 31.7  | 11.3 | 36.6  | 46.0  | 21.0 | 46.3 | 72.0  |
| Actuated g/C Ratio     | 0.23  | 0.25 | 0.35  | 0.09 | 0.10 | 0.29  | 0.10 | 0.33  | 0.42  | 0.19 | 0.42 | 0.65  |
| Clearance Time (s)     | 5.5   | 5.5  | 4.0   | 5.5  | 5.5  | 4.0   | 4.0  | 5.5   | 5.5   | 4.0  | 5.5  | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0  | 3.0   | 3.0  | 3.0  | 3.0   | 3.0  | 3.0   | 3.0   | 3.0  | 5.0  | 3.0   |
| Lane Grp Cap (vph)     | 802   | 1573 | 609   | 151  | 623  | 456   | 353  | 2510  | 662   | 655  | 3175 | 1094  |
| v/s Ratio Prot         | c0.24 | 0.09 | 0.03  | 0.04 | 0.09 | c0.22 | 0.07 | c0.34 | 0.02  | 0.07 | 0.19 | 0.07  |
| v/s Ratio Perm         |       |      | 0.07  |      |      | 0.11  |      |       | 0.06  |      |      | 0.13  |
| v/c Ratio              | 1.01  | 0.36 | 0.16  | 0.46 | 0.90 | 1.16  | 0.65 | 1.02  | 0.10  | 0.37 | 0.45 | 0.28  |
| Uniform Delay, d1      | 42.1  | 34.4 | 24.8  | 47.9 | 49.1 | 39.1  | 47.5 | 36.7  | 19.4  | 38.7 | 22.8 | 8.0   |
| Progression Factor     | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |
| Incremental Delay, d2  | 34.3  | 0.1  | 0.1   | 2.2  | 15.7 | 93.0  | 4.3  | 24.3  | 0.1   | 0.3  | 0.2  | 0.1   |
| Delay (s)              | 76.4  | 34.5 | 24.9  | 50.1 | 64.8 | 132.2 | 51.7 | 61.0  | 19.5  | 39.1 | 23.0 | 8.2   |
| Level of Service       | E     | C    | C     | D    | E    | F     | D    | E     | B     | D    | C    | A     |
| Approach Delay (s)     |       | 55.8 |       |      | 94.7 |       |      | 58.6  |       |      | 22.5 |       |
| Approach LOS           |       | E    |       |      | F    |       |      | E     |       |      | C    |       |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 54.1  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 1.07  |                      |      |
| Actuated Cycle Length (s)         | 110.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 95.7% | ICU Level of Service | F    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

