

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Shafers School House Rd & SR 611

3/11/2015

|                                       |  |  |  |  |  |  |         |     |         |
|---------------------------------------|---|---|---|---|---|---|---------|-----|---------|
| Movement                              | SET   | SER   | NWL   | NWT   | NEL   | NER   |         |     |         |
| Lane Configurations                   |  |   |  |  |  |  |         |     |         |
| Volume (vph)                          | 885   | 39  | 70  | 957   | 42  | 42  |         |     |         |
| Movement Number                       | 2   | 12  | 1   | 6   | 3   | 18  |         |     |         |
| Initial Queue, veh                    | 0   | 0   | 0   | 0   | 0   | 0   |         |     |         |
| Ped-Bike Adj. Factor (A_pbT)          |   | 1.00  | 1.00  |   | 1.00  | 1.00  |         |     |         |
| Parking, Bus Adj. Factors             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |         |     |         |
| Adj. Sat. Flow Rate, veh/h/ln         | 1807  | 1807  | 1768  | 1872  | 1808  | 1793  |         |     |         |
| Lanes                                 | 1   | 0   | 1   | 1   | 1   | 1   |         |     |         |
| <b>Lane Assignment</b>                |   |   |   |   |   |   |         |     |         |
| Capacity, veh/h                       | 1351  | 85  | 364   | 1503  | 139   | 123   |         |     |         |
| Proportion Arriving On Green          | 0.80  | 0.80  | 0.27  | 0.29  | 0.08  | 0.08  |         |     |         |
| Movement Delay, s/veh                 | 0.0   | 6.7   | 33.5  | 28.0  | 47.2  | 47.3  |         |     |         |
| Movement LOS                          |   | A   | C   | C   | D   | D   |         |     |         |
| Approach Volume, veh/h                | 1001  |   |   | 1168  | 110   |   |         |     |         |
| Approach Delay, s/veh                 | 6.7   |   |   | 28.4  | 47.2  |   |         |     |         |
| Approach LOS                          | A   |   |   | C   | D   |   |         |     |         |
| <b>Timer:</b>                         |   | 1   | 2   | 3   | 4   | 5   | 6       | 7   | 8       |
| Assigned Phase                        |   |   | 2   |   |   |   | 6       |     | 8       |
| Case No                               |   |   | 8.0   |   |   |   | 6.0     |     | 9.0     |
| Phase Duration (G+Y+Rc), s            |   |   | 88.80   |   |   |   | 88.80   |     | 14.32   |
| Change Period (Y+Rc), s               |   |   | 6.00  |   |   |   | 6.00    |     | 6.00    |
| Max. Allowable Headway (MAH), s       |   |   | 6.72  |   |   |   | 6.72    |     | 4.50    |
| Maximum Green Setting (Gmax), s       |   |   | 82.80   |   |   |   | 82.80   |     | 8.70    |
| Max. Queue Clearance Time (g_c+I1), s |   |   | 27.83   |   |   |   | 55.86   |     | 5.37    |
| Green Extension Time (g_e), s         |   |   | 47.47   |   |   |   | 24.90   |     | 0.09    |
| Probability of Phase Call (p_c)       |   |   | 1.000   |   |   |   | 1.000   |     | 0.957   |
| Probability of Max Out (p_x)          |   |   | 0.831   |   |   |   | 0.925   |     | 1.000   |
| <b>Left-Turn Movement Data</b>        |   |   |   |   |   |   |         |     |         |
| Assigned Movement                     |   |   |   |   |   |   | 1       |     | 3       |
| Mvmt. Sat Flow, veh/h                 |   |   |   |   |   |   | 532.24  |     | 1721.68 |
| <b>Through Movement Data</b>          |   |   |   |   |   |   |         |     |         |
| Assigned Movement                     |   |   | 2   |   |   |   | 6       |     |         |
| Mvmt. Sat Flow, veh/h                 |   |   | 1682.33   |   |   |   | 1872.06 |     |         |
| <b>Right-Turn Movement Data</b>       |   |   |   |   |   |   |         |     |         |
| Assigned Movement                     |   |   | 12  |   |   |   | 16      |     | 18      |
| Mvmt. Sat Flow, veh/h                 |   |   | 105.59  |   |   |   | 0.00    |     | 1524.08 |
| <b>Left Lane Group Data</b>           |   |   |   |   |   |   |         |     |         |
| Assigned Movement                     |   | 0   | 0   | 0   | 0   | 0   | 1       | 0   | 3       |
| Lane Assignment                       |   |   |   |   |   |   | L       |     | L       |
| Lanes in Group                        |   | 0   | 0   | 0   | 0   | 0   | 1       | 0   | 1       |
| Group Volume (v), veh/h               |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 80.5    | 0.0 | 59.2    |
| Group Sat. Flow (s), veh/h/ln         |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 532.2   | 0.0 | 1721.7  |
| Queue Serve Time (g_s), s             |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 13.4    | 0.0 | 3.4     |
| Cycle Queue Clear Time (g_c), s       |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 39.2    | 0.0 | 3.4     |

# HCM 2010 Signalized Intersection Capacity Analysis

## 1: Shafers School House Rd & SR 611

3/11/2015

|                                       |       |       |       |       |       |        |       |        |
|---------------------------------------|-------|-------|-------|-------|-------|--------|-------|--------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 532.2  | 0.0   | 1721.7 |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Perm LT Eff. Green (g_p), s           | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 82.8   | 0.0   | 0.0    |
| Perm LT Serve Time (g_u), s           | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 57.0   | 0.0   | 0.0    |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 13.4   | 0.0   | 0.0    |
| Time to First Blk (g_f), s            | 0.0   | 82.8  | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Proportion LT Inside Lane (P_L)       | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 1.000  |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 363.8  | 0.0   | 139.0  |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.221  | 0.000 | 0.426  |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 363.8  | 0.0   | 145.2  |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.695  | 0.000 | 1.000  |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 32.9   | 0.0   | 45.1   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.6    | 0.0   | 2.1    |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 33.5   | 0.0   | 47.2   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1.9    | 0.0   | 1.4    |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.1    | 0.0   | 0.1    |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 1.000  |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1.9    | 0.0   | 1.5    |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.34   | 0.00  | 0.08   |
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| <b>Middle Lane Group Data</b>         |       |       |       |       |       |        |       |        |
| Assigned Movement                     | 0     | 2     | 0     | 0     | 0     | 6      | 0     | 0      |
| Lane Assignment                       | T     |       |       |       |       |        |       |        |
| Lanes in Group                        | 0     | 0     | 0     | 0     | 0     | 1      | 0     | 0      |
| Group Volume (v), veh/h               | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1087.5 | 0.0   | 0.0    |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1872.1 | 0.0   | 0.0    |
| Queue Serve Time (g_s), s             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 53.9   | 0.0   | 0.0    |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 53.9   | 0.0   | 0.0    |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1503.1 | 0.0   | 0.0    |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.724  | 0.000 | 0.000  |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1503.1 | 0.0   | 0.0    |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.695  | 0.000 | 0.000  |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 26.4   | 0.0   | 0.0    |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1.7    | 0.0   | 0.0    |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 28.0   | 0.0   | 0.0    |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 26.2   | 0.0   | 0.0    |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.7    | 0.0   | 0.0    |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000  |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 26.9   | 0.0   | 0.0    |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.46   | 0.00  | 0.00   |

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Shafers School House Rd & SR 611

3/11/2015

|                                  |     |     |     |     |     |     |     |     |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Initial Queue (Qb), veh          | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Final (Residual) Queue (Qe), veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Delay (ds), s/veh      | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Queue (Qs), veh        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Capacity (cs), veh/h   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Initial Queue Clear Time (tc), h | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Right Lane Group Data**

|                                       |       |        |       |       |       |       |       |        |  |
|---------------------------------------|-------|--------|-------|-------|-------|-------|-------|--------|--|
| Assigned Movement                     | 0     | 12     | 0     | 0     | 0     | 16    | 0     | 18     |  |
| Lane Assignment                       | T+R   |        |       |       |       |       |       | R      |  |
| Lanes in Group                        | 0     | 1      | 0     | 0     | 0     | 0     | 0     | 1      |  |
| Group Volume (v), veh/h               | 0.0   | 1000.6 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 50.6   |  |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1787.9 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1524.1 |  |
| Queue Serve Time (g_s), s             | 0.0   | 25.8   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 3.3    |  |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 25.8   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 3.3    |  |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |
| Proportion RT Outside Lane (P_R)      | 0.000 | 0.059  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000  |  |
| Lane Group Capacity (c), veh/h        | 0.0   | 1435.5 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 123.0  |  |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.697  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.411  |  |
| Available Capacity (c_a), veh/h       | 0.0   | 1435.5 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 128.6  |  |
| Upstream Filter Factor (I)            | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000  |  |
| Uniform Delay (d1), s/veh             | 0.0   | 4.5    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 45.1   |  |
| Incremental Delay (d2), s/veh         | 0.0   | 2.1    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 2.2    |  |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |
| Control Delay (d), s/veh              | 0.0   | 6.7    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 47.3   |  |
| First-Term Queue (Q1), veh/ln         | 0.0   | 4.7    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1.2    |  |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.9    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.1    |  |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 | 1.000  |  |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 5.6    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1.3    |  |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.15   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.21   |  |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |  |

**Intersection Summary**

|                           |      |
|---------------------------|------|
| HCM Average Control Delay | 19.8 |
| HCM Level of Service      | B    |

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Applegate Rd/Terrace Dr & SR 611

3/11/2015

|                                       |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations                   |  |  |   |  |  |   |  |  |   |   |  |   |
| Volume (vph)                          | 24  | 841   | 31  | 31  | 908   | 14  | 36   | 3   | 32  | 8   | 2   | 24  |
| Movement Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Queue, veh                    | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj. Factor (A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking, Bus Adj. Factors             | 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. Sat. Flow Rate, veh/h/ln         | 1890  | 1873  | 1873  | 1890  | 1872  | 1872  | 1881   | 1911  | 1911  | 1884  | 1884  | 1884  |
| Lanes                                 | 1   | 1   | 0   | 1   | 1   | 0   | 1  | 1   | 0   | 0   | 1   | 0   |
| Lane Assignment                       |   |   |   |   |   |   |  |   |   |   |   |   |
| Capacity, veh/h                       | 373   | 1389  | 58  | 393   | 1419  | 32  | 144  | 32  | 115   | 56  | 22  | 93  |
| Proportion Arriving On Green          | 0.89  | 0.79  | 0.79  | 0.78  | 0.78  | 0.78  | 0.09   | 0.09  | 0.09  | 0.09  | 0.09  | 0.09  |
| Movement Delay, s/veh                 | 8.5   | 0.0   | 6.4   | 12.0  | 0.0   | 7.7   | 49.6   | 0.0   | 46.3  | 45.9  | 0.0   | 0.0   |
| Movement LOS                          | A   |   | A   | B   |   | A   | D  |   | D   | D   |   |   |
| Approach Volume, veh/h                |   | 992   |   |   | 1034  |   |  | 105   |   |   | 57  |   |
| Approach Delay, s/veh                 |   | 6.4   |   |   | 7.9   |   |  | 47.9  |   |   | 45.9  |   |
| Approach LOS                          |   | A   |   |   | A   |   |  | D   |   |   | D   |   |
| Timer:                                |   | 1   | 2   | 3   | 4   | 5   | 6  | 7   | 8   |   |   |   |
| Assigned Phase                        |   |   | 2   |   | 4   |   | 6  |   | 8   |   |   |   |
| Case No                               |   |   | 6.0   |   | 8.0   |   | 6.0  |   | 6.0   |   |   |   |
| Phase Duration (G+Y+Rc), s            |   |   | 87.30   |   | 16.60   |   | 87.30  |   | 16.60   |   |   |   |
| Change Period (Y+Rc), s               |   |   | 6.50  |   | 7.50  |   | 6.50   |   | 7.50  |   |   |   |
| Max. Allowable Headway (MAH), s       |   |   | 7.20  |   | 4.59  |   | 7.20   |   | 4.59  |   |   |   |
| Maximum Green Setting (Gmax), s       |   |   | 80.80   |   | 9.10  |   | 80.80  |   | 9.10  |   |   |   |
| Max. Queue Clearance Time (g_c+l1), s |   |   | 30.22   |   | 5.37  |   | 29.93  |   | 9.19  |   |   |   |
| Green Extension Time (g_e), s         |   |   | 43.97   |   | 0.19  |   | 44.20  |   | 0.00  |   |   |   |
| Probability of Phase Call (p_c)       |   |   | 1.000   |   | 0.991   |   | 1.000  |   | 0.991   |   |   |   |
| Probability of Max Out (p_x)          |   |   | 0.840   |   | 1.000   |   | 0.839  |   | 1.000   |   |   |   |
| <b>Left-Turn Movement Data</b>        |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 5   |   | 7   |   | 1  |   | 3   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 576.16  |   | 305.54  |   | 589.91   |   | 1353.62   |   |   |   |
| <b>Through Movement Data</b>          |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 2   |   | 4   |   | 6  |   | 8   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 1785.52   |   | 102.36  |   | 1824.34  |   | 368.78  |   |   |   |
| <b>Right-Turn Movement Data</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 12  |   | 14  |   | 16   |   | 18  |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 73.94   |   | 1058.86   |   | 40.68  |   | 1311.23   |   |   |   |
| <b>Left Lane Group Data</b>           |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   | 0   | 5   | 0   | 7   | 0   | 1  | 0   | 3   |   |   |   |
| Lane Assignment                       |   |   | L   |   | L+T+R   |   | L  |   | L   |   |   |   |
| Lanes in Group                        |   | 0   | 1   | 0   | 1   | 0   | 1  | 0   | 1   |   |   |   |
| Group Volume (v), veh/h               |   | 0.0   | 29.3  | 0.0   | 57.3  | 0.0   | 47.0   | 0.0   | 50.7  |   |   |   |
| Group Sat. Flow (s), veh/h/ln         |   | 0.0   | 576.2   | 0.0   | 1466.8  | 0.0   | 589.9  | 0.0   | 1353.6  |   |   |   |
| Queue Serve Time (g_s), s             |   | 0.0   | 2.2   | 0.0   | 0.0   | 0.0   | 4.1  | 0.0   | 3.8   |   |   |   |
| Cycle Queue Clear Time (g_c), s       |   | 0.0   | 28.2  | 0.0   | 3.4   | 0.0   | 27.9   | 0.0   | 7.2   |   |   |   |

# HCM 2010 Signalized Intersection Capacity Analysis

## 2: Applegate Rd/Terrace Dr & SR 611

3/11/2015

|                                       |       |       |       |       |       |       |       |        |
|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|--------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 576.2 | 0.0   | 773.0 | 0.0   | 589.9 | 0.0   | 1353.6 |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Perm LT Eff. Green (g_p), s           | 0.0   | 80.8  | 0.0   | 9.1   | 0.0   | 80.8  | 0.0   | 9.1    |
| Perm LT Serve Time (g_u), s           | 0.0   | 54.8  | 0.0   | 5.9   | 0.0   | 56.9  | 0.0   | 5.7    |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 2.2   | 0.0   | 0.0   | 0.0   | 4.1   | 0.0   | 3.8    |
| Time to First Blk (g_f), s            | 0.0   | 0.0   | 0.0   | 3.9   | 0.0   | 0.0   | 0.0   | 0.0    |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0   | 0.0   | 3.4   | 0.0   | 0.0   | 0.0   | 0.0    |
| Proportion LT Inside Lane (P_L)       | 0.000 | 1.000 | 0.000 | 0.208 | 0.000 | 1.000 | 0.000 | 1.000  |
| Lane Group Capacity (c), veh/h        | 0.0   | 373.2 | 0.0   | 170.3 | 0.0   | 392.6 | 0.0   | 144.0  |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.078 | 0.000 | 0.337 | 0.000 | 0.120 | 0.000 | 0.352  |
| Available Capacity (c_a), veh/h       | 0.0   | 373.2 | 0.0   | 170.3 | 0.0   | 392.6 | 0.0   | 144.0  |
| Upstream Filter Factor (I)            | 0.000 | 0.681 | 0.000 | 1.000 | 0.000 | 1.000 | 0.000 | 1.000  |
| Uniform Delay (d1), s/veh             | 0.0   | 8.3   | 0.0   | 44.8  | 0.0   | 11.5  | 0.0   | 48.2   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.2   | 0.0   | 1.2   | 0.0   | 0.5   | 0.0   | 1.5    |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Control Delay (d), s/veh              | 0.0   | 8.5   | 0.0   | 45.9  | 0.0   | 12.0  | 0.0   | 49.6   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.2   | 0.0   | 1.4   | 0.0   | 0.5   | 0.0   | 1.3    |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.1   | 0.0   | 0.1   | 0.0   | 0.1    |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 0.000 | 1.000 | 0.000 | 1.000 | 0.000 | 1.000  |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.3   | 0.0   | 1.5   | 0.0   | 0.5   | 0.0   | 1.4    |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.08  | 0.00  | 0.08  | 0.00  | 0.18  | 0.00  | 0.47   |
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| <b>Middle Lane Group Data</b>         |       |       |       |       |       |       |       |        |
| Assigned Movement                     | 0     | 2     | 0     | 4     | 0     | 6     | 0     | 8      |
| Lane Assignment                       |       |       |       |       |       |       |       |        |
| Lanes in Group                        | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      |
| Group Volume (v), veh/h               | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Queue Serve Time (g_s), s             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000  |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000  |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 0.000 | 1.000 | 0.000 | 1.000 | 0.000 | 1.000  |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   |

# HCM 2010 Signalized Intersection Capacity Analysis

## 2: Applegate Rd/Terrace Dr & SR 611

3/11/2015

|                                       |       |        |       |       |       |        |       |        |
|---------------------------------------|-------|--------|-------|-------|-------|--------|-------|--------|
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| <b>Right Lane Group Data</b>          |       |        |       |       |       |        |       |        |
| Assigned Movement                     | 0     | 12     | 0     | 14    | 0     | 16     | 0     | 18     |
| Lane Assignment                       | T+R   |        |       | T+R   |       |        | T+R   |        |
| Lanes in Group                        | 0     | 1      | 0     | 0     | 0     | 1      | 0     | 1      |
| Group Volume (v), veh/h               | 0.0   | 962.4  | 0.0   | 0.0   | 0.0   | 987.5  | 0.0   | 54.7   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1859.5 | 0.0   | 0.0   | 0.0   | 1865.0 | 0.0   | 1680.0 |
| Queue Serve Time (g_s), s             | 0.0   | 23.9   | 0.0   | 0.0   | 0.0   | 26.0   | 0.0   | 3.2    |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 23.9   | 0.0   | 0.0   | 0.0   | 26.0   | 0.0   | 3.2    |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Proportion RT Outside Lane (P_R)      | 0.000 | 0.040  | 0.000 | 0.722 | 0.000 | 0.022  | 0.000 | 0.780  |
| Lane Group Capacity (c), veh/h        | 0.0   | 1446.1 | 0.0   | 0.0   | 0.0   | 1450.4 | 0.0   | 147.1  |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.666  | 0.000 | 0.000 | 0.000 | 0.681  | 0.000 | 0.372  |
| Available Capacity (c_a), veh/h       | 0.0   | 1446.1 | 0.0   | 0.0   | 0.0   | 1450.4 | 0.0   | 147.1  |
| Upstream Filter Factor (I)            | 0.000 | 0.681  | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 1.000  |
| Uniform Delay (d1), s/veh             | 0.0   | 4.9    | 0.0   | 0.0   | 0.0   | 5.5    | 0.0   | 44.7   |
| Incremental Delay (d2), s/veh         | 0.0   | 1.4    | 0.0   | 0.0   | 0.0   | 2.3    | 0.0   | 1.6    |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Control Delay (d), s/veh              | 0.0   | 6.4    | 0.0   | 0.0   | 0.0   | 7.7    | 0.0   | 46.3   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 5.1    | 0.0   | 0.0   | 0.0   | 6.0    | 0.0   | 1.3    |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.6    | 0.0   | 0.0   | 0.0   | 0.9    | 0.0   | 0.1    |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 0.000 | 1.000 | 0.000 | 1.000  | 0.000 | 1.000  |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 5.7    | 0.0   | 0.0   | 0.0   | 6.9    | 0.0   | 1.4    |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.10   | 0.00  | 0.00  | 0.00  | 0.20   | 0.00  | 0.07   |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| <b>Intersection Summary</b>           |       |        |       |       |       |        |       |        |
| HCM Average Control Delay             | 10.2  |        |       |       |       |        |       |        |
| HCM Level of Service                  | B     |        |       |       |       |        |       |        |