ULTRA  
2034 AM BUILD  
7/26/2005

| Movement               | SEL   | SET   | SER  | NWL   | NWT   | NWR   | NEL  | NET   | NER  | SWL   | SWT  | SWR   |
|------------------------|-------|-------|------|-------|-------|-------|------|-------|------|-------|------|-------|
| Lane Configurations    | ↘↘    | ↑↑↑   | ↗    | ↘     | ↑↑↑   | ↗     | ↘↘   | ↑↑↑   | ↗    | ↘↘    | ↑↑↑  | ↗     |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  | 1900 | 1900  | 1900 | 1900  | 1900 | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0   | 4.0  | 4.0   |
| Lane Util. Factor      | 0.97  | 0.91  | 1.00 | 1.00  | 0.91  | 1.00  | 0.97 | 0.86  | 1.00 | 0.97  | 0.86 | 1.00  |
| Frt                    | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85  | 1.00 | 1.00  | 0.85 | 1.00  | 1.00 | 0.85  |
| Flt Protected          | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00  | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00  |
| Satd. Flow (prot)      | 3433  | 5085  | 1583 | 1770  | 5085  | 1583  | 3433 | 6408  | 1583 | 3433  | 6408 | 1583  |
| Flt Permitted          | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00  | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 | 1.00  |
| Satd. Flow (perm)      | 3433  | 5085  | 1583 | 1770  | 5085  | 1583  | 3433 | 6408  | 1583 | 3433  | 6408 | 1583  |
| Volume (vph)           | 810   | 570   | 150  | 70    | 560   | 530   | 230  | 2570  | 120  | 240   | 1430 | 320   |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  |
| Adj. Flow (vph)        | 810   | 570   | 150  | 70    | 560   | 530   | 230  | 2570  | 120  | 240   | 1430 | 320   |
| RTOR Reduction (vph)   | 0     | 0     | 47   | 0     | 0     | 1     | 0    | 0     | 44   | 0     | 0    | 12    |
| Lane Group Flow (vph)  | 810   | 570   | 103  | 70    | 560   | 529   | 230  | 2570  | 76   | 240   | 1430 | 308   |
| Turn Type              | Prot  | pm+ov | Prot | pm+ov | Prot  | pm+ov | Prot | pm+ov | Prot | pm+ov | Prot | pm+ov |
| Protected Phases       | 5     | 2     | 3    | 1     | 6     | 7     | 3    | 8     | 1    | 7     | 4    | 5     |
| Permitted Phases       |       |       | 2    |       |       | 6     |      |       | 8    |       |      | 4     |
| Actuated Green, G (s)  | 24.5  | 28.8  | 40.9 | 8.2   | 12.5  | 32.5  | 12.1 | 42.5  | 50.7 | 20.0  | 50.4 | 74.9  |
| Effective Green, g (s) | 26.0  | 30.3  | 42.4 | 9.7   | 14.0  | 34.0  | 12.1 | 44.0  | 53.7 | 20.0  | 51.9 | 77.9  |
| Actuated g/C Ratio     | 0.22  | 0.25  | 0.35 | 0.08  | 0.12  | 0.28  | 0.10 | 0.37  | 0.45 | 0.17  | 0.43 | 0.65  |
| Clearance Time (s)     | 5.5   | 5.5   | 4.0  | 5.5   | 5.5   | 4.0   | 4.0  | 5.5   | 5.5  | 4.0   | 5.5  | 5.5   |
| Vehicle Extension (s)  | 3.0   | 3.0   | 3.0  | 3.0   | 3.0   | 3.0   | 3.0  | 3.0   | 3.0  | 3.0   | 5.0  | 3.0   |
| Lane Grp Cap (vph)     | 744   | 1284  | 612  | 143   | 593   | 449   | 346  | 2350  | 708  | 572   | 2771 | 1080  |
| v/s Ratio Prot         | c0.24 | 0.11  | 0.02 | 0.04  | 0.11  | c0.20 | 0.07 | c0.40 | 0.01 | 0.07  | 0.22 | 0.06  |
| v/s Ratio Perm         |       |       | 0.07 |       |       | 0.14  |      |       | 0.06 |       |      | 0.14  |
| v/c Ratio              | 1.09  | 0.44  | 0.17 | 0.49  | 0.94  | 1.18  | 0.66 | 1.09  | 0.11 | 0.42  | 0.52 | 0.29  |
| Uniform Delay, d1      | 47.0  | 37.8  | 26.7 | 52.8  | 52.6  | 43.0  | 52.0 | 38.0  | 19.2 | 44.8  | 24.9 | 9.1   |
| Progression Factor     | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  |
| Incremental Delay, d2  | 59.8  | 0.2   | 0.1  | 2.6   | 23.9  | 100.8 | 4.8  | 49.7  | 0.1  | 0.5   | 0.3  | 0.1   |
| Delay (s)              | 106.8 | 38.0  | 26.8 | 55.4  | 76.5  | 143.8 | 56.8 | 87.7  | 19.3 | 45.3  | 25.2 | 9.2   |
| Level of Service       | F     | D     | C    | E     | E     | F     | E    | F     | B    | D     | C    | A     |
| Approach Delay (s)     |       | 73.3  |      |       | 106.0 |       |      | 82.5  |      |       | 25.1 |       |
| Approach LOS           |       | E     |      |       | F     |       |      | F     |      |       | C    |       |