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Pocono Commons Dr

3/25/2015



| Movement                      | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|-------------------------------|------|------|------|------|------|------|
| Lane Configurations           | ↔↔   | ↑    | ↑    | ↗    | ↔↔   | ↗    |
| Volume (vph)                  | 274  | 590  | 771  | 217  | 186  | 337  |
| Movement Number               | 5    | 2    | 6    | 16   | 7    | 14   |
| Initial Queue, veh            | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj. Factor (A_pbT)  | 1.00 |      |      | 1.00 | 1.00 | 1.00 |
| Parking, Bus Adj. Factors     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj. Sat. Flow Rate, veh/h/ln | 1891 | 1872 | 1872 | 1947 | 1957 | 1957 |
| Lanes                         | 2    | 1    | 1    | 1    | 2    | 1    |
| Lane Assignment               |      |      |      |      |      |      |
| Capacity, veh/h               | 587  | 1440 | 1003 | 887  | 383  | 456  |
| Proportion Arriving On Green  | 0.17 | 0.77 | 0.54 | 0.54 | 0.11 | 0.11 |
| Movement Delay, s/veh         | 40.4 | 4.8  | 33.1 | 13.1 | 44.2 | 94.2 |
| Movement LOS                  | D    | A    | C    | B    | D    | F    |
| Approach Volume, veh/h        |      | 1033 | 1148 |      | 706  |      |
| Approach Delay, s/veh         |      | 17.5 | 28.9 |      | 78.3 |      |
| Approach LOS                  |      | B    | C    |      | E    |      |

| Timer:                                | 1 | 2     | 3 | 4     | 5     | 6     | 7 | 8 |
|---------------------------------------|---|-------|---|-------|-------|-------|---|---|
| Assigned Phase                        |   | 2     |   | 4     | 5     | 6     |   |   |
| Case No                               |   | 4.0   |   | 9.0   | 2.0   | 7.0   |   |   |
| Phase Duration (G+Y+Rc), s            |   | 83.40 |   | 16.60 | 23.30 | 60.10 |   |   |
| Change Period (Y+Rc), s               |   | 6.50  |   | 6.00  | 6.50  | 6.50  |   |   |
| Max. Allowable Headway (MAH), s       |   | 6.63  |   | 3.63  | 3.18  | 6.63  |   |   |
| Maximum Green Setting (Gmax), s       |   | 76.90 |   | 10.60 | 16.80 | 53.60 |   |   |
| Max. Queue Clearance Time (g_c+I1), s |   | 14.66 |   | 12.60 | 11.86 | 45.63 |   |   |
| Green Extension Time (g_e), s         |   | 39.47 |   | 0.00  | 0.46  | 7.22  |   |   |
| Probability of Phase Call (p_c)       |   | 1.000 |   | 1.000 | 1.000 | 1.000 |   |   |
| Probability of Max Out (p_x)          |   | 0.514 |   | 1.000 | 0.247 | 0.984 |   |   |

| Left-Turn Movement Data |  |  |  |  |         |         |  |  |
|-------------------------|--|--|--|--|---------|---------|--|--|
| Assigned Movement       |  |  |  |  | 7       | 5       |  |  |
| Mvmt. Sat Flow, veh/h   |  |  |  |  | 3615.10 | 3493.10 |  |  |

| Through Movement Data |  |         |  |  |  |         |  |  |
|-----------------------|--|---------|--|--|--|---------|--|--|
| Assigned Movement     |  | 2       |  |  |  | 6       |  |  |
| Mvmt. Sat Flow, veh/h |  | 1872.06 |  |  |  | 1871.78 |  |  |

| Right-Turn Movement Data |  |  |      |  |         |  |         |  |
|--------------------------|--|--|------|--|---------|--|---------|--|
| Assigned Movement        |  |  | 12   |  | 14      |  | 16      |  |
| Mvmt. Sat Flow, veh/h    |  |  | 0.00 |  | 1663.13 |  | 1654.66 |  |

| Left Lane Group Data            |  |     |     |     |        |          |     |     |
|---------------------------------|--|-----|-----|-----|--------|----------|-----|-----|
| Assigned Movement               |  | 0   | 0   | 0   | 7      | 5        | 0   | 0   |
| Lane Assignment                 |  |     |     |     | L      | L (Prot) |     |     |
| Lanes in Group                  |  | 0   | 0   | 0   | 2      | 2        | 0   | 0   |
| Group Volume (v), veh/h         |  | 0.0 | 0.0 | 0.0 | 224.1  | 370.3    | 0.0 | 0.0 |
| Group Sat. Flow (s), veh/h/ln   |  | 0.0 | 0.0 | 0.0 | 1807.6 | 1746.5   | 0.0 | 0.0 |
| Queue Serve Time (g_s), s       |  | 0.0 | 0.0 | 0.0 | 5.9    | 9.9      | 0.0 | 0.0 |
| Cycle Queue Clear Time (g_c), s |  | 0.0 | 0.0 | 0.0 | 5.9    | 9.9      | 0.0 | 0.0 |

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Pocono Commons Dr

3/25/2015

|                                       |       |        |       |        |       |        |       |       |
|---------------------------------------|-------|--------|-------|--------|-------|--------|-------|-------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 0.0    | 0.0   | 1807.6 | 0.0   | 0.0    | 0.0   | 0.0   |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Eff. Green (g_p), s           | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Serve Time (g_u), s           | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Time to First Blk (g_f), s            | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 53.6   | 0.0   | 0.0   |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion LT Inside Lane (P_L)       | 0.000 | 0.000  | 0.000 | 1.000  | 1.000 | 0.000  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0    | 0.0   | 383.2  | 586.8 | 0.0    | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000  | 0.000 | 0.585  | 0.631 | 0.000  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0    | 0.0   | 383.2  | 586.8 | 0.0    | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000  | 0.000 | 1.000  | 1.000 | 0.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0    | 0.0   | 42.6   | 38.7  | 0.0    | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0    | 0.0   | 1.6    | 1.7   | 0.0    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0    | 0.0   | 44.2   | 40.4  | 0.0    | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0    | 0.0   | 2.6    | 4.0   | 0.0    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0    | 0.0   | 0.1    | 0.1   | 0.0    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 0.000  | 0.000 | 1.000  | 1.000 | 0.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0    | 0.0   | 2.7    | 4.2   | 0.0    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00   | 0.00  | 0.15   | 0.60  | 0.00   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Middle Lane Group Data</b>         |       |        |       |        |       |        |       |       |
| Assigned Movement                     | 0     | 2      | 0     | 0      | 0     | 6      | 0     | 0     |
| Lane Assignment                       | T     |        |       | T      |       |        |       |       |
| Lanes in Group                        | 0     | 1      | 0     | 0      | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 662.9  | 0.0   | 0.0    | 0.0   | 907.1  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1872.1 | 0.0   | 0.0    | 0.0   | 1871.8 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 12.7   | 0.0   | 0.0    | 0.0   | 43.6   | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 12.7   | 0.0   | 0.0    | 0.0   | 43.6   | 0.0   | 0.0   |
| Lane Group Capacity (c), veh/h        | 0.0   | 1439.6 | 0.0   | 0.0    | 0.0   | 1003.3 | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.460  | 0.000 | 0.000  | 0.000 | 0.904  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 1439.6 | 0.0   | 0.0    | 0.0   | 1003.3 | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 1.000  | 0.000 | 0.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 4.1    | 0.0   | 0.0    | 0.0   | 20.9   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.6    | 0.0   | 0.0    | 0.0   | 12.2   | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 4.8    | 0.0   | 0.0    | 0.0   | 33.1   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 2.9    | 0.0   | 0.0    | 0.0   | 16.4   | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.3    | 0.0   | 0.0    | 0.0   | 3.4    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 0.000 | 0.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 3.2    | 0.0   | 0.0    | 0.0   | 19.8   | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.26   | 0.00  | 0.00   | 0.00  | 0.52   | 0.00  | 0.00  |

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Pocono Commons Dr

3/25/2015

|                                       |       |       |       |        |       |        |       |       |
|---------------------------------------|-------|-------|-------|--------|-------|--------|-------|-------|
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Right Lane Group Data</b>          |       |       |       |        |       |        |       |       |
| Assigned Movement                     | 0     | 12    | 0     | 14     | 0     | 16     | 0     | 0     |
| Lane Assignment                       |       |       |       | R      |       | R      |       |       |
| Lanes in Group                        | 0     | 0     | 0     | 1      | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 0.0   | 0.0   | 481.4  | 0.0   | 241.1  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 0.0   | 0.0   | 1663.1 | 0.0   | 1654.7 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 0.0   | 0.0   | 10.6   | 0.0   | 7.9    | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0   | 0.0   | 10.6   | 0.0   | 7.9    | 0.0   | 0.0   |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0   | 0.0   | 1663.1 | 0.0   | 0.0    | 0.0   | 0.0   |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0   | 0.0   | 16.8   | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion RT Outside Lane (P_R)      | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 455.7  | 0.0   | 886.9  | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 1.056  | 0.000 | 0.272  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 455.7  | 0.0   | 886.9  | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 36.3   | 0.0   | 12.6   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 57.9   | 0.0   | 0.5    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 94.2   | 0.0   | 13.1   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 12.7   | 0.0   | 2.6    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 7.3    | 0.0   | 0.1    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 20.0   | 0.0   | 2.7    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 3.38   | 0.00  | 0.25   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0   | 6.4    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0   | 0.3    | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Intersection Summary</b>           |       |       |       |        |       |        |       |       |
| HCM Average Control Delay             | 36.9  |       |       |        |       |        |       |       |
| HCM Level of Service                  | D     |       |       |        |       |        |       |       |

HCM 2010 Signalized Intersection Capacity Analysis  
6: SR 611 & Connector Rd

3/11/2015



| Movement                      | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|-------------------------------|------|------|------|------|------|------|
| Lane Configurations           |      |      |      |      |      |      |
| Volume (vph)                  | 268  | 610  | 785  | 322  | 449  | 204  |
| Movement Number               | 5    | 2    | 6    | 16   | 7    | 14   |
| Initial Queue, veh            | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj. Factor (A_pbT)  | 1.00 |      |      | 1.00 | 1.00 | 1.00 |
| Parking, Bus Adj. Factors     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj. Sat. Flow Rate, veh/h/ln | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lanes                         | 1    | 2    | 2    | 0    | 1    | 1    |
| Lane Assignment               |      |      |      |      |      |      |
| Capacity, veh/h               | 496  | 3388 | 1547 | 631  | 0    | 0    |
| Proportion Arriving On Green  | 0.27 | 0.94 | 0.60 | 0.60 | 0.00 | 0.00 |
| Movement Delay, s/veh         | 22.4 | 0.2  | 8.4  | 8.5  | 0.0  | 0.0  |
| Movement LOS                  | C    | A    | A    | A    |      |      |
| Approach Volume, veh/h        |      | 976  | 1230 |      | 0    |      |
| Approach Delay, s/veh         |      | 7.0  | 8.5  |      | 0.0  |      |
| Approach LOS                  |      | A    | A    |      |      |      |

| Timer:                                | 1 | 2     | 3 | 4     | 5     | 6     | 7 | 8 |
|---------------------------------------|---|-------|---|-------|-------|-------|---|---|
| Assigned Phase                        |   | 2     |   | 4     | 5     | 6     |   |   |
| Case No                               |   | 4.0   |   | 0.0   | 2.0   | 8.0   |   |   |
| Phase Duration (G+Y+Rc), s            |   | 64.94 |   | 0.00  | 21.82 | 43.13 |   |   |
| Change Period (Y+Rc), s               |   | 4.00  |   | 4.00  | 4.00  | 4.00  |   |   |
| Max. Allowable Headway (MAH), s       |   | 5.21  |   | 0.00  | 3.80  | 5.21  |   |   |
| Maximum Green Setting (Gmax), s       |   | 61.00 |   | 31.00 | 17.90 | 39.10 |   |   |
| Max. Queue Clearance Time (g_c+I1), s |   | 2.92  |   | 0.00  | 11.28 | 15.39 |   |   |
| Green Extension Time (g_e), s         |   | 22.48 |   | 0.00  | 0.50  | 14.61 |   |   |
| Probability of Phase Call (p_c)       |   | 1.000 |   | 0.000 | 0.995 | 1.000 |   |   |
| Probability of Max Out (p_x)          |   | 0.181 |   | 0.000 | 0.173 | 0.550 |   |   |

Left-Turn Movement Data

|                       |  |  |  |      |         |  |  |  |
|-----------------------|--|--|--|------|---------|--|--|--|
| Assigned Movement     |  |  |  | 7    | 5       |  |  |  |
| Mvmt. Sat Flow, veh/h |  |  |  | 0.00 | 1809.52 |  |  |  |

Through Movement Data

|                       |  |         |  |  |  |         |  |  |
|-----------------------|--|---------|--|--|--|---------|--|--|
| Assigned Movement     |  | 2       |  |  |  | 6       |  |  |
| Mvmt. Sat Flow, veh/h |  | 3705.00 |  |  |  | 2567.30 |  |  |

Right-Turn Movement Data

|                       |  |  |      |  |  |  |         |  |
|-----------------------|--|--|------|--|--|--|---------|--|
| Assigned Movement     |  |  | 12   |  |  |  | 16      |  |
| Mvmt. Sat Flow, veh/h |  |  | 0.00 |  |  |  | 1047.79 |  |

Left Lane Group Data

|                                 |  |     |     |     |     |          |     |     |     |
|---------------------------------|--|-----|-----|-----|-----|----------|-----|-----|-----|
| Assigned Movement               |  | 0   | 0   | 0   | 7   | 5        | 0   | 0   | 0   |
| Lane Assignment                 |  |     |     |     |     | L (Prot) |     |     |     |
| Lanes in Group                  |  | 0   | 0   | 0   | 0   | 1        | 0   | 0   | 0   |
| Group Volume (v), veh/h         |  | 0.0 | 0.0 | 0.0 | 0.0 | 297.8    | 0.0 | 0.0 | 0.0 |
| Group Sat. Flow (s), veh/h/ln   |  | 0.0 | 0.0 | 0.0 | 0.0 | 1809.5   | 0.0 | 0.0 | 0.0 |
| Queue Serve Time (g_s), s       |  | 0.0 | 0.0 | 0.0 | 0.0 | 9.3      | 0.0 | 0.0 | 0.0 |
| Cycle Queue Clear Time (g_c), s |  | 0.0 | 0.0 | 0.0 | 0.0 | 9.3      | 0.0 | 0.0 | 0.0 |

# HCM 2010 Signalized Intersection Capacity Analysis

## 6: SR 611 & Connector Rd

3/11/2015

|                                       |       |        |       |       |       |        |       |       |
|---------------------------------------|-------|--------|-------|-------|-------|--------|-------|-------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Eff. Green (g_p), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Serve Time (g_u), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Time to First Blk (g_f), s            | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 39.1   | 0.0   | 0.0   |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion LT Inside Lane (P_L)       | 0.000 | 0.000  | 0.000 | 0.000 | 1.000 | 0.000  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 496.4 | 0.0    | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000  | 0.000 | 0.000 | 0.600 | 0.000  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0    | 0.0   | 0.0   | 498.7 | 0.0    | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000  | 0.000 | 0.000 | 1.000 | 0.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0    | 0.0   | 0.0   | 20.5  | 0.0    | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0    | 0.0   | 0.0   | 2.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0    | 0.0   | 0.0   | 22.4  | 0.0    | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 3.6   | 0.0    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0    | 0.0   | 0.0   | 0.3   | 0.0    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 0.000  | 0.000 | 1.000 | 1.000 | 0.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0    | 0.0   | 0.0   | 3.9   | 0.0    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00   | 0.00  | 0.00  | 0.65  | 0.00   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Middle Lane Group Data</b>         |       |        |       |       |       |        |       |       |
| Assigned Movement                     | 0     | 2      | 0     | 0     | 0     | 6      | 0     | 0     |
| Lane Assignment                       |       | T      |       |       |       | T      |       |       |
| Lanes in Group                        | 0     | 2      | 0     | 0     | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 677.8  | 0.0   | 0.0   | 0.0   | 644.4  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1805.0 | 0.0   | 0.0   | 0.0   | 1900.0 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 0.9    | 0.0   | 0.0   | 0.0   | 13.2   | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.9    | 0.0   | 0.0   | 0.0   | 13.2   | 0.0   | 0.0   |
| Lane Group Capacity (c), veh/h        | 0.0   | 3387.7 | 0.0   | 0.0   | 0.0   | 1144.7 | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.200  | 0.000 | 0.000 | 0.000 | 0.563  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 3390.7 | 0.0   | 0.0   | 0.0   | 1144.7 | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.2    | 0.0   | 0.0   | 0.0   | 7.8    | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.6    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.2    | 0.0   | 0.0   | 0.0   | 8.4    | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | -0.6   | 0.0   | 0.0   | 0.0   | 4.0    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.2    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | -0.6   | 0.0   | 0.0   | 0.0   | 4.2    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | -0.01  | 0.00  | 0.00  | 0.00  | 0.14   | 0.00  | 0.00  |

# HCM 2010 Signalized Intersection Capacity Analysis

## 6: SR 611 & Connector Rd

3/11/2015

|                                  |     |     |     |     |     |     |     |     |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Initial Queue (Qb), veh          | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Final (Residual) Queue (Qe), veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Delay (ds), s/veh      | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Queue (Qs), veh        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Capacity (cs), veh/h   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Initial Queue Clear Time (tc), h | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

### Right Lane Group Data

|                                       |       |       |       |       |       |        |       |       |
|---------------------------------------|-------|-------|-------|-------|-------|--------|-------|-------|
| Assigned Movement                     | 0     | 12    | 0     | 0     | 0     | 16     | 0     | 0     |
| Lane Assignment                       | T+R   |       |       |       |       |        |       |       |
| Lanes in Group                        | 0     | 0     | 0     | 0     | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 585.6  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1715.1 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 13.4   | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 13.4   | 0.0   | 0.0   |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion RT Outside Lane (P_R)      | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.611  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1033.3 | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.567  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1033.3 | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 7.8    | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.7    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 8.5    | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 3.6    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.2    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 3.8    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.13   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |

### Intersection Summary

|                           |     |
|---------------------------|-----|
| HCM Average Control Delay | 7.8 |
| HCM Level of Service      | A   |

**Intersection**

Intersection Delay (sec/veh): 1.9

| Movement                | EBL  | EBT  | EBR  | WBL   | WBT   | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|------|------|------|-------|-------|-------|------|------|------|------|------|------|
| Volume (vph)            | 0    | 0    | 0    | 1     | 1     | 204   | 1    | 449  | 0    | 0    | 268  | 322  |
| Conflicting Peds.(#/hr) | 0    | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control            | Stop | Stop | Stop | Stop  | Stop  | Stop  | Free | Free | Free | Free | Free | Free |
| Right Turn Channelized  | None | None | None | Yield | Yield | Yield | None | None | None | None | None | None |
| Storage Length          | 0    |      | 0    | 0     |       | 0     | 0    |      | 0    | 0    |      | 0    |
| Median Width            |      | 0    |      |       | 0     |       |      | 0    |      |      | 0    |      |
| Grade (%)               |      | 0%   |      |       | 0%    |       |      | 0%   |      |      | 0%   |      |
| Peak Hour Factor        | 0.90 | 0.90 | 0.90 | 0.90  | 0.90  | 0.90  | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles(%)       | 0    | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Movement Flow Rate      | 0    | 0    | 0    | 1     | 1     | 227   | 1    | 499  | 0    | 0    | 298  | 358  |
| Number of Lanes         | 0    | 0    | 0    | 0     | 1     | 0     | 0    | 2    | 0    | 0    | 1    | 1    |

| Major/Minor                 | Minor 1 |     |     | Major 1 |     |     | Major 2 |     |   |
|-----------------------------|---------|-----|-----|---------|-----|-----|---------|-----|---|
| Conflicting Flow Rate - All | 850     | 799 | 249 | 656     | 0   | -   | -       | 0   | 0 |
| Stage 1                     | 501     | 652 | 305 | 517     | 636 | 274 | 323     | 180 | 0 |
| Stage 2                     | 349     | 388 | 149 | 289     | 138 | 237 | 418     | 188 | 0 |
| Follow-up Headway           | 3.5     | 4   | 3.3 | 2.2     | -   | -   | -       | 0   | 0 |
| Pot Capacity-1 Maneuver     | 270     | 321 | 758 | 941     | -   | -   | -       | -   | - |
| Stage 1                     | 541     | 546 | -   | -       | -   | -   | -       | -   | - |
| Stage 2                     | 659     | 671 | -   | -       | -   | -   | -       | -   | - |
| Mov Capacity-1 Maneuver     | -       | 321 | 758 | 941     | -   | -   | -       | -   | - |
| Mov Capacity-2 Maneuver     | -       | 321 | -   | -       | -   | -   | -       | -   | - |
| Stage 1                     | 541     | 546 | -   | -       | -   | -   | -       | -   | - |
| Stage 2                     | 627     | # 0 | -   | -       | -   | -   | -       | -   | - |

| Approach              | WB   | NB | SB |
|-----------------------|------|----|----|
| HCM Control Delay (s) | 11.7 | 0  | 0  |
| HCM LOS               | B    | A  | A  |

| Lane                            | NBL   | NBT | WBLn1 | SBT | SBR |
|---------------------------------|-------|-----|-------|-----|-----|
| Capacity (vph)                  |       |     | 765   |     |     |
| HCM Control Delay (s)           | 8.83  | 0   | 11.7  | -   | -   |
| HCM Lane VC Ratio               | 0.001 | -   | 0.299 | 0   | -   |
| HCM Lane LOS                    | A     | -   | B     | -   | -   |
| HCM 95th Percentile Queue (veh) | 0.004 | -   | 1.257 | 0   | -   |

**Intersection**

Intersection Delay (sec/veh): 0

| Movement                | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|-------------------------|------|------|------|------|------|------|
| Volume (vph)            | 449  | 1    | 0    | 0    | 268  | 0    |
| Conflicting Peds.(#/hr) | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control            | Stop | Stop | Free | Free | Free | Free |
| Right Turn Channelized  | None | None | None | None | None | None |
| Storage Length          | 0    |      |      | 0    | 0    | 0    |
| Median Width            |      | 0    | 0    |      | 12   |      |
| Grade (%)               |      | 0%   | 0%   |      | 0%   |      |
| Peak Hour Factor        | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles(%)       | 0    | 0    | 0    | 0    | 0    | 0    |
| Movement Flow Rate      | 499  | 1    | 0    | 0    | 298  | 0    |
| Number of Lanes         | 0    | 1    | 0    | 0    | 1    | 0    |

**Major/Minor**

Minor 1

|                             |                   |     |  |   |   |
|-----------------------------|-------------------|-----|--|---|---|
| Conflicting Flow Rate - All | 212108462         | 596 |  | 0 | - |
| Stage 1                     | 257910146222.049  | 596 |  | 0 | - |
| Stage 2                     | 709768592022E-312 | 0   |  | 0 | - |
| Follow-up Headway           | -                 | 0   |  | - | - |
| Pot Capacity-1 Maneuver     | -                 | -   |  | - | - |
| Stage 1                     | -                 | -   |  | - | - |
| Stage 2                     | -                 | -   |  | - | - |
| Mov Capacity-1 Maneuver     | -                 | # 0 |  | - | - |
| Mov Capacity-2 Maneuver     | -                 | # 0 |  | - | - |
| Stage 1                     | -                 | # 0 |  | - | - |
| Stage 2                     | -                 | # 0 |  | - | - |

**Approach**

EB

SB

|                       |   |   |
|-----------------------|---|---|
| HCM Control Delay (s) | - | 0 |
| HCM LOS               | - | A |

**Lane**

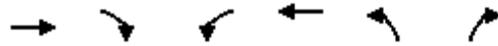
EBLn1

SBL

|                                 |   |   |
|---------------------------------|---|---|
| Capacity (vph)                  | - |   |
| HCM Control Delay (s)           | - | - |
| HCM Lane VC Ratio               | - | - |
| HCM Lane LOS                    | - | - |
| HCM 95th Percentile Queue (veh) | - | - |

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Bridge St & SR 611

3/11/2015



| Movement                      | EBT  | EBR  | WBL  | WBT  | NBL  | NBR   |
|-------------------------------|------|------|------|------|------|-------|
| Lane Configurations           | ↑    | ↑    | ↑    | ↑    | ↑    | ↑     |
| Volume (vph)                  | 695  | 112  | 251  | 829  | 193  | 308   |
| Movement Number               | 2    | 12   | 1    | 6    | 3    | 18    |
| Initial Queue, veh            | 0    | 0    | 0    | 0    | 0    | 0     |
| Ped-Bike Adj. Factor (A_pbT)  |      | 1.00 | 1.00 |      | 1.00 | 1.00  |
| Parking, Bus Adj. Factors     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  |
| Adj. Sat. Flow Rate, veh/h/ln | 1891 | 1872 | 1853 | 1908 | 1806 | 1771  |
| Lanes                         | 1    | 1    | 1    | 1    | 1    | 1     |
| Lane Assignment               |      |      |      |      |      |       |
| Capacity, veh/h               | 1263 | 1063 | 0    | 1275 | 330  | 289   |
| Proportion Arriving On Green  | 0.67 | 0.67 | 0.00 | 0.15 | 0.19 | 0.19  |
| Movement Delay, s/veh         | 9.4  | 5.3  | 0.0  | 30.2 | 35.1 | 128.3 |
| Movement LOS                  | A    | A    |      | C    | D    | F     |
| Approach Volume, veh/h        | 857  |      |      | 891  | 531  |       |
| Approach Delay, s/veh         | 8.8  |      |      | 30.2 | 92.7 |       |
| Approach LOS                  | A    |      |      | C    | F    |       |

| Timer:                                | 1 | 2     | 3 | 4 | 5 | 6     | 7 | 8     |
|---------------------------------------|---|-------|---|---|---|-------|---|-------|
| Assigned Phase                        |   | 2     |   |   |   | 6     |   | 8     |
| Case No                               |   | 7.0   |   |   |   | 4.0   |   | 9.0   |
| Phase Duration (G+Y+Rc), s            |   | 63.37 |   |   |   | 63.37 |   | 22.50 |
| Change Period (Y+Rc), s               |   | 6.00  |   |   |   | 6.00  |   | 6.00  |
| Max. Allowable Headway (MAH), s       |   | 7.23  |   |   |   | 7.23  |   | 4.46  |
| Maximum Green Setting (Gmax), s       |   | 47.10 |   |   |   | 66.50 |   | 16.50 |
| Max. Queue Clearance Time (g_c+I1), s |   | 20.30 |   |   |   | 40.17 |   | 18.50 |
| Green Extension Time (g_e), s         |   | 22.63 |   |   |   | 13.16 |   | 0.00  |
| Probability of Phase Call (p_c)       |   | 1.000 |   |   |   | 1.000 |   | 1.000 |
| Probability of Max Out (p_x)          |   | 0.842 |   |   |   | 0.846 |   | 1.000 |

| Left-Turn Movement Data |  |  |  |  |  |  |  |         |
|-------------------------|--|--|--|--|--|--|--|---------|
| Assigned Movement       |  |  |  |  |  |  |  | 3       |
| Mvmt. Sat Flow, veh/h   |  |  |  |  |  |  |  | 1719.94 |

| Through Movement Data |  |         |  |  |  |         |  |  |
|-----------------------|--|---------|--|--|--|---------|--|--|
| Assigned Movement     |  | 2       |  |  |  | 6       |  |  |
| Mvmt. Sat Flow, veh/h |  | 1890.69 |  |  |  | 1908.20 |  |  |

| Right-Turn Movement Data |  |  |         |  |  |  |      |         |
|--------------------------|--|--|---------|--|--|--|------|---------|
| Assigned Movement        |  |  | 12      |  |  |  | 16   | 18      |
| Mvmt. Sat Flow, veh/h    |  |  | 1591.48 |  |  |  | 0.00 | 1505.24 |

| Left Lane Group Data            |  |     |     |     |     |     |     |        |
|---------------------------------|--|-----|-----|-----|-----|-----|-----|--------|
| Assigned Movement               |  | 0   | 0   | 0   | 0   | 0   | 0   | 3      |
| Lane Assignment                 |  |     |     |     |     |     |     | L      |
| Lanes in Group                  |  | 0   | 0   | 0   | 0   | 0   | 0   | 1      |
| Group Volume (v), veh/h         |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 203.2  |
| Group Sat. Flow (s), veh/h/ln   |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1719.9 |
| Queue Serve Time (g_s), s       |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.3    |
| Cycle Queue Clear Time (g_c), s |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.3    |

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Bridge St & SR 611

3/11/2015

|                                       |       |        |       |       |       |        |       |        |
|---------------------------------------|-------|--------|-------|-------|-------|--------|-------|--------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 1719.9 |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Perm LT Eff. Green (g_p), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Perm LT Serve Time (g_u), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Time to First Blk (g_f), s            | 0.0   | 57.4   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Proportion LT Inside Lane (P_L)       | 0.000 | 0.000  | 0.000 | 0.000 | 0.000 | 0.000  | 0.000 | 1.000  |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 330.5  |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000  | 0.000 | 0.000 | 0.000 | 0.000  | 0.000 | 0.615  |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 330.5  |
| Upstream Filter Factor (I)            | 0.000 | 0.000  | 0.000 | 0.000 | 0.000 | 0.000  | 0.000 | 1.000  |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 31.8   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 3.4    |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Control Delay (d), s/veh              | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 35.1   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 3.7    |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.3    |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 0.000  | 0.000 | 0.000 | 0.000 | 0.000  | 0.000 | 1.000  |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 4.0    |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.11   |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| <b>Middle Lane Group Data</b>         |       |        |       |       |       |        |       |        |
| Assigned Movement                     | 0     | 2      | 0     | 0     | 0     | 6      | 0     | 0      |
| Lane Assignment                       |       | T      |       |       |       | T      |       |        |
| Lanes in Group                        | 0     | 1      | 0     | 0     | 0     | 1      | 0     | 0      |
| Group Volume (v), veh/h               | 0.0   | 739.4  | 0.0   | 0.0   | 0.0   | 891.4  | 0.0   | 0.0    |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1890.7 | 0.0   | 0.0   | 0.0   | 1908.2 | 0.0   | 0.0    |
| Queue Serve Time (g_s), s             | 0.0   | 18.3   | 0.0   | 0.0   | 0.0   | 38.2   | 0.0   | 0.0    |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 18.3   | 0.0   | 0.0   | 0.0   | 38.2   | 0.0   | 0.0    |
| Lane Group Capacity (c), veh/h        | 0.0   | 1263.2 | 0.0   | 0.0   | 0.0   | 1274.9 | 0.0   | 0.0    |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.585  | 0.000 | 0.000 | 0.000 | 0.699  | 0.000 | 0.000  |
| Available Capacity (c_a), veh/h       | 0.0   | 1263.2 | 0.0   | 0.0   | 0.0   | 1477.7 | 0.0   | 0.0    |
| Upstream Filter Factor (I)            | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 0.632  | 0.000 | 0.000  |
| Uniform Delay (d1), s/veh             | 0.0   | 7.8    | 0.0   | 0.0   | 0.0   | 28.5   | 0.0   | 0.0    |
| Incremental Delay (d2), s/veh         | 0.0   | 1.6    | 0.0   | 0.0   | 0.0   | 1.7    | 0.0   | 0.0    |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Control Delay (d), s/veh              | 0.0   | 9.4    | 0.0   | 0.0   | 0.0   | 30.2   | 0.0   | 0.0    |
| First-Term Queue (Q1), veh/ln         | 0.0   | 5.8    | 0.0   | 0.0   | 0.0   | 19.6   | 0.0   | 0.0    |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.6    | 0.0   | 0.0   | 0.0   | 0.6    | 0.0   | 0.0    |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000  |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 6.4    | 0.0   | 0.0   | 0.0   | 20.2   | 0.0   | 0.0    |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.17   | 0.00  | 0.00  | 0.00  | 0.86   | 0.00  | 0.00   |

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Bridge St & SR 611

3/11/2015

|                                  |     |     |     |     |     |     |     |     |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Initial Queue (Qb), veh          | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Final (Residual) Queue (Qe), veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Delay (ds), s/veh      | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Queue (Qs), veh        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Capacity (cs), veh/h   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Initial Queue Clear Time (tc), h | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Right Lane Group Data**

|                                       |       |        |       |       |       |       |       |        |
|---------------------------------------|-------|--------|-------|-------|-------|-------|-------|--------|
| Assigned Movement                     | 0     | 12     | 0     | 0     | 0     | 16    | 0     | 18     |
| Lane Assignment                       |       | R      |       |       |       |       |       | R      |
| Lanes in Group                        | 0     | 1      | 0     | 0     | 0     | 0     | 0     | 1      |
| Group Volume (v), veh/h               | 0.0   | 117.9  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 327.7  |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1591.5 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1505.2 |
| Queue Serve Time (g_s), s             | 0.0   | 2.3    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 16.5   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 2.3    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 16.5   |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Proportion RT Outside Lane (P_R)      | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000  |
| Lane Group Capacity (c), veh/h        | 0.0   | 1063.3 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 289.2  |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.111  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.133  |
| Available Capacity (c_a), veh/h       | 0.0   | 1063.3 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 289.2  |
| Upstream Filter Factor (I)            | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000  |
| Uniform Delay (d1), s/veh             | 0.0   | 5.1    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 34.7   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.2    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 93.7   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Control Delay (d), s/veh              | 0.0   | 5.3    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 128.3  |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.6    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 5.8    |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 7.5    |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 | 1.000  |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.7    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 13.3   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.09   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 2.35   |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 9.6    |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.3    |

**Intersection Summary**

|                           |      |
|---------------------------|------|
| HCM Average Control Delay | 36.7 |
| HCM Level of Service      | D    |

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Commercial Driveway/Stroud Mall Main Dr & SR 611

3/11/2015

|                                       |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations                   |  |  |   |  |  |  |  |  |   |   |  |  |
| Volume (vph)                          | 172   | 905   | 13  | 13  | 890   | 66  | 23   | 4   | 11  | 99  | 3   | 156   |
| Movement Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Queue, veh                    | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj. Factor (A_pbT)          | 1.00  |   | 0.98  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking, Bus Adj. Factors             | 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. Sat. Flow Rate, veh/h/ln         | 1881  | 1882  | 1882  | 1900  | 1937  | 1976  | 1986   | 1986  | 1986  | 2025  | 2025  | 2005  |
| Lanes                                 | 1   | 1   | 0   | 1   | 1   | 1   | 0  | 1   | 0   | 0   | 1   | 1   |
| Lane Assignment                       |   |   |   |   |   |   |  |   |   |   |   |   |
| Capacity, veh/h                       | 0   | 1395  | 24  | 504   | 1466  | 1271  | 67   | 32  | 11  | 200   | 5   | 198   |
| Proportion Arriving On Green          | 0.00  | 1.00  | 1.00  | 0.23  | 0.31  | 0.12  | 0.12   | 0.12  | 0.12  | 0.12  | 0.12  | 0.12  |
| Movement Delay, s/veh                 | 0.0   | 0.0   | 1.8   | 10.1  | 22.6  | 11.9  | 48.7   | 0.0   | 0.0   | 44.8  | 0.0   | 82.3  |
| Movement LOS                          |   |   | A   | B   | C   | B   | D  |   |   | D   |   | F   |
| Approach Volume, veh/h                |   | 1012  |   |   | 1025  |   |  | 63  |   |   | 297   |   |
| Approach Delay, s/veh                 |   | 1.8   |   |   | 21.5  |   |  | 48.7  |   |   | 67.7  |   |
| Approach LOS                          |   | A   |   |   | C   |   |  | D   |   |   | E   |   |
| Timer:                                |   | 1   | 2   | 3   | 4   | 5   | 6  | 7   | 8   |   |   |   |
| Assigned Phase                        |   |   | 2   |   | 4   |   | 6  |   | 8   |   |   |   |
| Case No                               |   |   | 4.0   |   | 7.0   |   | 5.3  |   | 8.0   |   |   |   |
| Phase Duration (G+Y+Rc), s            |   |   | 77.90   |   | 17.10   |   | 77.90  |   | 17.10   |   |   |   |
| Change Period (Y+Rc), s               |   |   | 6.00  |   | 6.00  |   | 6.00   |   | 6.00  |   |   |   |
| Max. Allowable Headway (MAH), s       |   |   | 1.46  |   | 4.64  |   | 1.46   |   | 4.64  |   |   |   |
| Maximum Green Setting (Gmax), s       |   |   | 71.90   |   | 11.10   |   | 56.90  |   | 11.10   |   |   |   |
| Max. Queue Clearance Time (g_c+l1), s |   |   | 2.00  |   | 12.04   |   | 40.89  |   | 13.10   |   |   |   |
| Green Extension Time (g_e), s         |   |   | 0.41  |   | 0.00  |   | 0.41   |   | 0.00  |   |   |   |
| Probability of Phase Call (p_c)       |   |   | 1.000   |   | 1.000   |   | 1.000  |   | 1.000   |   |   |   |
| Probability of Max Out (p_x)          |   |   | 0.000   |   | 1.000   |   | 0.000  |   | 1.000   |   |   |   |
| Left-Turn Movement Data               |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   |   |   | 7   |   | 1  |   | 3   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   |   |   | 1077.51   |   | 565.64   |   | 232.63  |   |   |   |
| Through Movement Data                 |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 2   |   | 4   |   | 6  |   | 8   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 1842.85   |   | 38.75   |   | 1937.25  |   | 111.67  |   |   |   |
| Right-Turn Movement Data              |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 12  |   | 14  |   | 16   |   | 18  |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 32.12   |   | 1697.25   |   | 1679.60  |   | 92.49   |   |   |   |
| Left Lane Group Data                  |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   | 0   | 0   | 0   | 7   | 0   | 1  | 0   | 3   |   |   |   |
| Lane Assignment                       |   |   |   |   | L+T   |   | L  |   | L+T+R   |   |   |   |
| Lanes in Group                        |   | 0   | 0   | 0   | 1   | 0   | 1  | 0   | 1   |   |   |   |
| Group Volume (v), veh/h               |   | 0.0   | 0.0   | 0.0   | 115.2   | 0.0   | 21.7   | 0.0   | 62.6  |   |   |   |
| Group Sat. Flow (s), veh/h/ln         |   | 0.0   | 0.0   | 0.0   | 1116.3  | 0.0   | 565.6  | 0.0   | 436.8   |   |   |   |
| Queue Serve Time (g_s), s             |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 2.8  | 0.0   | 1.4   |   |   |   |
| Cycle Queue Clear Time (g_c), s       |   | 0.0   | 0.0   | 0.0   | 9.7   | 0.0   | 2.8  | 0.0   | 11.1  |   |   |   |

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Commercial Driveway/Stroud Mall Main Dr & SR 611

3/11/2015

|                                       |       |       |       |        |       |        |       |       |
|---------------------------------------|-------|-------|-------|--------|-------|--------|-------|-------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 0.0   | 0.0   | 769.1  | 0.0   | 565.6  | 0.0   | 742.2 |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0   | 0.0   | 1112.8 | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Eff. Green (g_p), s           | 0.0   | 0.0   | 0.0   | 11.1   | 0.0   | 71.9   | 0.0   | 11.1  |
| Perm LT Serve Time (g_u), s           | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 71.9   | 0.0   | 1.4   |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 2.8    | 0.0   | 1.4   |
| Time to First Blk (g_f), s            | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 1.7   |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 1.7   |
| Proportion LT Inside Lane (P_L)       | 0.000 | 0.000 | 0.000 | 0.965  | 0.000 | 1.000  | 0.000 | 0.533 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 204.9  | 0.0   | 503.9  | 0.0   | 109.1 |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.562  | 0.000 | 0.043  | 0.000 | 0.574 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 204.9  | 0.0   | 503.9  | 0.0   | 109.1 |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.634  | 0.000 | 1.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 41.3   | 0.0   | 10.0   | 0.0   | 41.6  |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 3.5    | 0.0   | 0.1    | 0.0   | 7.1   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 44.8   | 0.0   | 10.1   | 0.0   | 48.7  |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 2.9    | 0.0   | 0.3    | 0.0   | 1.5   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.2    | 0.0   | 0.0    | 0.0   | 0.2   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 1.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 3.1    | 0.0   | 0.3    | 0.0   | 1.7   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.17   | 0.00  | 0.09   | 0.00  | 0.09  |
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Middle Lane Group Data</b>         |       |       |       |        |       |        |       |       |
| Assigned Movement                     | 0     | 2     | 0     | 4      | 0     | 6      | 0     | 8     |
| Lane Assignment                       | T     |       |       |        |       |        |       |       |
| Lanes in Group                        | 0     | 0     | 0     | 0      | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 927.1  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 1937.3 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 38.9   | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 38.9   | 0.0   | 0.0   |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 1466.2 | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.000  | 0.000 | 0.632  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 1466.2 | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 0.000  | 0.000 | 0.634  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 21.2   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 1.3    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 22.6   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 19.4   | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.5    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 1.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 20.0   | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 1.93   | 0.00  | 0.00  |

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Commercial Driveway/Stroud Mall Main Dr & SR 611

3/11/2015

|                                  |     |     |     |     |     |     |     |     |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Initial Queue (Qb), veh          | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Final (Residual) Queue (Qe), veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Delay (ds), s/veh      | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Queue (Qs), veh        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Capacity (cs), veh/h   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Initial Queue Clear Time (tc), h | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Right Lane Group Data

|                                       |       |        |       |        |       |        |       |       |
|---------------------------------------|-------|--------|-------|--------|-------|--------|-------|-------|
| Assigned Movement                     | 0     | 12     | 0     | 14     | 0     | 16     | 0     | 18    |
| Lane Assignment                       |       | T+R    |       | R      |       | R      |       |       |
| Lanes in Group                        | 0     | 1      | 0     | 1      | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 1011.8 | 0.0   | 181.4  | 0.0   | 76.7   | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1875.0 | 0.0   | 1697.3 | 0.0   | 1679.6 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 0.0    | 0.0   | 10.0   | 0.0   | 3.9    | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0    | 0.0   | 10.0   | 0.0   | 3.9    | 0.0   | 0.0   |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion RT Outside Lane (P_R)      | 0.000 | 0.017  | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 0.212 |
| Lane Group Capacity (c), veh/h        | 0.0   | 1419.1 | 0.0   | 198.3  | 0.0   | 1271.2 | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.713  | 0.000 | 0.915  | 0.000 | 0.060  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 1419.1 | 0.0   | 198.3  | 0.0   | 1271.2 | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.571  | 0.000 | 1.000  | 0.000 | 0.634  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0    | 0.0   | 41.5   | 0.0   | 11.9   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 1.8    | 0.0   | 40.8   | 0.0   | 0.1    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 1.8    | 0.0   | 82.3   | 0.0   | 11.9   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0    | 0.0   | 4.2    | 0.0   | 1.1    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.7    | 0.0   | 2.3    | 0.0   | 0.0    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 1.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.7    | 0.0   | 6.4    | 0.0   | 1.1    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.03   | 0.00  | 1.30   | 0.00  | 0.19   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |

Intersection Summary

|                           |      |
|---------------------------|------|
| HCM Average Control Delay | 19.6 |
| HCM Level of Service      | B    |

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Stroud Mall East Dr

3/11/2015



| Movement                      | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|-------------------------------|------|------|------|------|------|------|
| Lane Configurations           | ↙    | ↑    | ↑    | ↗    | ↙    | ↗    |
| Volume (vph)                  | 19   | 757  | 903  | 77   | 36   | 63   |
| Movement Number               | 5    | 2    | 6    | 16   | 7    | 14   |
| Initial Queue, veh            | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj. Factor (A_pbT)  | 1.00 |      |      | 1.00 | 1.00 | 1.00 |
| Parking, Bus Adj. Factors     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj. Sat. Flow Rate, veh/h/ln | 1900 | 1863 | 1863 | 1900 | 1976 | 1937 |
| Lanes                         | 1    | 1    | 1    | 1    | 1    | 1    |
| Lane Assignment               |      |      |      |      |      |      |
| Capacity, veh/h               | 0    | 1500 | 1500 | 1301 | 137  | 120  |
| Proportion Arriving On Green  | 0.00 | 0.59 | 0.40 | 0.01 | 0.07 | 0.07 |
| Movement Delay, s/veh         | 0.0  | 10.6 | 21.6 | 12.7 | 46.2 | 55.0 |
| Movement LOS                  |      | B    | C    | B    | D    | D    |
| Approach Volume, veh/h        |      | 841  | 1143 |      | 140  |      |
| Approach Delay, s/veh         |      | 10.6 | 20.8 |      | 51.0 |      |
| Approach LOS                  |      | B    | C    |      | D    |      |

| Timer:                                | 1 | 2     | 3 | 4     | 5 | 6     | 7 | 8 |
|---------------------------------------|---|-------|---|-------|---|-------|---|---|
| Assigned Phase                        |   | 2     |   | 4     |   | 6     |   |   |
| Case No                               |   | 4.0   |   | 9.0   |   | 7.0   |   |   |
| Phase Duration (G+Y+Rc), s            |   | 85.20 |   | 13.14 |   | 85.20 |   |   |
| Change Period (Y+Rc), s               |   | 6.00  |   | 6.00  |   | 6.00  |   |   |
| Max. Allowable Headway (MAH), s       |   | 1.43  |   | 4.59  |   | 1.43  |   |   |
| Maximum Green Setting (Gmax), s       |   | 79.20 |   | 7.30  |   | 74.30 |   |   |
| Max. Queue Clearance Time (g_c+I1), s |   | 29.38 |   | 6.46  |   | 47.61 |   |   |
| Green Extension Time (g_e), s         |   | 0.36  |   | 0.04  |   | 0.36  |   |   |
| Probability of Phase Call (p_c)       |   | 1.000 |   | 0.978 |   | 1.000 |   |   |
| Probability of Max Out (p_x)          |   | 0.000 |   | 1.000 |   | 0.000 |   |   |

| Left-Turn Movement Data |  |  |  |  |         |  |  |  |
|-------------------------|--|--|--|--|---------|--|--|--|
| Assigned Movement       |  |  |  |  | 7       |  |  |  |
| Mvmt. Sat Flow, veh/h   |  |  |  |  | 1881.90 |  |  |  |

| Through Movement Data |  |         |  |  |  |         |  |  |
|-----------------------|--|---------|--|--|--|---------|--|--|
| Assigned Movement     |  | 2       |  |  |  | 6       |  |  |
| Mvmt. Sat Flow, veh/h |  | 1862.75 |  |  |  | 1862.75 |  |  |

| Right-Turn Movement Data |  |  |      |  |         |  |         |  |
|--------------------------|--|--|------|--|---------|--|---------|--|
| Assigned Movement        |  |  | 12   |  | 14      |  | 16      |  |
| Mvmt. Sat Flow, veh/h    |  |  | 0.00 |  | 1646.67 |  | 1615.00 |  |

| Left Lane Group Data            |  |     |     |     |        |     |     |     |
|---------------------------------|--|-----|-----|-----|--------|-----|-----|-----|
| Assigned Movement               |  | 0   | 0   | 0   | 7      | 0   | 0   | 0   |
| Lane Assignment                 |  |     |     |     | L      |     |     |     |
| Lanes in Group                  |  | 0   | 0   | 0   | 1      | 0   | 0   | 0   |
| Group Volume (v), veh/h         |  | 0.0 | 0.0 | 0.0 | 63.2   | 0.0 | 0.0 | 0.0 |
| Group Sat. Flow (s), veh/h/ln   |  | 0.0 | 0.0 | 0.0 | 1881.9 | 0.0 | 0.0 | 0.0 |
| Queue Serve Time (g_s), s       |  | 0.0 | 0.0 | 0.0 | 3.2    | 0.0 | 0.0 | 0.0 |
| Cycle Queue Clear Time (g_c), s |  | 0.0 | 0.0 | 0.0 | 3.2    | 0.0 | 0.0 | 0.0 |

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Stroud Mall East Dr

3/11/2015

|                                       |       |        |       |        |       |        |       |       |
|---------------------------------------|-------|--------|-------|--------|-------|--------|-------|-------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 0.0    | 0.0   | 1881.9 | 0.0   | 0.0    | 0.0   | 0.0   |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Eff. Green (g_p), s           | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Serve Time (g_u), s           | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Time to First Blk (g_f), s            | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 79.2   | 0.0   | 0.0   |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion LT Inside Lane (P_L)       | 0.000 | 0.000  | 0.000 | 1.000  | 0.000 | 0.000  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0    | 0.0   | 136.6  | 0.0   | 0.0    | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000  | 0.000 | 0.462  | 0.000 | 0.000  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0    | 0.0   | 139.7  | 0.0   | 0.0    | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000  | 0.000 | 1.000  | 0.000 | 0.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0    | 0.0   | 43.8   | 0.0   | 0.0    | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0    | 0.0   | 2.4    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0    | 0.0   | 46.2   | 0.0   | 0.0    | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0    | 0.0   | 1.5    | 0.0   | 0.0    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0    | 0.0   | 0.1    | 0.0   | 0.0    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 0.000  | 0.000 | 1.000  | 0.000 | 0.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0    | 0.0   | 1.6    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00   | 0.00  | 0.09   | 0.00  | 0.00   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Middle Lane Group Data</b>         |       |        |       |        |       |        |       |       |
| Assigned Movement                     | 0     | 2      | 0     | 0      | 0     | 6      | 0     | 0     |
| Lane Assignment                       | T     |        |       | T      |       |        |       |       |
| Lanes in Group                        | 0     | 1      | 0     | 0      | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 841.1  | 0.0   | 0.0    | 0.0   | 1037.9 | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1862.7 | 0.0   | 0.0    | 0.0   | 1862.7 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 27.4   | 0.0   | 0.0    | 0.0   | 45.6   | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 27.4   | 0.0   | 0.0    | 0.0   | 45.6   | 0.0   | 0.0   |
| Lane Group Capacity (c), veh/h        | 0.0   | 1500.2 | 0.0   | 0.0    | 0.0   | 1500.2 | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.561  | 0.000 | 0.000  | 0.000 | 0.692  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 1500.2 | 0.0   | 0.0    | 0.0   | 1500.2 | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.633  | 0.000 | 0.000  | 0.000 | 0.770  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 9.6    | 0.0   | 0.0    | 0.0   | 19.6   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 1.0    | 0.0   | 0.0    | 0.0   | 2.0    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 10.6   | 0.0   | 0.0    | 0.0   | 21.6   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 11.3   | 0.0   | 0.0    | 0.0   | 21.4   | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.4    | 0.0   | 0.0    | 0.0   | 0.9    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 0.000 | 0.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 11.7   | 0.0   | 0.0    | 0.0   | 22.3   | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 1.13   | 0.00  | 0.00   | 0.00  | 0.34   | 0.00  | 0.00  |

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Stroud Mall East Dr

3/11/2015

|                                  |     |     |     |     |     |     |     |     |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Initial Queue (Qb), veh          | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Final (Residual) Queue (Qe), veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Delay (ds), s/veh      | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Queue (Qs), veh        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Capacity (cs), veh/h   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Initial Queue Clear Time (tc), h | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

### Right Lane Group Data

|                                       |       |       |       |        |       |        |       |       |
|---------------------------------------|-------|-------|-------|--------|-------|--------|-------|-------|
| Assigned Movement                     | 0     | 12    | 0     | 14     | 0     | 16     | 0     | 0     |
| Lane Assignment                       |       |       |       | R      |       | R      |       |       |
| Lanes in Group                        | 0     | 0     | 0     | 1      | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 0.0   | 0.0   | 76.8   | 0.0   | 105.5  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 0.0   | 0.0   | 1646.7 | 0.0   | 1615.0 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 0.0   | 0.0   | 4.5    | 0.0   | 6.4    | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0   | 0.0   | 4.5    | 0.0   | 6.4    | 0.0   | 0.0   |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion RT Outside Lane (P_R)      | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 119.6  | 0.0   | 1300.7 | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.643  | 0.000 | 0.081  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 122.2  | 0.0   | 1300.7 | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.770  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 44.4   | 0.0   | 12.6   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 10.6   | 0.0   | 0.1    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 55.0   | 0.0   | 12.7   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 2.0    | 0.0   | 1.8    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.4    | 0.0   | 0.0    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 2.4    | 0.0   | 1.8    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.41   | 0.00  | 0.18   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |

### Intersection Summary

|                           |      |
|---------------------------|------|
| HCM Average Control Delay | 18.7 |
| HCM Level of Service      | B    |

HCM 2010 Signalized Intersection Capacity Analysis  
 4: Commercial Driveway/Chipperfield Dr & SR 611

3/25/2015

|                                       |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations                   |  |  |   |  |  |  |  |  |  |   |  |  |
| Volume (vph)                          | 216   | 499   | 1   | 5   | 489   | 54  | 28   | 7   | 7   | 251   | 11  | 248   |
| Movement Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Queue, veh                    | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj. Factor (A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 0.99  | 1.00  |   | 1.00  |
| Parking, Bus Adj. Factors             | 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. Sat. Flow Rate, veh/h/ln         | 1872  | 1891  | 1891  | 1890  | 1872  | 1928  | 1900   | 1900  | 1976  | 1856  | 1856  | 1947  |
| Lanes                                 | 1   | 1   | 0   | 1   | 1   | 1   | 0  | 1   | 1   | 0   | 1   | 1   |
| Lane Assignment                       |   |   |   |   |   |   |  |   |   |   |   |   |
| Capacity, veh/h                       | 0   | 980   | 7   | 342   | 979   | 855   | 86   | 18  | 94  | 364   | 27  | 364   |
| Proportion Arriving On Green          | 0.00  | 0.34  | 0.34  | 0.52  | 0.52  | 0.52  | 0.06   | 0.06  | 0.06  | 0.22  | 0.22  | 0.22  |
| Movement Delay, s/veh                 | 0.0   | 0.0   | 22.3  | 22.7  | 15.7  | 10.7  | 44.2   | 0.0   | 40.9  | 46.5  | 0.0   | 39.5  |
| Movement LOS                          |   |   | C   | C   | B   | B   | D  |   | D   | D   |   | D   |
| Approach Volume, veh/h                |   | 529   |   |   | 586   |   |  | 59  |   |   | 585   |   |
| Approach Delay, s/veh                 |   | 22.3  |   |   | 15.4  |   |  | 43.5  |   |   | 43.3  |   |
| Approach LOS                          |   | C   |   |   | B   |   |  | D   |   |   | D   |   |
| Timer:                                |   | 1   | 2   | 3   | 4   | 5   | 6  | 7   | 8   |   |   |   |
| Assigned Phase                        |   |   | 2   | 8   | 4   |   | 6  |   |   |   |   |   |
| Case No                               |   |   | 4.0   | 11.0  | 11.0  |   | 5.3  |   |   |   |   |   |
| Phase Duration (G+Y+Rc), s            |   |   | 53.01   | 11.08   | 25.80   |   | 53.01  |   |   |   |   |   |
| Change Period (Y+Rc), s               |   |   | 6.00  | 6.00  | 6.00  |   | 6.00   |   |   |   |   |   |
| Max. Allowable Headway (MAH), s       |   |   | 7.24  | 5.18  | 4.90  |   | 7.24   |   |   |   |   |   |
| Maximum Green Setting (Gmax), s       |   |   | 55.40   | 6.60  | 19.80   |   | 39.30  |   |   |   |   |   |
| Max. Queue Clearance Time (g_c+I1), s |   |   | 22.36   | 4.24  | 17.48   |   | 23.23  |   |   |   |   |   |
| Green Extension Time (g_e), s         |   |   | 8.39  | 0.03  | 0.75  |   | 10.48  |   |   |   |   |   |
| Probability of Phase Call (p_c)       |   |   | 1.000   | 0.776   | 1.000   |   | 1.000  |   |   |   |   |   |
| Probability of Max Out (p_x)          |   |   | 0.380   | 1.000   | 1.000   |   | 0.718  |   |   |   |   |   |
| <b>Left-Turn Movement Data</b>        |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   |   | 3   | 7   |   | 1  |   |   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   |   | 1514.49   | 1651.73   |   | 883.56   |   |   |   |   |   |
| <b>Through Movement Data</b>          |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 2   | 8   | 4   |   | 6  |   |   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 1873.95   | 309.79  | 121.61  |   | 1871.78  |   |   |   |   |   |
| <b>Right-Turn Movement Data</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 12  | 18  | 14  |   | 16   |   |   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 14.27   | 1656.72   | 1654.66   |   | 1635.30  |   |   |   |   |   |
| <b>Left Lane Group Data</b>           |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   | 0   | 0   | 3   | 7   | 0   | 1  | 0   | 0   |   |   |   |
| Lane Assignment                       |   |   |   | L+T   | L+T   |   | L  |   |   |   |   |   |
| Lanes in Group                        |   | 0   | 0   | 1   | 1   | 0   | 1  | 0   | 0   |   |   |   |
| Group Volume (v), veh/h               |   | 0.0   | 0.0   | 46.8  | 320.8   | 0.0   | 11.9   | 0.0   | 0.0   |   |   |   |
| Group Sat. Flow (s), veh/h/ln         |   | 0.0   | 0.0   | 1824.3  | 1773.3  | 0.0   | 883.6  | 0.0   | 0.0   |   |   |   |
| Queue Serve Time (g_s), s             |   | 0.0   | 0.0   | 2.2   | 15.5  | 0.0   | 0.9  | 0.0   | 0.0   |   |   |   |
| Cycle Queue Clear Time (g_c), s       |   | 0.0   | 0.0   | 2.2   | 15.5  | 0.0   | 21.2   | 0.0   | 0.0   |   |   |   |

# HCM 2010 Signalized Intersection Capacity Analysis

## 4: Commercial Driveway/Chipperfield Dr & SR 611

3/25/2015

|                                       |       |       |       |       |       |        |       |       |
|---------------------------------------|-------|-------|-------|-------|-------|--------|-------|-------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 883.6  | 0.0   | 0.0   |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Eff. Green (g_p), s           | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 47.0   | 0.0   | 0.0   |
| Perm LT Serve Time (g_u), s           | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 26.6   | 0.0   | 0.0   |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.9    | 0.0   | 0.0   |
| Time to First Blk (g_f), s            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion LT Inside Lane (P_L)       | 0.000 | 0.000 | 0.830 | 0.931 | 0.000 | 1.000  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 103.2 | 390.6 | 0.0   | 342.0  | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.454 | 0.821 | 0.000 | 0.035  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 133.9 | 390.6 | 0.0   | 342.0  | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 1.000 | 1.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 41.1  | 33.4  | 0.0   | 22.6   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 3.1   | 13.1  | 0.0   | 0.1    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 44.2  | 46.5  | 0.0   | 22.7   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 1.0   | 6.4   | 0.0   | 0.2    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.1   | 1.4   | 0.0   | 0.0    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 0.000 | 1.000 | 1.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 1.1   | 7.8   | 0.0   | 0.2    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.06  | 0.42  | 0.00  | 0.02   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Middle Lane Group Data</b>         |       |       |       |       |       |        |       |       |
| Assigned Movement                     | 0     | 2     | 8     | 4     | 0     | 6      | 0     | 0     |
| Lane Assignment                       | T     |       |       |       |       |        |       |       |
| Lanes in Group                        | 0     | 0     | 0     | 0     | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 514.7  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1871.8 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 16.3   | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 16.3   | 0.0   | 0.0   |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 978.8  | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.526  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 978.8  | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 14.1   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 1.6    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 15.7   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 6.2    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.4    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 1.000 | 1.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 6.7    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.17   | 0.00  | 0.00  |

HCM 2010 Signalized Intersection Capacity Analysis  
 4: Commercial Driveway/Chipperfield Dr & SR 611

3/25/2015

|                                  |     |     |     |     |     |     |     |     |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Initial Queue (Qb), veh          | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Final (Residual) Queue (Qe), veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Delay (ds), s/veh      | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Queue (Qs), veh        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Capacity (cs), veh/h   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Initial Queue Clear Time (tc), h | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Right Lane Group Data**

|                                       |       |        |        |        |       |        |       |       |
|---------------------------------------|-------|--------|--------|--------|-------|--------|-------|-------|
| Assigned Movement                     | 0     | 12     | 18     | 14     | 0     | 16     | 0     | 0     |
| Lane Assignment                       |       | T+R    | R      | R      |       | R      |       |       |
| Lanes in Group                        | 0     | 1      | 1      | 1      | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 529.3  | 12.1   | 263.8  | 0.0   | 59.3   | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1888.2 | 1656.7 | 1654.7 | 0.0   | 1635.3 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 20.4   | 0.6    | 13.3   | 0.0   | 1.6    | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 20.4   | 0.6    | 13.3   | 0.0   | 1.6    | 0.0   | 0.0   |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion RT Outside Lane (P_R)      | 0.000 | 0.008  | 1.000  | 1.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 987.4  | 93.7   | 364.5  | 0.0   | 855.1  | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.536  | 0.129  | 0.724  | 0.000 | 0.069  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 1163.7 | 121.6  | 364.5  | 0.0   | 855.1  | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.831  | 1.000  | 1.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 20.9   | 40.3   | 32.5   | 0.0   | 10.6   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 1.4    | 0.6    | 7.0    | 0.0   | 0.1    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 22.3   | 40.9   | 39.5   | 0.0   | 10.7   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 9.4    | 0.3    | 5.3    | 0.0   | 0.5    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.4    | 0.0    | 0.7    | 0.0   | 0.0    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 1.000  | 1.000  | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 9.8    | 0.3    | 6.0    | 0.0   | 0.6    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.15   | 0.08   | 0.75   | 0.00  | 0.07   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |

**Intersection Summary**

|                           |      |
|---------------------------|------|
| HCM Average Control Delay | 27.7 |
| HCM Level of Service      | C    |

# HCM Signalized Intersection Capacity Analysis

## 16: Dreher Connector Road & W Main St

3/11/2015



| Movement               | EBT  | EBR  | WBL   | WBT   | NWL   | NWR  |
|------------------------|------|------|-------|-------|-------|------|
| Lane Configurations    | ↑    | ↑    | ↑     | ↑     | ↑     | ↑    |
| Volume (vph)           | 322  | 317  | 53    | 986   | 109   | 308  |
| Ideal Flow (vphpl)     | 1900 | 1900 | 1900  | 1900  | 1900  | 1900 |
| Total Lost time (s)    | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   | 4.0  |
| Lane Util. Factor      | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 |
| Frt                    | 1.00 | 0.85 | 1.00  | 1.00  | 1.00  | 0.85 |
| Flt Protected          | 1.00 | 1.00 | 0.95  | 1.00  | 0.95  | 1.00 |
| Satd. Flow (prot)      | 1900 | 1615 | 1805  | 1900  | 1805  | 1615 |
| Flt Permitted          | 1.00 | 1.00 | 0.47  | 1.00  | 0.95  | 1.00 |
| Satd. Flow (perm)      | 1900 | 1615 | 893   | 1900  | 1805  | 1615 |
| Peak-hour factor, PHF  | 0.90 | 0.90 | 0.90  | 0.90  | 0.90  | 0.90 |
| Adj. Flow (vph)        | 358  | 352  | 59    | 1096  | 121   | 342  |
| RTOR Reduction (vph)   | 0    | 136  | 0     | 0     | 0     | 285  |
| Lane Group Flow (vph)  | 358  | 216  | 59    | 1096  | 121   | 57   |
| Turn Type              | NA   | Perm | pm+pt | NA    | NA    | Perm |
| Protected Phases       | 4    |      | 3     | 8     | 2     |      |
| Permitted Phases       |      | 4    | 8     |       |       | 2    |
| Actuated Green, G (s)  | 39.2 | 39.2 | 45.2  | 45.2  | 10.6  | 10.6 |
| Effective Green, g (s) | 39.2 | 39.2 | 45.2  | 45.2  | 10.6  | 10.6 |
| Actuated g/C Ratio     | 0.61 | 0.61 | 0.71  | 0.71  | 0.17  | 0.17 |
| Clearance Time (s)     | 4.0  | 4.0  | 4.0   | 4.0   | 4.0   | 4.0  |
| Vehicle Extension (s)  | 3.0  | 3.0  | 3.0   | 3.0   | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 1167 | 992  | 661   | 1346  | 300   | 268  |
| v/s Ratio Prot         | 0.19 |      | 0.00  | c0.58 | c0.07 |      |
| v/s Ratio Perm         |      | 0.13 | 0.06  |       |       | 0.04 |
| v/c Ratio              | 0.31 | 0.22 | 0.09  | 0.81  | 0.40  | 0.21 |
| Uniform Delay, d1      | 5.8  | 5.5  | 3.1   | 6.4   | 23.8  | 23.0 |
| Progression Factor     | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 |
| Incremental Delay, d2  | 0.2  | 0.1  | 0.1   | 3.9   | 0.9   | 0.4  |
| Delay (s)              | 6.0  | 5.6  | 3.2   | 10.3  | 24.7  | 23.4 |
| Level of Service       | A    | A    | A     | B     | C     | C    |
| Approach Delay (s)     | 5.8  |      |       | 9.9   | 23.7  |      |
| Approach LOS           | A    |      |       | A     | C     |      |