**Intersection Summary**

|                                   |        |                      |      |
|-----------------------------------|--------|----------------------|------|
| HCM Average Control Delay         | 69.2   | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 1.12   |                      |      |
| Actuated Cycle Length (s)         | 120.0  | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 103.2% | ICU Level of Service | G    |
| Analysis Period (min)             | 15     |                      |      |
| c Critical Lane Group             |        |                      |      |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

ULTRA  
2034 AM BUILD  
7/26/2005

| Movement               | SEL   | SET   | SER   | NWL  | NWT  | NWR   | NEL  | NET   | NER   | SWL  | SWT  | SWR   |
|------------------------|-------|-------|-------|------|------|-------|------|-------|-------|------|------|-------|
| Lane Configurations    |       |       |       |      |      |       |      |       |       |      |      |       |
| Ideal Flow (vphpl)     | 1900  | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900 | 1900  |
| Total Lost time (s)    | 4.0   | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   |
| Lane Util. Factor      | 0.97  | 0.95  | 1.00  | 0.97 | 0.95 | 1.00  | 1.00 | 0.91  | 1.00  | 0.97 | 0.91 | 1.00  |
| Frt                    | 1.00  | 1.00  | 0.85  | 1.00 | 1.00 | 0.85  | 1.00 | 1.00  | 0.85  | 1.00 | 1.00 | 0.85  |
| Flt Protected          | 0.95  | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  | 0.95 | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  |
| Satd. Flow (prot)      | 3433  | 3539  | 1583  | 3433 | 3539 | 1583  | 1770 | 5085  | 1583  | 3433 | 5085 | 1583  |
| Flt Permitted          | 0.95  | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  | 0.95 | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  |
| Satd. Flow (perm)      | 3433  | 3539  | 1583  | 3433 | 3539 | 1583  | 1770 | 5085  | 1583  | 3433 | 5085 | 1583  |
| Volume (vph)           | 660   | 740   | 40    | 200  | 220  | 430   | 30   | 1040  | 410   | 160  | 200  | 80    |
| Peak-hour factor, PHF  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |
| Adj. Flow (vph)        | 660   | 740   | 40    | 200  | 220  | 430   | 30   | 1040  | 410   | 160  | 200  | 80    |
| RTOR Reduction (vph)   | 0     | 0     | 26    | 0    | 0    | 4     | 0    | 0     | 132   | 0    | 0    | 0     |
| Lane Group Flow (vph)  | 660   | 740   | 14    | 200  | 220  | 426   | 30   | 1040  | 278   | 160  | 200  | 80    |
| Turn Type              | Prot  |       | pt+ov | Prot |      | pm+ov | Prot |       | pm+ov | Prot |      | pm+ov |
| Protected Phases       | 1     | 6     | 6.3   | 5    | 2    | 7     | 3    | 8     | 5     | 7    | 4    | 1     |
| Permitted Phases       |       |       |       |      |      | 2     |      |       | 8     |      |      | 4     |
| Actuated Green, G (s)  | 14.2  | 19.1  | 23.5  | 8.3  | 13.2 | 23.3  | 4.4  | 16.4  | 24.7  | 10.1 | 22.1 | 36.3  |
| Effective Green, g (s) | 15.7  | 21.1  | 27.0  | 9.8  | 15.2 | 26.8  | 5.9  | 18.4  | 28.2  | 11.6 | 24.1 | 39.8  |
| Actuated g/C Ratio     | 0.20  | 0.27  | 0.35  | 0.13 | 0.20 | 0.35  | 0.08 | 0.24  | 0.37  | 0.15 | 0.31 | 0.52  |
| Clearance Time (s)     | 5.5   | 6.0   |       | 5.5  | 6.0  | 5.5   | 5.5  | 6.0   | 5.5   | 5.5  | 6.0  | 5.5   |
| Vehicle Extension (s)  | 3.0   | 4.5   |       | 3.0  | 4.5  | 3.0   | 3.0  | 3.0   | 3.0   | 3.0  | 3.0  | 3.0   |
| Lane Grp Cap (vph)     | 701   | 971   | 556   | 437  | 700  | 634   | 136  | 1217  | 581   | 518  | 1594 | 902   |
| v/s Ratio Prot         | c0.19 | c0.21 | 0.03  | 0.06 | 0.06 | c0.10 | 0.02 | c0.20 | 0.09  | 0.05 | 0.04 | 0.02  |
| v/s Ratio Perm         |       |       |       |      |      | 0.17  |      |       | 0.17  |      |      | 0.03  |
| v/c Ratio              | 0.94  | 0.76  | 0.03  | 0.46 | 0.31 | 0.67  | 0.22 | 0.85  | 0.48  | 0.31 | 0.13 | 0.09  |
| Uniform Delay, d1      | 30.1  | 25.6  | 16.3  | 31.1 | 26.4 | 21.3  | 33.3 | 28.0  | 18.7  | 29.1 | 18.9 | 9.4   |
| Progression Factor     | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |
| Incremental Delay, d2  | 20.8  | 4.0   | 0.0   | 0.8  | 0.4  | 2.8   | 0.8  | 6.0   | 0.6   | 0.3  | 0.0  | 0.0   |
| Delay (s)              | 51.0  | 29.6  | 16.4  | 31.8 | 26.8 | 24.1  | 34.2 | 34.0  | 19.3  | 29.4 | 18.9 | 9.4   |
| Level of Service       | D     | C     | B     | C    | C    | C     | C    | C     | B     | C    | B    | A     |
| Approach Delay (s)     |       | 39.1  |       |      | 26.6 |       |      | 29.9  |       |      | 21.0 |       |
| Approach LOS           |       | D     |       |      | C    |       |      | C     |       |      | C    |       |