### Intersection Summary

|                                   |       |                      |     |
|-----------------------------------|-------|----------------------|-----|
| HCM Average Control Delay         | 11.4  | HCM Level of Service | B   |
| HCM Volume to Capacity ratio      | 0.74  |                      |     |
| Actuated Cycle Length (s)         | 63.8  | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 64.6% | ICU Level of Service | C   |
| Analysis Period (min)             | 15    |                      |     |
| c Critical Lane Group             |       |                      |     |

HCM 2010 Signalized Intersection Capacity Analysis  
 22: 305 WB Off Ramp/305 WB On Ramp & W Main St

6/17/2015

|                                 |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement                        | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | SEL   | SET   | SER   | NWL   | NWT   | NWR   |
| Lane Configurations             |  |  |   |   |  |   |   |   |   |  |  |   |
| Volume (veh/h)                  | 72  | 558   | 0   | 0   | 711   | 288   | 0   | 0   | 0   | 250   | 247   | 183   |
| Number                          | 7   | 4   | 14  | 3   | 8   | 18  |   |   |   | 5   | 2   | 12  |
| Initial Q, veh                  | 0   | 0   | 0   | 0   | 0   | 0   |   |   |   | 0   | 0   | 0   |
| Ped-Bike Adj (A_pbT)            | 1.00  |   | 1.00  | 1.00  |   | 1.00  |   |   |   | 1.00  |   | 1.00  |
| Parking Bus Adj                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |   |   | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln          | 1900  | 1900  | 0   | 0   | 1900  | 1900  |   |   |   | 1900  | 1900  | 1900  |
| Adj Flow Rate, veh/h            | 80  | 620   | 0   | 0   | 790   | 0   |   |   |   | 276   | 277   | 0   |
| Adj No. of Lanes                | 1   | 1   | 0   | 0   | 1   | 0   |   |   |   | 1   | 1   | 0   |
| Peak Hour Factor                | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |   |   |   | 0.90  | 0.90  | 0.90  |
| Percent Heavy Veh, %            | 0   | 0   | 0   | 0   | 0   | 0   |   |   |   | 0   | 0   | 0   |
| Opposing Right Turn Influence   | Yes   |   |   | No  |   |   |   |   |   | Yes   |   |   |
| Cap, veh/h                      | 231   | 1044  | 0   | 0   | 1044  | 0   |   |   |   | 671   | 704   | 0   |
| HCM Platoon Ratio               | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |   |   | 1.00  | 1.00  | 1.00  |
| Prop Arrive On Green            | 0.55  | 0.55  | 0.00  | 0.00  | 0.55  | 0.00  |   |   |   | 0.37  | 0.37  | 0.00  |
| Ln Grp Delay, s/veh             | 34.5  | 15.6  | 0.0   | 0.0   | 19.7  | 0.0   |   |   |   | 25.2  | 24.8  | 0.0   |
| Ln Grp LOS                      | C   | B   |   |   | B   |   |   |   |   | C   | C   |   |
| Approach Vol, veh/h             |   | 700   |   |   | 790   |   |   |   |   |   | 553   |   |
| Approach Delay, s/veh           |   | 17.8  |   |   | 19.7  |   |   |   |   |   | 25.0  |   |
| Approach LOS                    |   | B   |   |   | B   |   |   |   |   |   | C   |   |
| Timer:                          |   | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |   |   |   |
| Assigned Phs                    |   |   | 2   |   | 4   |   |   |   | 8   |   |   |   |
| Case No                         |   |   | 10.0  |   | 6.0   |   |   |   | 8.0   |   |   |   |
| Phs Duration (G+Y+Rc), s        |   |   | 41.1  |   | 58.9  |   |   |   | 58.9  |   |   |   |
| Change Period (Y+Rc), s         |   |   | 4.0   |   | 4.0   |   |   |   | 4.0   |   |   |   |
| Max Green (Gmax), s             |   |   | 28.0  |   | 64.0  |   |   |   | 64.0  |   |   |   |
| Max Allow Headway (MAH), s      |   |   | 4.5   |   | 5.3   |   |   |   | 5.3   |   |   |   |
| Max Q Clear (g_c+I1), s         |   |   | 13.3  |   | 44.1  |   |   |   | 34.1  |   |   |   |
| Green Ext Time (g_e), s         |   |   | 2.2   |   | 10.9  |   |   |   | 13.5  |   |   |   |
| Prob of Phs Call (p_c)          |   |   | 1.00  |   | 1.00  |   |   |   | 1.00  |   |   |   |
| Prob of Max Out (p_x)           |   |   | 0.00  |   | 0.49  |   |   |   | 0.31  |   |   |   |
| <b>Left-Turn Movement Data</b>  |   |   |   |   |   |   |   |   |   |   |   |   |
| Assigned Mvmt                   |   |   | 5   |   | 7   |   |   |   | 3   |   |   |   |
| Mvmt Sat Flow, veh/h            |   |   | 1810  |   | 697   |   |   |   | 0   |   |   |   |
| <b>Through Movement Data</b>    |   |   |   |   |   |   |   |   |   |   |   |   |
| Assigned Mvmt                   |   |   | 2   |   | 4   |   |   |   | 8   |   |   |   |
| Mvmt Sat Flow, veh/h            |   |   | 1900  |   | 1900  |   |   |   | 1900  |   |   |   |
| <b>Right-Turn Movement Data</b> |   |   |   |   |   |   |   |   |   |   |   |   |
| Assigned Mvmt                   |   |   | 12  |   | 14  |   |   |   | 18  |   |   |   |
| Mvmt Sat Flow, veh/h            |   |   | 0   |   | 0   |   |   |   | 0   |   |   |   |
| <b>Left Lane Group Data</b>     |   |   |   |   |   |   |   |   |   |   |   |   |
| Assigned Mvmt                   |   | 0   | 5   | 0   | 7   | 0   | 0   | 0   | 3   |   |   |   |
| Lane Assignment                 |   |   |   |   |   |   |   |   |   |   |   |   |
| Lanes in Grp                    |   | 0   | 1   | 0   | 1   | 0   | 0   | 0   | 0   |   |   |   |

HCM 2010 Signalized Intersection Capacity Analysis  
 22: 305 WB Off Ramp/305 WB On Ramp & W Main St

6/17/2015

|                                     |      |      |      |      |      |      |      |      |
|-------------------------------------|------|------|------|------|------|------|------|------|
| Grp Vol (v), veh/h                  | 0    | 276  | 0    | 80   | 0    | 0    | 0    | 0    |
| Grp Sat Flow (s), veh/h/ln          | 0    | 1810 | 0    | 697  | 0    | 0    | 0    | 0    |
| Q Serve Time (g_s), s               | 0.0  | 11.3 | 0.0  | 10.0 | 0.0  | 0.0  | 0.0  | 0.0  |
| Cycle Q Clear Time (g_c), s         | 0.0  | 11.3 | 0.0  | 42.1 | 0.0  | 0.0  | 0.0  | 0.0  |
| Perm LT Sat Flow (s_l), veh/h/ln    | 0    | 1810 | 0    | 697  | 0    | 0    | 0    | 0    |
| Shared LT Sat Flow (s_sh), veh/h/ln | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Perm LT Eff Green (g_p), s          | 0.0  | 0.0  | 0.0  | 54.9 | 0.0  | 0.0  | 0.0  | 0.0  |
| Perm LT Serve Time (g_u), s         | 0.0  | 0.0  | 0.0  | 22.9 | 0.0  | 0.0  | 0.0  | 0.0  |
| Perm LT Q Serve Time (g_ps), s      | 0.0  | 0.0  | 0.0  | 10.0 | 0.0  | 0.0  | 0.0  | 0.0  |
| Time to First Blk (g_f), s          | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 54.9 |
| Serve Time pre Blk (g_fs), s        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Prop LT Inside Lane (P_L)           | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Lane Grp Cap (c), veh/h             | 0    | 671  | 0    | 231  | 0    | 0    | 0    | 0    |
| V/C Ratio (X)                       | 0.00 | 0.41 | 0.00 | 0.35 | 0.00 | 0.00 | 0.00 | 0.00 |
| Avail Cap (c_a), veh/h              | 0    | 671  | 0    | 295  | 0    | 0    | 0    | 0    |
| Upstream Filter (I)                 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Uniform Delay (d1), s/veh           | 0.0  | 23.4 | 0.0  | 33.6 | 0.0  | 0.0  | 0.0  | 0.0  |
| Incr Delay (d2), s/veh              | 0.0  | 1.9  | 0.0  | 0.9  | 0.0  | 0.0  | 0.0  | 0.0  |
| Initial Q Delay (d3), s/veh         | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Control Delay (d), s/veh            | 0.0  | 25.2 | 0.0  | 34.5 | 0.0  | 0.0  | 0.0  | 0.0  |
| 1st-Term Q (Q1), veh/ln             | 0.0  | 5.7  | 0.0  | 1.9  | 0.0  | 0.0  | 0.0  | 0.0  |
| 2nd-Term Q (Q2), veh/ln             | 0.0  | 0.3  | 0.0  | 0.1  | 0.0  | 0.0  | 0.0  | 0.0  |
| 3rd-Term Q (Q3), veh/ln             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile Back of Q Factor (f_B%)        | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| %ile Back of Q (-26165%), veh/ln    | 0.0  | 6.0  | 0.0  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile Storage Ratio (RQ%)            | 0.00 | 0.16 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Initial Q (Qb), veh                 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Final (Residual) Q (Qe), veh        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Sat Delay (ds), s/veh               | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Sat Q (Qs), veh                     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Sat Cap (cs), veh/h                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Initial Q Clear Time (tc), h        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| <b>Middle Lane Group Data</b>       |      |      |      |      |      |      |      |      |
| Assigned Mvmt                       | 0    | 2    | 0    | 4    | 0    | 0    | 0    | 8    |
| Lane Assignment                     |      | T    |      | T    |      |      |      | T    |
| Lanes in Grp                        | 0    | 1    | 0    | 1    | 0    | 0    | 0    | 1    |
| Grp Vol (v), veh/h                  | 0    | 277  | 0    | 620  | 0    | 0    | 0    | 790  |
| Grp Sat Flow (s), veh/h/ln          | 0    | 1900 | 0    | 1900 | 0    | 0    | 0    | 1900 |
| Q Serve Time (g_s), s               | 0.0  | 10.7 | 0.0  | 21.8 | 0.0  | 0.0  | 0.0  | 32.1 |
| Cycle Q Clear Time (g_c), s         | 0.0  | 10.7 | 0.0  | 21.8 | 0.0  | 0.0  | 0.0  | 32.1 |
| Lane Grp Cap (c), veh/h             | 0    | 704  | 0    | 1044 | 0    | 0    | 0    | 1044 |
| V/C Ratio (X)                       | 0.00 | 0.39 | 0.00 | 0.59 | 0.00 | 0.00 | 0.00 | 0.76 |
| Avail Cap (c_a), veh/h              | 0    | 704  | 0    | 1216 | 0    | 0    | 0    | 1216 |
| Upstream Filter (I)                 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| Uniform Delay (d1), s/veh           | 0.0  | 23.2 | 0.0  | 15.1 | 0.0  | 0.0  | 0.0  | 17.4 |
| Incr Delay (d2), s/veh              | 0.0  | 1.6  | 0.0  | 0.6  | 0.0  | 0.0  | 0.0  | 2.4  |
| Initial Q Delay (d3), s/veh         | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Control Delay (d), s/veh            | 0.0  | 24.8 | 0.0  | 15.6 | 0.0  | 0.0  | 0.0  | 19.7 |
| 1st-Term Q (Q1), veh/ln             | 0.0  | 5.6  | 0.0  | 11.4 | 0.0  | 0.0  | 0.0  | 16.7 |
| 2nd-Term Q (Q2), veh/ln             | 0.0  | 0.3  | 0.0  | 0.2  | 0.0  | 0.0  | 0.0  | 0.7  |

HCM 2010 Signalized Intersection Capacity Analysis  
 22: 305 WB Off Ramp/305 WB On Ramp & W Main St

6/17/2015

|                                  |      |      |      |      |      |      |      |      |
|----------------------------------|------|------|------|------|------|------|------|------|
| 3rd-Term Q (Q3), veh/ln          | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile Back of Q Factor (f_B%)     | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| %ile Back of Q (-26165%), veh/ln | 0.0  | 5.9  | 0.0  | 11.5 | 0.0  | 0.0  | 0.0  | 17.4 |
| %ile Storage Ratio (RQ%)         | 0.00 | 0.15 | 0.00 | 0.77 | 0.00 | 0.00 | 0.00 | 2.57 |
| Initial Q (Qb), veh              | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Final (Residual) Q (Qe), veh     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Sat Delay (ds), s/veh            | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Sat Q (Qs), veh                  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Sat Cap (cs), veh/h              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Initial Q Clear Time (tc), h     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |

Right Lane Group Data

|                                  |      |      |      |      |      |      |      |      |
|----------------------------------|------|------|------|------|------|------|------|------|
| Assigned Mvmt                    | 0    | 12   | 0    | 14   | 0    | 0    | 0    | 18   |
| Lane Assignment                  |      |      |      |      |      |      |      |      |
| Lanes in Grp                     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Grp Vol (v), veh/h               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Grp Sat Flow (s), veh/h/ln       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Q Serve Time (g_s), s            | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Cycle Q Clear Time (g_c), s      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Prot RT Sat Flow (s_R), veh/h/ln | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Prot RT Eff Green (g_R), s       | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Prop RT Outside Lane (P_R)       | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Lane Grp Cap (c), veh/h          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| V/C Ratio (X)                    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Avail Cap (c_a), veh/h           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Upstream Filter (I)              | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Uniform Delay (d1), s/veh        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Incr Delay (d2), s/veh           | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Initial Q Delay (d3), s/veh      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Control Delay (d), s/veh         | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 1st-Term Q (Q1), veh/ln          | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 2nd-Term Q (Q2), veh/ln          | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| 3rd-Term Q (Q3), veh/ln          | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile Back of Q Factor (f_B%)     | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| %ile Back of Q (-26165%), veh/ln | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile Storage Ratio (RQ%)         | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Initial Q (Qb), veh              | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Final (Residual) Q (Qe), veh     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Sat Delay (ds), s/veh            | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Sat Q (Qs), veh                  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Sat Cap (cs), veh/h              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Initial Q Clear Time (tc), h     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |

Intersection Summary

|                     |      |
|---------------------|------|
| HCM 2010 Ctrl Delay | 20.5 |
| HCM 2010 LOS        | C    |

Notes

User approved volume balancing among the lanes for turning movement.

**Intersection**

Intersection Delay (sec/veh): 11

| Movement                | EBL  | EBT  | WBT   | WBR   | SWL  | SWR  |
|-------------------------|------|------|-------|-------|------|------|
| Volume (vph)            | 369  | 10   | 10    | 189   | 118  | 417  |
| Conflicting Peds.(#/hr) | 0    | 0    | 0     | 0     | 0    | 0    |
| Sign Control            | Free | Free | Free  | Free  | Stop | Stop |
| Right Turn Channelized  | None | None | Yield | Yield | None | None |
| Storage Length          | 200  |      |       | 100   | 150  | 0    |
| Median Width            |      | 12   | 12    |       | 12   |      |
| Grade (%)               |      | 0%   | 0%    |       | 0%   |      |
| Peak Hour Factor        | 0.90 | 0.90 | 0.90  | 0.90  | 0.90 | 0.90 |
| Heavy Vehicles(%)       | 0    | 0    | 0     | 0     | 0    | 0    |
| Movement Flow Rate      | 410  | 11   | 11    | 210   | 131  | 463  |
| Number of Lanes         | 1    | 1    | 1     | 1     | 1    | 1    |

**Major/Minor**

|                             | Major 1 |   | Major 2 |   |       |      |
|-----------------------------|---------|---|---------|---|-------|------|
| Conflicting Flow Rate - All | 221     | 0 | 0       | 0 | 842   | 11   |
| Stage 1                     | 0       | 0 | 0       | 0 | 11    | 0    |
| Stage 2                     | 0       | 0 | 0       | 0 | 831   | 0    |
| Follow-up Headway           | 2.2     | - | 0       | 0 | 3.5   | 3.3  |
| Pot Capacity-1 Maneuver     | 1360    | - | -       | - | 337   | 1085 |
| Stage 1                     | -       | - | -       | - | 1017  | -    |
| Stage 2                     | -       | - | -       | - | 431   | -    |
| Mov Capacity-1 Maneuver     | 1360    | - | -       | - | 235.6 | 1085 |
| Mov Capacity-2 Maneuver     | -       | - | -       | - | 235.6 | -    |
| Stage 1                     | -       | - | -       | - | # 0   | -    |
| Stage 2                     | -       | - | -       | - | 301.3 | -    |

**Approach**

|                       | EB  | WB | SW     |
|-----------------------|-----|----|--------|
| HCM Control Delay (s) | 8.6 | 0  | 16.755 |
| HCM LOS               | A   | A  | C      |

**Lane**

|                                 | EBL   | EBT | WBT | WBR | SWLn1 | SWLn2 |
|---------------------------------|-------|-----|-----|-----|-------|-------|
| Capacity (vph)                  |       |     |     |     | 236   | 1085  |
| HCM Control Delay (s)           | 8.785 | -   | -   | -   | 37.8  | 10.8  |
| HCM Lane VC Ratio               | 0.301 | -   | 0   | -   | 0.556 | 0.427 |
| HCM Lane LOS                    | A     | -   | -   | -   | E     | B     |
| HCM 95th Percentile Queue (veh) | 1.281 | -   | 0   | -   | 3.044 | 2.175 |

HCM 2010 TWSC  
 18: Dreher Ave & Dreher Connector Road

3/11/2015

**Intersection**

Intersection Delay (sec/veh): 2.9

| Movement                | EBL   | EBR   | NEL   | NET   | SWT  | SWR  |
|-------------------------|-------|-------|-------|-------|------|------|
| Volume (vph)            | 83    | 35    | 85    | 111   | 109  | 312  |
| Conflicting Peds.(#/hr) | 0     | 0     | 0     | 0     | 0    | 0    |
| Sign Control            | Stop  | Stop  | Free  | Free  | Free | Free |
| Right Turn Channelized  | Yield | Yield | Yield | Yield | None | None |
| Storage Length          | 0     | 100   | 150   |       |      | 0    |
| Median Width            | 12    |       |       | 12    | 12   |      |
| Grade (%)               | 0%    |       |       | 0%    | 0%   |      |
| Peak Hour Factor        | 0.90  | 0.90  | 0.90  | 0.90  | 0.90 | 0.90 |
| Heavy Vehicles(%)       | 0     | 0     | 0     | 0     | 0    | 0    |
| Movement Flow Rate      | 92    | 39    | 94    | 123   | 121  | 347  |
| Number of Lanes         | 1     | 1     | 1     | 1     | 1    | 1    |

**Major/Minor**

|                             | Major 1 |     |      |   | Major 2 |   |
|-----------------------------|---------|-----|------|---|---------|---|
| Conflicting Flow Rate - All | 433     | 121 | 468  | 0 | 0       | 0 |
| Stage 1                     | 121     | 0   | 0    | 0 | 0       | 0 |
| Stage 2                     | 312     | 0   | 0    | 0 | 0       | 0 |
| Follow-up Headway           | 3.5     | 3.3 | 2.2  | - | 0       | 0 |
| Pot Capacity-1 Maneuver     | 584     | 935 | 1104 | - | -       | - |
| Stage 1                     | 909     | -   | -    | - | -       | - |
| Stage 2                     | 747     | -   | -    | - | -       | - |
| Mov Capacity-1 Maneuver     | 533.8   | 935 | 1104 | - | -       | - |
| Mov Capacity-2 Maneuver     | 533.8   | -   | -    | - | -       | - |
| Stage 1                     | # 0     | -   | -    | - | -       | - |
| Stage 2                     | 682.8   | -   | -    | - | -       | - |