**Intersection Summary**

|                                   |       |                      |     |
|-----------------------------------|-------|----------------------|-----|
| HCM Average Control Delay         | 31.5  | HCM Level of Service | C   |
| HCM Volume to Capacity ratio      | 0.76  |                      |     |
| Actuated Cycle Length (s)         | 76.9  | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 75.5% | ICU Level of Service | D   |
| Analysis Period (min)             | 15    |                      |     |
| c Critical Lane Group             |       |                      |     |

HCM Signalized Intersection Capacity Analysis  
1: THREE CHOPT RD & GASKINS RD

ULTRA  
2034 PM BUILD  
7/26/2005

| Movement               | SEL  | SET   | SER  | NWL   | NWT   | NWR  | NEL   | NET   | NER  | SWL  | SWT   | SWR  |
|------------------------|------|-------|------|-------|-------|------|-------|-------|------|------|-------|------|
| Lane Configurations    |      |       |      |       |       |      |       |       |      |      |       |      |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900  | 1900  | 1900 | 1900  | 1900  | 1900 | 1900 | 1900  | 1900 |
| Total Lost time (s)    | 4.0  | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   | 4.0  |
| Lane Util. Factor      | 0.97 | 0.91  | 1.00 | 1.00  | 0.91  | 1.00 | 0.97  | 0.86  | 1.00 | 0.97 | 0.86  | 1.00 |
| Frt                    | 1.00 | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 | 1.00  | 1.00  | 0.85 | 1.00 | 1.00  | 0.85 |
| Flt Protected          | 0.95 | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  | 1.00 |
| Satd. Flow (prot)      | 3433 | 5085  | 1583 | 1770  | 5085  | 1583 | 3433  | 6408  | 1583 | 3433 | 6408  | 1583 |
| Flt Permitted          | 0.95 | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 | 0.95  | 1.00  | 1.00 | 0.95 | 1.00  | 1.00 |
| Satd. Flow (perm)      | 3433 | 5085  | 1583 | 1770  | 5085  | 1583 | 3433  | 6408  | 1583 | 3433 | 6408  | 1583 |
| Volume (vph)           | 290  | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210  | 300  | 2730  | 580  |
| Peak-hour factor, PHF  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 |
| Adj. Flow (vph)        | 290  | 590   | 290  | 180   | 680   | 240  | 240   | 1750  | 210  | 300  | 2730  | 580  |