**Approach**

|                       | EB     | NE  | SW |
|-----------------------|--------|-----|----|
| HCM Control Delay (s) | 11.884 | 3.7 | 0  |
| HCM LOS               | B      | A   | A  |

**Lane**

|                                 | NEL   | NET | EBLn1 | EBLn2 | SWT | SWR |
|---------------------------------|-------|-----|-------|-------|-----|-----|
| Capacity (vph)                  |       |     | 534   | 935   |     |     |
| HCM Control Delay (s)           | 8.566 | -   | 13.1  | 9     | -   | -   |
| HCM Lane VC Ratio               | 0.086 | -   | 0.173 | 0.042 | 0   | -   |
| HCM Lane LOS                    | A     | -   | B     | A     | -   | -   |
| HCM 95th Percentile Queue (veh) | 0.28  | -   | 0.619 | 0.13  | 0   | -   |

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: Broad St & 307 WB On Ramp/307 WB Exit Ramp

3/11/2015

|                                       |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations                   |   |   |   |   |  |  |  |  |   |   |  |  |
| Volume (vph)                          | 0   | 0   | 0   | 120   | 1   | 440   | 320  | 327   | 0   | 0   | 289   | 470   |
| Movement Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Queue, veh                    | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj. Factor (A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking, Bus Adj. Factors             | 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. Sat. Flow Rate, veh/h/ln         | 1900  | 1900  | 1900  | 1863  | 1863  | 1863  | 1872   | 1872  | 1900  | 1900  | 1863  | 1863  |
| Lanes                                 | 0   | 0   | 0   | 0   | 1   | 1   | 1  | 1   | 0   | 0   | 1   | 1   |
| Lane Assignment                       |   |   |   |   |   |   |  |   |   |   |   |   |
| Capacity, veh/h                       | 0   | 0   | 0   | 336   | 3   | 302   | 0  | 1242  | 0   | 0   | 1236  | 1051  |
| Proportion Arriving On Green          | 0.00  | 0.00  | 0.00  | 0.19  | 0.19  | 0.19  | 0.00   | 0.66  | 0.00  | 0.00  | 0.66  | 0.66  |
| Movement Delay, s/veh                 | 0.0   | 0.0   | 0.0   | 20.2  | 0.0   | 165.5   | 0.0  | 4.4   | 0.0   | 0.0   | 4.2   | 6.2   |
| Movement LOS                          |   |   |   | C   |   | F   |  | A   |   |   | A   | A   |
| Approach Volume, veh/h                |   | 0   |   |   | 514   |   |  | 355   |   |   | 825   |   |
| Approach Delay, s/veh                 |   | 0.0   |   |   | 128.3   |   |  | 4.4   |   |   | 5.5   |   |
| Approach LOS                          |   |   |   |   | F   |   |  | A   |   |   | A   |   |
| Timer:                                |   | 1   | 2   | 3   | 4   | 5   | 6  | 7   | 8   |   |   |   |
| Assigned Phase                        |   |   | 2   | 8   |   |   | 6  |   |   |   |   |   |
| Case No                               |   |   | 4.0   | 11.0  |   |   | 7.0  |   |   |   |   |   |
| Phase Duration (G+Y+Rc), s            |   |   | 40.50   | 14.50   |   |   | 40.50  |   |   |   |   |   |
| Change Period (Y+Rc), s               |   |   | 4.00  | 4.00  |   |   | 4.00   |   |   |   |   |   |
| Max. Allowable Headway (MAH), s       |   |   | 4.62  | 4.36  |   |   | 4.62   |   |   |   |   |   |
| Maximum Green Setting (Gmax), s       |   |   | 36.50   | 10.50   |   |   | 25.20  |   |   |   |   |   |
| Max. Queue Clearance Time (g_c+l1), s |   |   | 6.34  | 12.50   |   |   | 10.81  |   |   |   |   |   |
| Green Extension Time (g_e), s         |   |   | 6.71  | 0.00  |   |   | 5.24   |   |   |   |   |   |
| Probability of Phase Call (p_c)       |   |   | 1.000   | 1.000   |   |   | 1.000  |   |   |   |   |   |
| Probability of Max Out (p_x)          |   |   | 0.048   | 1.000   |   |   | 0.313  |   |   |   |   |   |
| <b>Left-Turn Movement Data</b>        |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   |   | 3   |   |   |  |   |   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   |   | 1760.07   |   |   |  |   |   |   |   |   |
| <b>Through Movement Data</b>          |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 2   | 8   |   |   | 6  |   |   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 1872.06   | 14.67   |   |   | 1862.75  |   |   |   |   |   |
| <b>Right-Turn Movement Data</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 12  | 18  |   |   | 16   |   |   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 0.00  | 1583.33   |   |   | 1583.33  |   |   |   |   |   |
| <b>Left Lane Group Data</b>           |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   | 0   | 0   | 3   | 0   | 0   | 0  | 0   | 0   |   |   |   |
| Lane Assignment                       |   |   |   | L+T   |   |   |  |   |   |   |   |   |
| Lanes in Group                        |   | 0   | 0   | 1   | 0   | 0   | 0  | 0   | 0   |   |   |   |
| Group Volume (v), veh/h               |   | 0.0   | 0.0   | 131.5   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |   |   |   |
| Group Sat. Flow (s), veh/h/ln         |   | 0.0   | 0.0   | 1774.7  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |   |   |   |
| Queue Serve Time (g_s), s             |   | 0.0   | 0.0   | 3.6   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |   |   |   |
| Cycle Queue Clear Time (g_c), s       |   | 0.0   | 0.0   | 3.6   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |   |   |   |

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: Broad St & 307 WB On Ramp/307 WB Exit Ramp

3/11/2015

|                                       |       |        |       |       |       |        |       |       |
|---------------------------------------|-------|--------|-------|-------|-------|--------|-------|-------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Eff. Green (g_p), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Serve Time (g_u), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Time to First Blk (g_f), s            | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 36.5   | 0.0   | 0.0   |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion LT Inside Lane (P_L)       | 0.000 | 0.000  | 0.992 | 0.000 | 0.000 | 0.000  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0    | 338.8 | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000  | 0.388 | 0.000 | 0.000 | 0.000  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0    | 338.8 | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000  | 1.000 | 0.000 | 0.000 | 0.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0    | 19.4  | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0    | 0.7   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0    | 20.2  | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0    | 1.3   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0    | 0.1   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 0.000  | 1.000 | 0.000 | 0.000 | 0.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0    | 1.4   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00   | 0.14  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Middle Lane Group Data</b>         |       |        |       |       |       |        |       |       |
| Assigned Movement                     | 0     | 2      | 8     | 0     | 0     | 6      | 0     | 0     |
| Lane Assignment                       |       | T      |       |       |       | T      |       |       |
| Lanes in Group                        | 0     | 1      | 0     | 0     | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 355.4  | 0.0   | 0.0   | 0.0   | 314.1  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1872.1 | 0.0   | 0.0   | 0.0   | 1862.7 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 4.3    | 0.0   | 0.0   | 0.0   | 3.8    | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 4.3    | 0.0   | 0.0   | 0.0   | 3.8    | 0.0   | 0.0   |
| Lane Group Capacity (c), veh/h        | 0.0   | 1242.4 | 0.0   | 0.0   | 0.0   | 1236.2 | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.286  | 0.000 | 0.000 | 0.000 | 0.254  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 1242.4 | 0.0   | 0.0   | 0.0   | 1236.2 | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 3.8    | 0.0   | 0.0   | 0.0   | 3.7    | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.6    | 0.0   | 0.0   | 0.0   | 0.5    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 4.4    | 0.0   | 0.0   | 0.0   | 4.2    | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.9    | 0.0   | 0.0   | 0.0   | 0.8    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.2    | 0.0   | 0.0   | 0.0   | 0.2    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 1.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 1.1    | 0.0   | 0.0   | 0.0   | 0.9    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.14   | 0.00  | 0.00  | 0.00  | 0.17   | 0.00  | 0.00  |

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: Broad St & 307 WB On Ramp/307 WB Exit Ramp

3/11/2015

|                                       |       |       |        |       |       |        |       |       |
|---------------------------------------|-------|-------|--------|-------|-------|--------|-------|-------|
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Right Lane Group Data</b>          |       |       |        |       |       |        |       |       |
| Assigned Movement                     | 0     | 12    | 18     | 0     | 0     | 16     | 0     | 0     |
| Lane Assignment                       |       |       | R      |       |       | R      |       |       |
| Lanes in Group                        | 0     | 0     | 1      | 0     | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 0.0   | 382.6  | 0.0   | 0.0   | 510.9  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 0.0   | 1583.3 | 0.0   | 0.0   | 1583.3 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 0.0   | 10.5   | 0.0   | 0.0   | 8.8    | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0   | 10.5   | 0.0   | 0.0   | 8.8    | 0.0   | 0.0   |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion RT Outside Lane (P_R)      | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 302.3  | 0.0   | 0.0   | 1050.8 | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 1.266  | 0.000 | 0.000 | 0.486  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 302.3  | 0.0   | 0.0   | 1050.8 | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 22.2   | 0.0   | 0.0   | 4.6    | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 143.3  | 0.0   | 0.0   | 1.6    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 165.5  | 0.0   | 0.0   | 6.2    | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 3.5    | 0.0   | 0.0   | 1.5    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 12.0   | 0.0   | 0.0   | 0.5    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 1.000  | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 15.6   | 0.0   | 0.0   | 2.0    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 7.91   | 0.00  | 0.00  | 1.02   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 20.1   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.3    | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Intersection Summary</b>           |       |       |        |       |       |        |       |       |
| HCM Average Control Delay             | 42.5  |       |        |       |       |        |       |       |
| HCM Level of Service                  | D     |       |        |       |       |        |       |       |

**Intersection**

Intersection Delay (sec/veh): 0.9

| Movement                 | WBL  | WBR  | NBT                             | NBR  | SBL                   | SBT               | Lane | NBT |
|--------------------------|------|------|---------------------------------|------|-----------------------|-------------------|------|-----|
| Volume (vph)             | 0    | 0    | 647                             | 162  | 102                   | Capacity (vph)    |      |     |
| Conflicting Peds. (#/hr) | 0    | 0    | 0                               | 0    | HCM Control Delay (s) |                   |      | -   |
| Sign Control             | Stop | Stop | Free                            | Free | Free                  | HCM Lane VC Ratio |      | 0   |
| Right Turn Channelized   | None | None | None                            | None | None                  | HCM Lane LOS      |      | -   |
| Storage Length           | 0    | 0    | HCM 95th Percentile Queue (veh) |      |                       |                   |      | 0   |
| Median Width             | 0    |      | 12                              |      |                       | 12                |      |     |
| Grade (%)                | 0%   |      | -1%                             |      |                       | 0%                |      |     |
| Peak Hour Factor         | 0.92 | 0.92 | 0.92                            | 0.92 | 0.92                  | 0.92              |      |     |
| Heavy Vehicles(%)        | 2    | 2    | 2                               | 2    | 2                     | 2                 |      |     |
| Movement Flow Rate       | 0    | 0    | 703                             | 176  | 111                   | 326               |      |     |
| Number of Lanes          | 0    | 0    | 1                               | 0    | 1                     | 1                 |      |     |

**Major/Minor**

|                             | Major 1 | Major 2 |
|-----------------------------|---------|---------|
| Conflicting Flow Rate - All | 0       | 879     |
| Stage 1                     | 0       | 0       |
| Stage 2                     | 0       | 0       |
| Follow-up Headway           | -       | 2.218   |
| Pot Capacity-1 Maneuver     | -       | 768     |
| Stage 1                     | -       | -       |
| Stage 2                     | -       | -       |
| Mov Capacity-1 Maneuver     | -       | 768     |
| Mov Capacity-2 Maneuver     | -       | -       |
| Stage 1                     | -       | -       |
| Stage 2                     | -       | -       |

**Approach**

|                       | NB | SB  |
|-----------------------|----|-----|
| HCM Control Delay (s) | 0  | 2.7 |
| HCM LOS               | A  | A   |

HCM 2010 TWSC  
 15: Seventh St & 307 EB Exit Ramp

3/11/2015

**Intersection**

Intersection Delay (sec/veh): 2.9

| Movement                | EBL   | EBT   | EBR   | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|-------------------------|-------|-------|-------|------|------|------|------|------|------|------|------|------|
| Volume (vph)            | 376   | 0     | 272   | 10   | 0    | 10   | 0    | 157  | 0    | 0    | 198  | 0    |
| Conflicting Peds.(#/hr) | 0     | 0     | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control            | Stop  | Stop  | Stop  | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| Right Turn Channelized  | Yield | Yield | Yield | None |
| Storage Length          | 0     |       | 50    | 20   |      | 0    | 0    |      | 0    | 0    |      | 0    |
| Median Width            |       | 12    |       |      | 12   |      |      | 0    |      |      | 0    |      |
| Grade (%)               |       | 0%    |       |      | 0%   |      |      | -5%  |      |      | 0%   |      |
| Peak Hour Factor        | 0.92  | 0.92  | 0.92  | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles(%)       | 2     | 2     | 2     | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Movement Flow Rate      | 409   | 0     | 296   | 11   | 0    | 11   | 0    | 171  | 0    | 0    | 215  | 0    |
| Number of Lanes         | 1     | 0     | 1     | 1    | 0    | 1    | 0    | 1    | 0    | 0    | 1    | 0    |

| Major/Minor                 | Minor 1 |   | Minor 1 |       | Major 1 |       | Major 2 |   |
|-----------------------------|---------|---|---------|-------|---------|-------|---------|---|
| Conflicting Flow Rate - All | 391     | - | 215     | 534   | -       | 171   | -       | 0 |
| Stage 1                     | 215     | - | 0       | 171   | -       | 0     | -       | 0 |
| Stage 2                     | 176     | - | 0       | 363   | -       | 0     | -       | 0 |
| Follow-up Headway           | 3.518   | - | 3.318   | 3.518 | -       | 3.318 | -       | 0 |
| Pot Capacity-1 Maneuver     | 568     | - | 826     | 457   | -       | 871   | -       | - |
| Stage 1                     | 787     | - | -       | 831   | -       | -     | -       | - |
| Stage 2                     | 826     | - | -       | 656   | -       | -     | -       | - |
| Mov Capacity-1 Maneuver     | -       | - | 826     | -     | -       | 871   | -       | - |
| Mov Capacity-2 Maneuver     | -       | - | -       | -     | -       | -     | -       | - |
| Stage 1                     | 787     | - | -       | 831   | -       | -     | -       | - |
| Stage 2                     | 815.7   | - | -       | 421.2 | -       | -     | -       | - |

| Approach              | EB    | WB  | NB | SB |
|-----------------------|-------|-----|----|----|
| HCM Control Delay (s) | 4.373 | 4.1 | 0  | 0  |
| HCM LOS               | A     | A   | A  | A  |

| Lane                            | NBT | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBT |
|---------------------------------|-----|-------|-------|-------|-------|-----|
| Capacity (vph)                  |     | -     | 826   | -     | 871   |     |
| HCM Control Delay (s)           |     | -     | 11.8  | -     | 9.2   | -   |
| HCM Lane VC Ratio               |     | 0     | 0.358 | -     | 0.012 | 0   |
| HCM Lane LOS                    |     | -     | B     | -     | A     | -   |
| HCM 95th Percentile Queue (veh) |     | 0     | 1.632 | -     | 0.038 | 0   |

# HCM Signalized Intersection Capacity Analysis

## 8: Dreher Ave/School Drive & Main Street

3/11/2015



| Movement               | EBL  | EBT  | EBR  | WBL   | WBT  | WBR  | NBL  | NBT  | NBR  | SBL   | SBT  | SBR  |
|------------------------|------|------|------|-------|------|------|------|------|------|-------|------|------|
| Lane Configurations    |      |      |      |       |      |      |      |      |      |       |      |      |
| Volume (vph)           | 57   | 399  | 64   | 256   | 559  | 107  | 42   | 32   | 158  | 116   | 32   | 60   |
| Ideal Flow (vphpl)     | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 |
| Lane Width             | 11   | 14   | 12   | 11    | 12   | 14   | 12   | 14   | 16   | 14    | 14   | 12   |
| Grade (%)              |      | -1%  |      |       | 0%   |      |      | 1%   |      |       |      | 1%   |
| Total Lost time (s)    | 5.0  | 5.0  |      | 5.0   | 5.0  | 7.0  | 4.0  | 4.0  |      | 6.0   | 6.0  |      |
| Lane Util. Factor      | 1.00 | 1.00 |      | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 |      | 1.00  | 1.00 |      |
| Frt                    | 1.00 | 0.98 |      | 1.00  | 1.00 | 0.85 | 1.00 | 0.87 |      | 1.00  | 0.90 |      |
| Flt Protected          | 0.95 | 1.00 |      | 0.95  | 1.00 | 1.00 | 0.95 | 1.00 |      | 0.95  | 1.00 |      |
| Satd. Flow (prot)      | 1337 | 1706 |      | 1525  | 1613 | 1397 | 1483 | 1521 |      | 1567  | 1489 |      |
| Flt Permitted          | 0.31 | 1.00 |      | 0.14  | 1.00 | 1.00 | 0.67 | 1.00 |      | 0.35  | 1.00 |      |
| Satd. Flow (perm)      | 435  | 1706 |      | 220   | 1613 | 1397 | 1053 | 1521 |      | 583   | 1489 |      |
| Peak-hour factor, PHF  | 0.92 | 0.86 | 0.92 | 0.91  | 0.92 | 0.92 | 0.81 | 0.92 | 0.77 | 0.92  | 0.92 | 0.92 |
| Adj. Flow (vph)        | 62   | 464  | 70   | 281   | 608  | 116  | 52   | 35   | 205  | 126   | 35   | 65   |
| RTOR Reduction (vph)   | 0    | 4    | 0    | 0     | 0    | 43   | 0    | 142  | 0    | 0     | 45   | 0    |
| Lane Group Flow (vph)  | 62   | 530  | 0    | 281   | 608  | 73   | 52   | 98   | 0    | 126   | 55   | 0    |
| Heavy Vehicles (%)     | 18%  | 4%   | 14%  | 3%    | 6%   | 11%  | 9%   | 10%  | 3%   | 10%   | 10%  | 10%  |
| Turn Type              | Perm | NA   |      | pm+pt | NA   | Perm | Perm | NA   |      | Perm  | NA   |      |
| Protected Phases       |      | 2    |      | 1     | 6    |      |      | 8    |      |       | 4    |      |
| Permitted Phases       | 2    |      |      | 6     |      | 6    | 8    |      |      | 4     |      |      |
| Actuated Green, G (s)  | 51.0 | 51.0 |      | 70.3  | 70.3 | 70.3 | 32.7 | 32.7 |      | 32.7  | 32.7 |      |
| Effective Green, g (s) | 53.0 | 53.0 |      | 72.3  | 72.3 | 70.3 | 34.7 | 34.7 |      | 32.7  | 32.7 |      |
| Actuated g/C Ratio     | 0.35 | 0.35 |      | 0.48  | 0.48 | 0.47 | 0.23 | 0.23 |      | 0.22  | 0.22 |      |
| Clearance Time (s)     | 7.0  | 7.0  |      | 7.0   | 7.0  | 7.0  | 6.0  | 6.0  |      | 6.0   | 6.0  |      |
| Vehicle Extension (s)  | 3.0  | 3.0  |      | 3.0   | 3.0  | 3.0  | 3.0  | 3.0  |      | 3.0   | 3.0  |      |
| Lane Grp Cap (vph)     | 154  | 603  |      | 230   | 777  | 655  | 244  | 352  |      | 127   | 325  |      |
| v/s Ratio Prot         |      | 0.31 |      | c0.12 | 0.38 |      |      | 0.06 |      |       | 0.04 |      |
| v/s Ratio Perm         | 0.14 |      |      | c0.47 |      | 0.05 | 0.05 |      |      | c0.22 |      |      |
| v/c Ratio              | 0.40 | 0.88 |      | 1.22  | 0.78 | 0.11 | 0.21 | 0.28 |      | 0.99  | 0.17 |      |
| Uniform Delay, d1      | 36.6 | 45.5 |      | 33.3  | 32.3 | 22.3 | 46.6 | 47.4 |      | 58.5  | 47.6 |      |
| Progression Factor     | 1.00 | 1.00 |      | 1.92  | 0.87 | 1.28 | 1.00 | 1.00 |      | 1.00  | 1.00 |      |
| Incremental Delay, d2  | 7.7  | 16.6 |      | 130.4 | 7.2  | 0.3  | 0.4  | 0.4  |      | 77.2  | 0.2  |      |
| Delay (s)              | 44.2 | 62.1 |      | 194.5 | 35.4 | 28.9 | 47.1 | 47.8 |      | 135.7 | 47.9 |      |
| Level of Service       | D    | E    |      | F     | D    | C    | D    | D    |      | F     | D    |      |
| Approach Delay (s)     |      | 60.3 |      |       | 79.1 |      |      | 47.7 |      |       | 96.8 |      |
| Approach LOS           |      | E    |      |       | E    |      |      | D    |      |       | F    |      |

### Intersection Summary

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 71.4  | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 1.12  |                      |      |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s) | 45.0 |
| Intersection Capacity Utilization | 79.9% | ICU Level of Service | D    |
| Analysis Period (min)             | 15    |                      |      |