| RTOR Reduction (vph)   | 0    | 0     | 39   | 0     | 0     | 18   | 0     | 0     | 13   | 0    | 0     | 5    |
| Lane Group Flow (vph)  | 290  | 590   | 251  | 180   | 680   | 222  | 240   | 1750  | 197  | 300  | 2730  | 575  |
| Turn Type              | Prot | pm+ov |      | Prot  | pm+ov |      | Prot  | pm+ov |      | Prot | pm+ov |      |
| Protected Phases       | 5    | 2     | 3    | 1     | 6     | 7    | 3     | 8     | 1    | 7    | 4     | 5    |
| Permitted Phases       |      | 2     |      |       | 6     |      |       | 8     |      |      | 4     |      |
| Actuated Green, G (s)  | 16.6 | 18.0  | 28.9 | 15.3  | 16.7  | 38.8 | 10.9  | 43.3  | 58.6 | 22.1 | 54.5  | 71.1 |
| Effective Green, g (s) | 16.6 | 19.5  | 30.4 | 15.3  | 18.2  | 40.3 | 10.9  | 44.8  | 60.1 | 22.1 | 56.0  | 72.6 |
| Actuated g/C Ratio     | 0.14 | 0.17  | 0.26 | 0.13  | 0.15  | 0.34 | 0.09  | 0.38  | 0.51 | 0.19 | 0.48  | 0.62 |
| Clearance Time (s)     | 4.0  | 5.5   | 4.0  | 4.0   | 5.5   | 4.0  | 4.0   | 5.5   | 4.0  | 4.0  | 5.5   | 4.0  |
| Vehicle Extension (s)  | 3.0  | 3.0   | 3.0  | 3.0   | 3.0   | 3.0  | 3.0   | 3.0   | 3.0  | 3.0  | 5.0   | 3.0  |
| Lane Grp Cap (vph)     | 484  | 842   | 409  | 230   | 786   | 542  | 318   | 2439  | 808  | 645  | 3049  | 976  |
| v/s Ratio Prot         | 0.08 | 0.12  | 0.07 | c0.10 | c0.13 | 0.08 | c0.07 | 0.27  | 0.03 | 0.09 | c0.43 | 0.08 |
| v/s Ratio Perm         |      |       | 0.12 |       |       | 0.07 |       |       | 0.10 |      |       | 0.28 |
| v/c Ratio              | 0.60 | 0.70  | 0.61 | 0.78  | 0.87  | 0.41 | 0.75  | 0.72  | 0.24 | 0.47 | 0.90  | 0.59 |
| Uniform Delay, d1      | 47.4 | 46.3  | 38.5 | 49.6  | 48.6  | 29.6 | 52.1  | 31.1  | 16.1 | 42.5 | 28.2  | 13.6 |
| Progression Factor     | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 |
| Incremental Delay, d2  | 2.0  | 2.7   | 2.7  | 15.8  | 9.8   | 0.5  | 9.8   | 1.0   | 0.2  | 0.5  | 4.1   | 0.9  |
| Delay (s)              | 49.4 | 49.0  | 41.2 | 65.4  | 58.4  | 30.1 | 61.9  | 32.1  | 16.3 | 43.1 | 32.3  | 14.5 |
| Level of Service       | D    | D     | D    | E     | E     | C    | E     | C     | B    | D    | C     | B    |
| Approach Delay (s)     |      | 47.2  |      |       | 53.4  |      |       | 33.8  |      |      | 30.3  |      |
| Approach LOS           |      | D     |      |       | D     |      |       | C     |      |      | C     |      |