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 9: 9th St & Main Street

3/11/2015



| Movement               | EBL   | EBT    | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL   | SBT   | SBR  |
|------------------------|-------|--------|------|------|------|------|------|------|------|-------|-------|------|
| Lane Configurations    |       | ↔↔     |      |      | ↔    | ↔    |      | ↔    |      | ↔     | ↔     | ↔    |
| Volume (vph)           | 177   | 383    | 7    | 2    | 405  | 161  | 43   | 74   | 63   | 301   | 8     | 35   |
| Ideal Flow (vphpl)     | 1900  | 1900   | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 |
| Lane Width             | 11    | 11     | 12   | 11   | 11   | 12   | 11   | 11   | 11   | 10    | 10    | 10   |
| Grade (%)              |       | 4%     |      |      | 1%   |      |      | 5%   |      |       |       | -2%  |
| Total Lost time (s)    |       | 4.0    |      |      | 4.0  | 4.0  |      | 4.0  |      | 4.0   | 4.0   |      |
| Lane Util. Factor      |       | 0.95   |      |      | 1.00 | 1.00 |      | 1.00 |      | 1.00  | 1.00  |      |
| Frt                    |       | 1.00   |      |      | 1.00 | 0.85 |      | 0.95 |      | 1.00  | 0.87  |      |
| Flt Protected          |       | 0.98   |      |      | 1.00 | 1.00 |      | 0.99 |      | 0.95  | 1.00  |      |
| Satd. Flow (prot)      |       | 2712   |      |      | 1597 | 1252 |      | 1495 |      | 1516  | 1377  |      |
| Flt Permitted          |       | 0.54   |      |      | 0.99 | 1.00 |      | 0.92 |      | 0.50  | 1.00  |      |
| Satd. Flow (perm)      |       | 1488   |      |      | 1589 | 1252 |      | 1390 |      | 805   | 1377  |      |
| Peak-hour factor, PHF  | 0.57  | 0.85   | 0.35 | 0.50 | 0.81 | 0.77 | 0.77 | 0.64 | 0.72 | 0.91  | 1.00  | 0.55 |
| Adj. Flow (vph)        | 311   | 451    | 20   | 4    | 500  | 209  | 56   | 116  | 88   | 331   | 8     | 64   |
| RTOR Reduction (vph)   | 0     | 0      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    |
| Lane Group Flow (vph)  | 0     | 782    | 0    | 0    | 504  | 209  | 0    | 260  | 0    | 331   | 72    | 0    |
| Heavy Vehicles (%)     | 9%    | 3%     | 0%   | 0%   | 3%   | 4%   | 2%   | 3%   | 0%   | 1%    | 13%   | 0%   |
| Parking (#/hr)         |       | 0      | 0    |      |      | 0    |      |      |      |       |       |      |
| Turn Type              | pm+pt | NA     |      | Perm | NA   | Perm | Perm | NA   |      | Perm  | NA    |      |
| Protected Phases       | 5     | 2      |      |      | 6    |      |      | 8    |      |       |       | 4    |
| Permitted Phases       | 2     |        |      | 6    |      | 6    | 8    |      |      | 4     |       |      |
| Actuated Green, G (s)  |       | 63.5   |      |      | 63.5 | 63.5 |      | 52.0 |      | 52.0  | 52.0  |      |
| Effective Green, g (s) |       | 64.0   |      |      | 64.0 | 64.0 |      | 54.0 |      | 54.0  | 54.0  |      |
| Actuated g/C Ratio     |       | 0.43   |      |      | 0.43 | 0.43 |      | 0.36 |      | 0.36  | 0.36  |      |
| Clearance Time (s)     |       | 4.5    |      |      | 4.5  | 4.5  |      | 6.0  |      | 6.0   | 6.0   |      |
| Vehicle Extension (s)  |       | 3.0    |      |      | 3.0  | 3.0  |      | 3.0  |      | 3.0   | 3.0   |      |
| Lane Grp Cap (vph)     |       | 635    |      |      | 678  | 534  |      | 500  |      | 290   | 496   |      |
| v/s Ratio Prot         |       |        |      |      |      |      |      |      |      |       |       | 0.05 |
| v/s Ratio Perm         |       | c0.53  |      |      | 0.32 | 0.17 |      | 0.19 |      | c0.41 |       |      |
| v/c Ratio              |       | 2.12dl |      |      | 0.74 | 0.39 |      | 0.52 |      | 1.14  | 0.15  |      |
| Uniform Delay, d1      |       | 43.0   |      |      | 36.1 | 29.6 |      | 37.8 |      | 48.0  | 32.4  |      |
| Progression Factor     |       | 0.76   |      |      | 0.79 | 0.81 |      | 1.00 |      | 1.00  | 1.00  |      |
| Incremental Delay, d2  |       | 112.4  |      |      | 6.6  | 2.0  |      | 1.0  |      | 96.6  | 0.1   |      |
| Delay (s)              |       | 145.2  |      |      | 35.1 | 25.8 |      | 38.8 |      | 144.6 | 32.5  |      |
| Level of Service       |       | F      |      |      | D    | C    |      | D    |      | F     | C     |      |
| Approach Delay (s)     |       | 145.2  |      |      | 32.4 |      |      | 38.8 |      |       | 124.6 |      |
| Approach LOS           |       | F      |      |      | C    |      |      | D    |      |       | F     |      |

### Intersection Summary

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 91.2  | HCM Level of Service | F    |
| HCM Volume to Capacity ratio      | 1.19  |                      |      |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s) | 32.0 |
| Intersection Capacity Utilization | 84.6% | ICU Level of Service | E    |
| Analysis Period (min)             | 15    |                      |      |

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 10: 8th St & Main Street/Main Street

3/11/2015



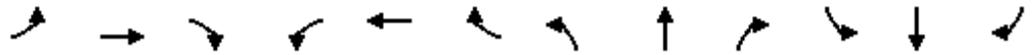
| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations    |      | ↕↕   |      |      | ↕↕   |      |      | ↕↕   |      |      | ↕↕   |      |
| Volume (vph)           | 44   | 539  | 22   | 6    | 351  | 8    | 65   | 76   | 35   | 43   | 19   | 68   |
| Ideal Flow (vphpl)     | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width             | 11   | 11   | 11   | 13   | 13   | 13   | 10   | 10   | 10   | 10   | 10   | 10   |
| Grade (%)              |      | 0%   |      |      | 0%   |      |      | 1%   |      |      | -1%  |      |
| Total Lost time (s)    |      | 2.5  |      |      | 2.5  |      |      | 3.5  |      |      | 3.5  |      |
| Lane Util. Factor      |      | 0.95 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00 |      |
| Frt                    |      | 0.99 |      |      | 1.00 |      |      | 0.97 |      |      | 0.93 |      |
| Flt Protected          |      | 1.00 |      |      | 1.00 |      |      | 0.98 |      |      | 0.98 |      |
| Satd. Flow (prot)      |      | 3502 |      |      | 1772 |      |      | 1760 |      |      | 1624 |      |
| Flt Permitted          |      | 0.88 |      |      | 0.98 |      |      | 0.83 |      |      | 0.82 |      |
| Satd. Flow (perm)      |      | 3021 |      |      | 1733 |      |      | 1405 |      |      | 1397 |      |
| Peak-hour factor, PHF  | 0.73 | 0.93 | 0.69 | 0.50 | 0.86 | 0.67 | 0.90 | 0.79 | 0.67 | 0.77 | 0.68 | 0.77 |
| Adj. Flow (vph)        | 60   | 580  | 32   | 12   | 408  | 12   | 72   | 96   | 52   | 56   | 28   | 88   |
| RTOR Reduction (vph)   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Group Flow (vph)  | 0    | 672  | 0    | 0    | 432  | 0    | 0    | 220  | 0    | 0    | 172  | 0    |
| Heavy Vehicles (%)     | 7%   | 2%   | 5%   | 0%   | 1%   | 0%   | 3%   | 0%   | 3%   | 2%   | 0%   | 2%   |
| Parking (#/hr)         |      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Turn Type              | Perm | NA   |      |
| Protected Phases       |      | 2    |      |      | 6    |      |      | 8    |      |      | 4    |      |
| Permitted Phases       | 2    |      |      | 6    |      |      | 8    |      |      | 4    |      |      |
| Actuated Green, G (s)  |      | 28.9 |      |      | 28.9 |      |      | 16.1 |      |      | 16.1 |      |
| Effective Green, g (s) |      | 30.9 |      |      | 30.9 |      |      | 18.1 |      |      | 18.1 |      |
| Actuated g/C Ratio     |      | 0.41 |      |      | 0.41 |      |      | 0.24 |      |      | 0.24 |      |
| Clearance Time (s)     |      | 4.5  |      |      | 4.5  |      |      | 5.5  |      |      | 5.5  |      |
| Vehicle Extension (s)  |      | 3.0  |      |      | 3.0  |      |      | 3.0  |      |      | 3.0  |      |
| Lane Grp Cap (vph)     |      | 1245 |      |      | 714  |      |      | 339  |      |      | 337  |      |
| v/s Ratio Prot         |      |      |      |      |      |      |      |      |      |      |      |      |
| v/s Ratio Perm         |      | 0.22 |      |      | 0.25 |      |      | 0.16 |      |      | 0.12 |      |
| v/c Ratio              |      | 0.54 |      |      | 0.61 |      |      | 0.65 |      |      | 0.51 |      |
| Uniform Delay, d1      |      | 16.7 |      |      | 17.3 |      |      | 25.6 |      |      | 24.6 |      |
| Progression Factor     |      | 0.83 |      |      | 0.89 |      |      | 1.00 |      |      | 1.00 |      |
| Incremental Delay, d2  |      | 0.2  |      |      | 2.1  |      |      | 4.2  |      |      | 1.3  |      |
| Delay (s)              |      | 14.0 |      |      | 17.4 |      |      | 29.8 |      |      | 25.9 |      |
| Level of Service       |      | B    |      |      | B    |      |      | C    |      |      | C    |      |
| Approach Delay (s)     |      | 14.0 |      |      | 17.4 |      |      | 29.8 |      |      | 25.9 |      |
| Approach LOS           |      | B    |      |      | B    |      |      | C    |      |      | C    |      |

### Intersection Summary

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 18.7  | HCM Level of Service | B    |
| HCM Volume to Capacity ratio      | 0.62  |                      |      |
| Actuated Cycle Length (s)         | 75.0  | Sum of lost time (s) | 26.0 |
| Intersection Capacity Utilization | 63.4% | ICU Level of Service | B    |
| Analysis Period (min)             | 15    |                      |      |
| c Critical Lane Group             |       |                      |      |

HCM Signalized Intersection Capacity Analysis  
 11: Seventh St/7th St & Main Street /Main Street

3/26/2015



| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations    |      | ↕↕   |      |      | ↕↕   |      |      | ↕↕   |      |      | ↕↕   |      |
| Volume (vph)           | 23   | 411  | 30   | 4    | 250  | 22   | 107  | 136  | 113  | 31   | 26   | 28   |
| Ideal Flow (vphpl)     | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width             | 11   | 11   | 11   | 13   | 13   | 13   | 14   | 14   | 14   | 11   | 11   | 11   |
| Grade (%)              |      | -1%  |      |      | 2%   |      |      | 4%   |      |      | -1%  |      |
| Total Lost time (s)    |      | 3.0  |      |      | 3.0  |      |      | 3.0  |      |      | 3.0  |      |
| Lane Util. Factor      |      | 0.95 |      |      | 1.00 |      |      | 1.00 |      |      | 1.00 |      |
| Frt                    |      | 0.99 |      |      | 0.98 |      |      | 0.96 |      |      | 0.95 |      |
| Flt Protected          |      | 1.00 |      |      | 1.00 |      |      | 0.98 |      |      | 0.98 |      |
| Satd. Flow (prot)      |      | 2884 |      |      | 1534 |      |      | 1631 |      |      | 1393 |      |
| Flt Permitted          |      | 0.92 |      |      | 0.99 |      |      | 0.81 |      |      | 0.64 |      |
| Satd. Flow (perm)      |      | 2654 |      |      | 1525 |      |      | 1342 |      |      | 917  |      |
| Peak-hour factor, PHF  | 0.82 | 0.79 | 0.81 | 0.75 | 0.74 | 0.46 | 0.59 | 0.72 | 0.79 | 0.48 | 0.86 | 0.58 |
| Adj. Flow (vph)        | 28   | 520  | 37   | 5    | 338  | 48   | 181  | 189  | 143  | 65   | 30   | 48   |
| RTOR Reduction (vph)   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lane Group Flow (vph)  | 0    | 585  | 0    | 0    | 391  | 0    | 0    | 513  | 0    | 0    | 143  | 0    |
| Heavy Vehicles (%)     | 0%   | 3%   | 1%   | 0%   | 1%   | 0%   | 4%   | 3%   | 4%   | 0%   | 1%   | 0%   |
| Parking (#/hr)         |      | 0    | 0    | 0    | 0    | 0    |      |      |      | 0    | 0    | 0    |
| Turn Type              | Perm | NA   |      |
| Protected Phases       |      | 2    |      |      | 6    |      |      | 8    |      |      | 4    |      |
| Permitted Phases       | 2    |      |      | 6    |      |      | 8    |      |      | 4    |      |      |
| Actuated Green, G (s)  |      | 67.0 |      |      | 67.0 |      |      | 51.0 |      |      | 51.0 |      |
| Effective Green, g (s) |      | 69.0 |      |      | 69.0 |      |      | 53.0 |      |      | 53.0 |      |
| Actuated g/C Ratio     |      | 0.46 |      |      | 0.46 |      |      | 0.35 |      |      | 0.35 |      |
| Clearance Time (s)     |      | 5.0  |      |      | 5.0  |      |      | 5.0  |      |      | 5.0  |      |
| Vehicle Extension (s)  |      | 3.0  |      |      | 3.0  |      |      | 3.0  |      |      | 3.0  |      |
| Lane Grp Cap (vph)     |      | 1221 |      |      | 702  |      |      | 474  |      |      | 324  |      |
| v/s Ratio Prot         |      |      |      |      |      |      |      |      |      |      |      |      |
| v/s Ratio Perm         |      | 0.22 |      |      | 0.26 |      |      | 0.38 |      |      | 0.16 |      |
| v/c Ratio              |      | 0.48 |      |      | 0.56 |      |      | 1.08 |      |      | 0.44 |      |
| Uniform Delay, d1      |      | 28.1 |      |      | 29.4 |      |      | 48.5 |      |      | 37.2 |      |
| Progression Factor     |      | 0.61 |      |      | 0.66 |      |      | 0.64 |      |      | 1.00 |      |
| Incremental Delay, d2  |      | 1.2  |      |      | 3.0  |      |      | 62.1 |      |      | 1.0  |      |
| Delay (s)              |      | 18.3 |      |      | 22.4 |      |      | 93.4 |      |      | 38.1 |      |
| Level of Service       |      | B    |      |      | C    |      |      | F    |      |      | D    |      |
| Approach Delay (s)     |      | 18.3 |      |      | 22.4 |      |      | 93.4 |      |      | 38.1 |      |
| Approach LOS           |      | B    |      |      | C    |      |      | F    |      |      | D    |      |

| Intersection Summary              |       |                      |
|-----------------------------------|-------|----------------------|
| HCM Average Control Delay         | 44.6  | HCM Level of Service |
| HCM Volume to Capacity ratio      | 0.79  | D                    |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 60.3% | 28.0                 |
| Analysis Period (min)             | 15    | ICU Level of Service |
| c Critical Lane Group             |       | B                    |

# HCM Signalized Intersection Capacity Analysis

## 12: Seventh St & Ann St

3/26/2015



| Movement                          | EBL  | EBT  | EBR   | WBL  | WBT                  | WBR  | NBL   | NBT  | NBR  | SBL  | SBT  | SBR  |  |
|-----------------------------------|------|------|-------|------|----------------------|------|-------|------|------|------|------|------|--|
| Lane Configurations               |      |      |       |      | ↕                    |      |       | ↕    |      |      | ↕    |      |  |
| Volume (vph)                      | 0    | 0    | 0     | 44   | 230                  | 33   | 148   | 340  | 0    | 0    | 168  | 64   |  |
| Ideal Flow (vphpl)                | 1900 | 1900 | 1900  | 1900 | 1900                 | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 |  |
| Lane Width                        | 12   | 12   | 12    | 16   | 16                   | 16   | 16    | 16   | 16   | 10   | 10   | 10   |  |
| Grade (%)                         |      | 0%   |       |      | 2%                   |      |       | -5%  |      |      | 0%   |      |  |
| Total Lost time (s)               |      |      |       |      | 4.0                  |      |       | 4.5  |      |      | 4.5  |      |  |
| Lane Util. Factor                 |      |      |       |      | 1.00                 |      |       | 1.00 |      |      | 1.00 |      |  |
| Frt                               |      |      |       |      | 0.98                 |      |       | 1.00 |      |      | 0.96 |      |  |
| Flt Protected                     |      |      |       |      | 0.99                 |      |       | 0.99 |      |      | 1.00 |      |  |
| Satd. Flow (prot)                 |      |      |       |      | 1849                 |      |       | 2138 |      |      | 1516 |      |  |
| Flt Permitted                     |      |      |       |      | 0.99                 |      |       | 0.72 |      |      | 1.00 |      |  |
| Satd. Flow (perm)                 |      |      |       |      | 1849                 |      |       | 1555 |      |      | 1516 |      |  |
| Peak-hour factor, PHF             | 0.92 | 0.92 | 0.92  | 0.52 | 0.82                 | 0.69 | 0.82  | 0.80 | 0.92 | 0.92 | 0.91 | 0.73 |  |
| Adj. Flow (vph)                   | 0    | 0    | 0     | 85   | 280                  | 48   | 180   | 425  | 0    | 0    | 185  | 88   |  |
| RTOR Reduction (vph)              | 0    | 0    | 0     | 0    | 3                    | 0    | 0     | 0    | 0    | 0    | 13   | 0    |  |
| Lane Group Flow (vph)             | 0    | 0    | 0     | 0    | 410                  | 0    | 0     | 605  | 0    | 0    | 260  | 0    |  |
| Heavy Vehicles (%)                | 0%   | 0%   | 0%    | 2%   | 1%                   | 0%   | 1%    | 2%   | 0%   | 0%   | 1%   | 0%   |  |
| Parking (#/hr)                    |      |      |       | 0    | 0                    | 0    |       |      |      |      | 0    | 0    |  |
| Turn Type                         |      |      |       | Perm | NA                   |      | pm+pt | NA   |      |      | NA   |      |  |
| Protected Phases                  |      |      |       |      | 6                    |      | 3     | 8    |      |      | 4    |      |  |
| Permitted Phases                  |      |      |       | 6    |                      |      | 8     |      |      |      |      |      |  |
| Actuated Green, G (s)             |      |      |       |      | 62.3                 |      |       | 77.2 |      |      | 77.2 |      |  |
| Effective Green, g (s)            |      |      |       |      | 63.3                 |      |       | 78.2 |      |      | 78.2 |      |  |
| Actuated g/C Ratio                |      |      |       |      | 0.42                 |      |       | 0.52 |      |      | 0.52 |      |  |
| Clearance Time (s)                |      |      |       |      | 5.0                  |      |       | 5.5  |      |      | 5.5  |      |  |
| Vehicle Extension (s)             |      |      |       |      | 3.0                  |      |       | 3.0  |      |      | 3.0  |      |  |
| Lane Grp Cap (vph)                |      |      |       |      | 780                  |      |       | 811  |      |      | 790  |      |  |
| v/s Ratio Prot                    |      |      |       |      |                      |      |       |      |      |      | 0.17 |      |  |
| v/s Ratio Perm                    |      |      |       |      | 0.22                 |      |       | 0.39 |      |      |      |      |  |
| v/c Ratio                         |      |      |       |      | 0.53                 |      |       | 0.75 |      |      | 0.33 |      |  |
| Uniform Delay, d1                 |      |      |       |      | 32.2                 |      |       | 28.1 |      |      | 20.7 |      |  |
| Progression Factor                |      |      |       |      | 1.00                 |      |       | 1.00 |      |      | 0.85 |      |  |
| Incremental Delay, d2             |      |      |       |      | 2.5                  |      |       | 3.8  |      |      | 0.2  |      |  |
| Delay (s)                         |      |      |       |      | 34.7                 |      |       | 31.9 |      |      | 17.9 |      |  |
| Level of Service                  |      |      |       |      | C                    |      |       | C    |      |      | B    |      |  |
| Approach Delay (s)                |      | 0.0  |       |      | 34.7                 |      |       | 31.9 |      |      | 17.9 |      |  |
| Approach LOS                      |      | A    |       |      | C                    |      |       | C    |      |      | B    |      |  |
| <b>Intersection Summary</b>       |      |      |       |      |                      |      |       |      |      |      |      |      |  |
| HCM Average Control Delay         |      |      | 29.8  |      | HCM Level of Service |      |       |      |      |      | C    |      |  |
| HCM Volume to Capacity ratio      |      |      | 0.65  |      |                      |      |       |      |      |      |      |      |  |
| Actuated Cycle Length (s)         |      |      | 150.0 |      | Sum of lost time (s) |      |       |      |      | 8.5  |      |      |  |
| Intersection Capacity Utilization |      |      | 66.2% |      | ICU Level of Service |      |       |      |      | C    |      |      |  |
| Analysis Period (min)             |      |      | 15    |      |                      |      |       |      |      |      |      |      |  |
| c Critical Lane Group             |      |      |       |      |                      |      |       |      |      |      |      |      |  |