**Intersection Summary**

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 36.9  | HCM Level of Service | D    |
| HCM Volume to Capacity ratio      | 0.85  |                      |      |
| Actuated Cycle Length (s)         | 117.7 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 81.2% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

HCM Signalized Intersection Capacity Analysis  
2: THREE CHOPT RD & COX RD

2034 PM BUILD  
7/26/2005

| Movement               | SEL  | SET  | SER   | NWL   | NWT   | NWR   | NEL  | NET  | NER   | SWL   | SWT   | SWR   |      |      |       |       |
|------------------------|------|------|-------|-------|-------|-------|------|------|-------|-------|-------|-------|------|------|-------|-------|
| Lane Configurations    |      |      |       |       |       |       |      |      |       |       |       |       |      |      |       |       |
| Ideal Flow (vphpl)     | 1900 | 1900 | 1900  | 1900  | 1900  | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  | 1900  | 1900 | 1900 | 1900  | 1900  |
| Total Lost time (s)    | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0  | 4.0  | 4.0   | 4.0   |
| Lane Util. Factor      | 0.97 | 0.95 | 1.00  | 0.97  | 0.95  | 1.00  | 1.00 | 0.91 | 1.00  | 0.97  | 0.91  | 1.00  | 0.97 | 0.91 | 1.00  | 0.85  |
| Frt                    | 1.00 | 1.00 | 0.85  | 1.00  | 1.00  | 0.85  | 1.00 | 1.00 | 0.85  | 1.00  | 1.00  | 0.85  | 1.00 | 1.00 | 0.85  | 1.00  |
| FIt Protected          | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  | 1.00  |
| Satd. Flow (prot)      | 3433 | 3539 | 1583  | 3433  | 3539  | 1583  | 1770 | 5085 | 1583  | 3433  | 5085  | 1583  | 3433 | 5085 | 1583  | 1583  |
| FIt Permitted          | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  | 0.95  | 1.00  | 1.00  | 0.95 | 1.00 | 1.00  | 1.00  |
| Satd. Flow (perm)      | 3433 | 3539 | 1583  | 3433  | 3539  | 1583  | 1770 | 5085 | 1583  | 3433  | 5085  | 1583  | 3433 | 5085 | 1583  | 1583  |
| Volume (vph)           | 240  | 650  | 110   | 520   | 770   | 270   | 70   | 320  | 200   | 590   | 1070  | 390   | 240  | 650  | 110   | 520   |
| Peak-hour factor, PHF  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  |
| Adj. Flow (vph)        | 240  | 650  | 110   | 520   | 770   | 270   | 70   | 320  | 200   | 590   | 1070  | 390   | 240  | 650  | 110   | 520   |
| RTOR Reduction (vph)   | 0    | 0    | 6     | 0     | 0     | 83    | 0    | 0    | 17    | 0     | 0     | 0     | 0    | 0    | 6     | 0     |
| Lane Group Flow (vph)  | 240  | 650  | 104   | 520   | 770   | 187   | 70   | 320  | 183   | 590   | 1070  | 390   | 240  | 650  | 104   | 520   |
| Turn Type              | Prot |      | pm+ov | Prot  |       | pm+ov | Prot |      | pm+ov | Prot  |       | pm+ov | Prot |      | pm+ov | Prot  |
| Protected Phases       | 1    | 6    | 7     | 5     | 2     | 3     | 7    | 4    | 5     | 3     | 8     | 1     | 1    | 6    | 7     | 5     |
| Permitted Phases       |      |      | 6     |       |       | 2     |      |      | 4     |       |       | 8     |      |      | 6     |       |
| Actuated Green, G (s)  | 13.6 | 19.2 | 28.2  | 14.4  | 20.0  | 37.3  | 9.0  | 12.2 | 26.6  | 17.3  | 20.5  | 34.1  | 13.6 | 19.2 | 28.2  | 14.4  |
| Effective Green, g (s) | 15.6 | 21.2 | 31.7  | 16.4  | 22.0  | 40.8  | 10.5 | 14.2 | 30.6  | 18.8  | 22.5  | 38.1  | 15.6 | 21.2 | 31.7  | 16.4  |
| Actuated g/C Ratio     | 0.18 | 0.24 | 0.37  | 0.19  | 0.25  | 0.47  | 0.12 | 0.16 | 0.35  | 0.22  | 0.26  | 0.44  | 0.18 | 0.24 | 0.37  | 0.19  |
| Clearance Time (s)     | 6.0  | 6.0  | 5.5   | 6.0   | 6.0   | 5.5   | 5.5  | 6.0  | 6.0   | 5.5   | 6.0   | 6.0   | 6.0  | 6.0  | 5.5   | 6.0   |
| Vehicle Extension (s)  | 4.5  | 4.5  | 3.0   | 4.5   | 4.5   | 3.0   | 3.0  | 4.5  | 4.5   | 3.0   | 4.5   | 4.5   | 4.5  | 4.5  | 3.0   | 4.5   |
| Lane Grp Cap (vph)     | 618  | 866  | 653   | 650   | 899   | 819   | 215  | 834  | 632   | 745   | 1321  | 770   | 618  | 866  | 653   | 650   |
| v/s Ratio Prot         | 0.07 | 0.18 | 0.02  | c0.15 | c0.22 | 0.07  | 0.04 | 0.06 | 0.06  | c0.17 | c0.21 | 0.09  | 0.07 | 0.18 | 0.02  | c0.15 |
| v/s Ratio Perm         |      |      | 0.05  |       |       | 0.10  |      |      | 0.07  |       |       | 0.16  |      |      | 0.05  |       |
| v/c Ratio              | 0.39 | 0.75 | 0.16  | 0.80  | 0.86  | 0.23  | 0.33 | 0.38 | 0.29  | 0.79  | 0.81  | 0.51  | 0.39 | 0.75 | 0.16  | 0.80  |
| Uniform Delay, d1      | 31.3 | 30.3 | 18.5  | 33.5  | 30.8  | 13.6  | 34.8 | 32.3 | 20.2  | 32.1  | 30.0  | 17.5  | 31.3 | 30.3 | 18.5  | 33.5  |
| Progression Factor     | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  |
| Incremental Delay, d2  | 0.7  | 4.2  | 0.1   | 7.8   | 8.6   | 0.1   | 0.9  | 0.5  | 0.4   | 5.8   | 4.2   | 0.9   | 0.7  | 4.2  | 0.1   | 7.8   |
| Delay (s)              | 32.0 | 34.4 | 18.6  | 41.3  | 39.4  | 13.7  | 35.7 | 32.8 | 20.6  | 37.8  | 34.3  | 18.4  | 32.0 | 34.4 | 18.6  | 41.3  |
| Level of Service       | C    | C    | B     | D     | D     | B     | D    | C    | C     | D     | C     | B     | C    | C    | B     | D     |
| Approach Delay (s)     |      | 32.1 |       |       | 35.6  |       |      | 29.0 |       |       | 32.3  |       |      | 32.1 |       | 35.6  |
| Approach LOS           |      | C    |       |       | D     |       |      | C    |       |       | C     |       |      | C    |       | D     |

**Intersection Summary**

|                                   |       |                      |     |
|-----------------------------------|-------|----------------------|-----|
| HCM Average Control Delay         | 32.9  | HCM Level of Service | C   |
| HCM Volume to Capacity ratio      | 0.77  |                      |     |
| Actuated Cycle Length (s)         | 86.6  | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 70.7% | ICU Level of Service | C   |
| Analysis Period (min)             | 15    |                      |     |
| c Critical Lane Group             |       |                      |     |