# HCM Signalized Intersection Capacity Analysis

## 13: 6th St & Main Street

3/26/2015



| Movement                          | EBL  | EBT   | EBR   | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR                  |      |
|-----------------------------------|------|-------|-------|------|------|------|------|------|------|------|------|----------------------|------|
| Lane Configurations               |      | ↕↕    |       |      | ↕    |      |      | ↕    |      |      |      |                      |      |
| Volume (vph)                      | 27   | 548   | 19    | 15   | 245  | 34   | 44   | 65   | 61   | 0    | 0    | 0                    |      |
| Ideal Flow (vphpl)                | 1900 | 1900  | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900                 |      |
| Lane Width                        | 11   | 11    | 11    | 16   | 16   | 16   | 11   | 11   | 11   | 12   | 12   | 12                   |      |
| Grade (%)                         |      | -1%   |       |      | 2%   |      |      | -1%  |      |      | 0%   |                      |      |
| Total Lost time (s)               |      | 4.0   |       |      | 4.0  |      |      | 4.0  |      |      |      |                      |      |
| Lane Util. Factor                 |      | 0.95  |       |      | 1.00 |      |      | 1.00 |      |      |      |                      |      |
| Frt                               |      | 0.99  |       |      | 0.98 |      |      | 0.95 |      |      |      |                      |      |
| Flt Protected                     |      | 1.00  |       |      | 1.00 |      |      | 0.99 |      |      |      |                      |      |
| Satd. Flow (prot)                 |      | 2944  |       |      | 1677 |      |      | 1554 |      |      |      |                      |      |
| Flt Permitted                     |      | 0.90  |       |      | 0.93 |      |      | 0.99 |      |      |      |                      |      |
| Satd. Flow (perm)                 |      | 2654  |       |      | 1570 |      |      | 1554 |      |      |      |                      |      |
| Peak-hour factor, PHF             | 0.61 | 0.90  | 0.68  | 0.63 | 0.83 | 0.71 | 0.79 | 0.68 | 0.80 | 0.92 | 0.92 | 0.92                 |      |
| Adj. Flow (vph)                   | 44   | 609   | 28    | 24   | 295  | 48   | 56   | 96   | 76   | 0    | 0    | 0                    |      |
| RTOR Reduction (vph)              | 0    | 1     | 0     | 0    | 3    | 0    | 0    | 0    | 0    | 0    | 0    | 0                    |      |
| Lane Group Flow (vph)             | 0    | 680   | 0     | 0    | 364  | 0    | 0    | 228  | 0    | 0    | 0    | 0                    |      |
| Heavy Vehicles (%)                | 0%   | 1%    | 0%    | 0%   | 1%   | 0%   | 0%   | 2%   | 0%   | 0%   | 0%   | 0%                   |      |
| Parking (#/hr)                    |      | 0     | 0     | 0    | 0    | 0    |      |      |      |      |      |                      |      |
| Turn Type                         | Perm | NA    |       | Perm | NA   |      | Perm | NA   |      |      |      |                      |      |
| Protected Phases                  |      | 2     |       |      | 6    |      |      | 4    |      |      |      |                      |      |
| Permitted Phases                  | 2    |       |       | 6    |      |      | 4    |      |      |      |      |                      |      |
| Actuated Green, G (s)             |      | 93.4  |       |      | 93.4 |      |      | 27.6 |      |      |      |                      |      |
| Effective Green, g (s)            |      | 94.4  |       |      | 94.4 |      |      | 28.6 |      |      |      |                      |      |
| Actuated g/C Ratio                |      | 0.63  |       |      | 0.63 |      |      | 0.19 |      |      |      |                      |      |
| Clearance Time (s)                |      | 5.0   |       |      | 5.0  |      |      | 5.0  |      |      |      |                      |      |
| Vehicle Extension (s)             |      | 3.0   |       |      | 3.0  |      |      | 3.0  |      |      |      |                      |      |
| Lane Grp Cap (vph)                |      | 1670  |       |      | 988  |      |      | 296  |      |      |      |                      |      |
| v/s Ratio Prot                    |      |       |       |      |      |      |      |      |      |      |      |                      |      |
| v/s Ratio Perm                    |      | c0.26 |       |      | 0.23 |      |      | 0.15 |      |      |      |                      |      |
| v/c Ratio                         |      | 0.41  |       |      | 0.37 |      |      | 0.77 |      |      |      |                      |      |
| Uniform Delay, d1                 |      | 13.9  |       |      | 13.4 |      |      | 57.6 |      |      |      |                      |      |
| Progression Factor                |      | 0.54  |       |      | 1.02 |      |      | 1.00 |      |      |      |                      |      |
| Incremental Delay, d2             |      | 0.6   |       |      | 1.0  |      |      | 11.7 |      |      |      |                      |      |
| Delay (s)                         |      | 8.1   |       |      | 14.7 |      |      | 69.3 |      |      |      |                      |      |
| Level of Service                  |      | A     |       |      | B    |      |      | E    |      |      |      |                      |      |
| Approach Delay (s)                |      | 8.1   |       |      | 14.7 |      |      | 69.3 |      |      | 0.0  |                      |      |
| Approach LOS                      |      | A     |       |      | B    |      |      | E    |      |      | A    |                      |      |
| <b>Intersection Summary</b>       |      |       |       |      |      |      |      |      |      |      |      |                      |      |
| HCM Average Control Delay         |      |       | 20.9  |      |      |      |      |      |      |      |      | HCM Level of Service | C    |
| HCM Volume to Capacity ratio      |      |       | 0.49  |      |      |      |      |      |      |      |      |                      |      |
| Actuated Cycle Length (s)         |      |       | 150.0 |      |      |      |      |      |      |      |      | Sum of lost time (s) | 27.0 |
| Intersection Capacity Utilization |      |       | 47.8% |      |      |      |      |      |      |      |      | ICU Level of Service | A    |
| Analysis Period (min)             |      |       | 15    |      |      |      |      |      |      |      |      |                      |      |
| c Critical Lane Group             |      |       |       |      |      |      |      |      |      |      |      |                      |      |

# HCM Signalized Intersection Capacity Analysis

## 14: Ann St & Broad St/5th St & Main Street

3/11/2015



| Movement               | EBT   | EBR  | NBL2   | NBR    | SBL   | SBT  | SBR2   |
|------------------------|-------|------|--------|--------|-------|------|--------|
| Lane Configurations    | ↑↑    |      | ↙      | ↘      | ↙     | ↑    | ↘      |
| Volume (vph)           | 534   | 84   | 267    | 601    | 78    | 639  | 348    |
| Ideal Flow (vphpl)     | 1900  | 1900 | 1900   | 1900   | 1900  | 1900 | 1900   |
| Lane Width             | 11    | 11   | 10     | 11     | 10    | 10   | 11     |
| Grade (%)              | -5%   |      |        |        |       | 2%   |        |
| Total Lost time (s)    | 4.5   |      | 6.5    | 4.0    | 4.0   | 4.0  | 6.5    |
| Lane Util. Factor      | 0.95  |      | 1.00   | 1.00   | 1.00  | 1.00 | 1.00   |
| Frt                    | 0.98  |      | 1.00   | 0.85   | 1.00  | 1.00 | 0.85   |
| Flt Protected          | 1.00  |      | 0.95   | 1.00   | 0.95  | 1.00 | 1.00   |
| Satd. Flow (prot)      | 3372  |      | 1509   | 1398   | 1752  | 1793 | 1377   |
| Flt Permitted          | 1.00  |      | 0.07   | 1.00   | 0.95  | 1.00 | 1.00   |
| Satd. Flow (perm)      | 3372  |      | 105    | 1398   | 1752  | 1792 | 1377   |
| Peak-hour factor, PHF  | 0.92  | 0.91 | 0.91   | 0.96   | 0.81  | 0.95 | 0.91   |
| Adj. Flow (vph)        | 580   | 92   | 293    | 626    | 96    | 673  | 382    |
| RTOR Reduction (vph)   | 0     | 0    | 0      | 0      | 0     | 0    | 146    |
| Lane Group Flow (vph)  | 672   | 0    | 293    | 626    | 96    | 673  | 236    |
| Heavy Vehicles (%)     | 0%    | 0%   | 1%     | 1%     | 3%    | 2%   | 1%     |
| Turn Type              | NA    |      | custom | custom | pm+pt | NA   | custom |
| Protected Phases       | 8     |      | 1      | 6      | 5     | 2    |        |
| Permitted Phases       |       |      | 6      |        | 2     |      | 2 8    |
| Actuated Green, G (s)  | 32.2  |      | 82.3   | 70.5   | 59.3  | 54.0 | 92.7   |
| Effective Green, g (s) | 34.7  |      | 82.3   | 73.0   | 64.3  | 56.5 | 92.7   |
| Actuated g/C Ratio     | 0.23  |      | 0.55   | 0.49   | 0.43  | 0.38 | 0.62   |
| Clearance Time (s)     | 7.0   |      | 6.5    | 6.5    | 6.5   | 6.5  |        |
| Vehicle Extension (s)  | 3.0   |      | 3.0    | 3.0    | 3.0   | 3.0  |        |
| Lane Grp Cap (vph)     | 780   |      | 262    | 680    | 751   | 675  | 851    |
| v/s Ratio Prot         | c0.20 |      | c0.16  | 0.45   | 0.01  | 0.38 |        |
| v/s Ratio Perm         |       |      | c0.45  |        | 0.05  |      | 0.17   |
| v/c Ratio              | 0.86  |      | 1.12   | 0.92   | 0.13  | 1.00 | 0.28   |
| Uniform Delay, d1      | 55.3  |      | 51.1   | 35.8   | 25.9  | 46.7 | 13.2   |
| Progression Factor     | 0.64  |      | 1.00   | 1.00   | 0.92  | 0.94 | 0.91   |
| Incremental Delay, d2  | 9.0   |      | 91.2   | 17.8   | 0.1   | 31.4 | 0.2    |
| Delay (s)              | 44.5  |      | 142.3  | 53.7   | 23.9  | 75.4 | 12.1   |
| Level of Service       | D     |      | F      | D      | C     | E    | B      |
| Approach Delay (s)     | 44.5  |      |        |        |       | 50.1 |        |
| Approach LOS           | D     |      |        |        |       | D    |        |

### Intersection Summary

|                                   |       |                      |      |
|-----------------------------------|-------|----------------------|------|
| HCM Average Control Delay         | 59.4  | HCM Level of Service | E    |
| HCM Volume to Capacity ratio      | 1.01  |                      |      |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s) | 33.0 |
| Intersection Capacity Utilization | 83.6% | ICU Level of Service | E    |
| Analysis Period (min)             | 15    |                      |      |

c Critical Lane Group

# HCM 2010 Signalized Intersection Capacity Analysis

## 24: 5th St & Sarah St

3/11/2015

|                                       |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations                   |   |  |   |   |  |  |  |  |   |   |  |   |
| Volume (vph)                          | 135   | 82  | 118   | 2   | 245   | 209   | 26   | 85  | 2   | 18  | 484   | 102   |
| Movement Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Queue, veh                    | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj. Factor (A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking, Bus Adj. Factors             | 1.00  | 1.00  | 0.90  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj. Sat. Flow Rate, veh/h/ln         | 1832  | 1832  | 1832  | 1650  | 1650  | 1650  | 1590   | 1590  | 1590  | 1849  | 1849  | 1849  |
| Lanes                                 | 0   | 1   | 0   | 0   | 1   | 1   | 0  | 1   | 0   | 0   | 1   | 0   |
| Lane Assignment                       |   |   |   |   |   |   |  |   |   |   |   |   |
| Capacity, veh/h                       | 0   | 193   | 257   | 90  | 488   | 421   | 209  | 355   | 12  | 103   | 656   | 155   |
| Proportion Arriving On Green          | 0.00  | 0.30  | 0.30  | 0.30  | 0.30  | 0.30  | 0.47   | 0.47  | 0.47  | 0.47  | 0.47  | 0.47  |
| Movement Delay, s/veh                 | 0.0   | 0.0   | 12.9  | 13.2  | 0.0   | 13.6  | 7.0  | 0.0   | 0.0   | 12.7  | 0.0   | 0.0   |
| Movement LOS                          |   |   | B   | B   |   | B   | A  |   |   | B   |   |   |
| Approach Volume, veh/h                |   | 225   |   |   | 539   |   |  | 152   |   |   | 663   |   |
| Approach Delay, s/veh                 |   | 12.9  |   |   | 13.4  |   |  | 7.0   |   |   | 12.7  |   |
| Approach LOS                          |   | B   |   |   | B   |   |  | A   |   |   | B   |   |
| Timer:                                |   | 1   | 2   | 3   | 4   | 5   | 6  | 7   | 8   |   |   |   |
| Assigned Phase                        |   |   | 2   |   | 4   | 5   | 6  |   | 8   |   |   |   |
| Case No                               |   |   | 4.0   |   | 8.0   | 0.0   | 7.3  |   | 8.0   |   |   |   |
| Phase Duration (G+Y+Rc), s            |   |   | 16.57   |   | 25.27   | 0.00  | 16.57  |   | 25.27   |   |   |   |
| Change Period (Y+Rc), s               |   |   | 5.50  |   | 7.00  | 5.50  | 5.50   |   | 7.00  |   |   |   |
| Max. Allowable Headway (MAH), s       |   |   | 4.23  |   | 9.38  | 0.00  | 4.23   |   | 9.38  |   |   |   |
| Maximum Green Setting (Gmax), s       |   |   | 33.50   |   | 19.00   | 5.00  | 23.00  |   | 19.00   |   |   |   |
| Max. Queue Clearance Time (g_c+I1), s |   |   | 7.17  |   | 15.23   | 0.00  | 8.39   |   | 4.35  |   |   |   |
| Green Extension Time (g_e), s         |   |   | 3.07  |   | 3.04  | 0.00  | 2.68   |   | 10.35   |   |   |   |
| Probability of Phase Call (p_c)       |   |   | 1.000   |   | 1.000   | 0.000   | 1.000  |   | 1.000   |   |   |   |
| Probability of Max Out (p_x)          |   |   | 0.004   |   | 1.000   | 0.000   | 0.071  |   | 0.850   |   |   |   |
| <b>Left-Turn Movement Data</b>        |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   |   |   | 7   | 5   | 1  |   | 3   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   |   |   | 63.14   | 0.00  | 22.09  |   | 309.98  |   |   |   |
| <b>Through Movement Data</b>          |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 2   |   | 4   |   | 6  |   | 8   |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 642.93  |   | 1354.56   |   | 1611.04  |   | 643.81  |   |   |   |
| <b>Right-Turn Movement Data</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   |   | 12  |   | 14  |   | 16   |   | 18  |   |   |   |
| Mvmt. Sat Flow, veh/h                 |   |   | 854.80  |   | 327.24  |   | 1402.63  |   | 25.75   |   |   |   |
| <b>Left Lane Group Data</b>           |   |   |   |   |   |   |  |   |   |   |   |   |
| Assigned Movement                     |   | 0   | 0   | 0   | 7   | 5   | 1  | 0   | 3   |   |   |   |
| Lane Assignment                       |   |   |   |   | L+T+R   |   | L+T  |   | L+T+R   |   |   |   |
| Lanes in Group                        |   | 0   | 0   | 0   | 1   | 0   | 1  | 0   | 1   |   |   |   |
| Group Volume (v), veh/h               |   | 0.0   | 0.0   | 0.0   | 663.3   | 0.0   | 295.7  | 0.0   | 152.1   |   |   |   |
| Group Sat. Flow (s), veh/h/ln         |   | 0.0   | 0.0   | 0.0   | 1744.9  | 0.0   | 1633.1   | 0.0   | 979.5   |   |   |   |
| Queue Serve Time (g_s), s             |   | 0.0   | 0.0   | 0.0   | 2.8   | 0.0   | 0.0  | 0.0   | 0.0   |   |   |   |
| Cycle Queue Clear Time (g_c), s       |   | 0.0   | 0.0   | 0.0   | 13.2  | 0.0   | 6.4  | 0.0   | 2.3   |   |   |   |

**Intersection**

Intersection Delay (sec/veh): 62

| Movement                | NBL  | NBT  | SBT  | SBR  | SEL  | SER  |
|-------------------------|------|------|------|------|------|------|
| Volume (vph)            | 0    | 0    | 793  | 113  | 0    | 604  |
| Conflicting Peds.(#/hr) | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control            | Free | Free | Free | Free | Stop | Stop |
| Right Turn Channelized  | None | None | Free | Free | None | None |
| Storage Length          | 0    |      |      | 0    | 0    | 0    |
| Median Width            |      | 0    | 0    |      | 0    |      |
| Grade (%)               |      | 0%   | 0%   |      | 0%   |      |
| Peak Hour Factor        | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles(%)       | 2    | 2    | 2    | 2    | 2    | 2    |
| Movement Flow Rate      | 0    | 0    | 862  | 123  | 0    | 657  |
| Number of Lanes         | 0    | 0    | 2    | 0    | 0    | 1    |

**Major/Minor Major 2**

|                             |   |   |   |       |
|-----------------------------|---|---|---|-------|
| Conflicting Flow Rate - All | 0 | 0 | - | 492   |
| Stage 1                     | 0 | 0 | - | 0     |
| Stage 2                     | 0 | 0 | - | 0     |
| Follow-up Headway           | 0 | 0 | - | 3.32  |
| Pot Capacity-1 Maneuver     | - | - | - | # 522 |
| Stage 1                     | - | - | - | -     |
| Stage 2                     | - | - | - | -     |
| Mov Capacity-1 Maneuver     | - | - | - | # 522 |
| Mov Capacity-2 Maneuver     | - | - | - | -     |
| Stage 1                     | - | - | - | -     |
| Stage 2                     | - | - | - | -     |

**Approach SB SE**

|                       |   |       |
|-----------------------|---|-------|
| HCM Control Delay (s) | 0 | 155.1 |
| HCM LOS               | A | F     |

**Lane SELn1 SBT SBR**

|                                 |        |   |   |
|---------------------------------|--------|---|---|
| Capacity (vph)                  | 522    |   |   |
| HCM Control Delay (s)           | 155.1  | - | - |
| HCM Lane VC Ratio               | 1.258  | 0 | - |
| HCM Lane LOS                    | F      | - | - |
| HCM 95th Percentile Queue (veh) | 26.209 | 0 | - |

HCM 2010 Signalized Intersection Capacity Analysis  
 24: 5th St & Sarah St

3/11/2015

|                                       |       |       |       |        |       |        |       |       |
|---------------------------------------|-------|-------|-------|--------|-------|--------|-------|-------|
| Perm LT Sat Flow Rate (s_l), veh/h/ln | 0.0   | 0.0   | 0.0   | 726.3  | 0.0   | 622.7  | 0.0   | 513.7 |
| Shared LT Sat Flow (s_sh), veh/h/ln   | 0.0   | 0.0   | 0.0   | 1849.5 | 0.0   | 1650.2 | 0.0   | 786.9 |
| Perm LT Eff. Green (g_p), s           | 0.0   | 0.0   | 0.0   | 19.8   | 0.0   | 12.6   | 0.0   | 19.8  |
| Perm LT Serve Time (g_u), s           | 0.0   | 0.0   | 0.0   | 17.4   | 0.0   | 7.4    | 0.0   | 6.5   |
| Perm LT Que Serve Time (g_ps), s      | 0.0   | 0.0   | 0.0   | 2.8    | 0.0   | 0.0    | 0.0   | 0.0   |
| Time to First Blk (g_f), s            | 0.0   | 0.0   | 0.0   | 10.4   | 0.0   | 7.8    | 0.0   | 4.2   |
| Serve Time pre Blk (g_fs), s          | 0.0   | 0.0   | 0.0   | 10.4   | 0.0   | 6.4    | 0.0   | 2.3   |
| Proportion LT Inside Lane (P_L)       | 0.000 | 0.000 | 0.000 | 0.036  | 0.000 | 0.014  | 0.000 | 0.316 |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 913.7  | 0.0   | 577.8  | 0.0   | 576.1 |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.726  | 0.000 | 0.512  | 0.000 | 0.264 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 943.3  | 0.0   | 1035.8 | 0.0   | 591.1 |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 1.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 9.3    | 0.0   | 12.5   | 0.0   | 6.4   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 3.5    | 0.0   | 0.7    | 0.0   | 0.5   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 12.7   | 0.0   | 13.2   | 0.0   | 7.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 3.2    | 0.0   | 1.8    | 0.0   | 0.5   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.9    | 0.0   | 0.1    | 0.0   | 0.1   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 0.000 | 0.000 | 1.000  | 1.000 | 1.000  | 0.000 | 1.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 4.1    | 0.0   | 1.9    | 0.0   | 0.6   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.33   | 0.00  | 0.11   | 0.00  | 0.04  |
| Initial Queue (Qb), veh               | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| <b>Middle Lane Group Data</b>         |       |       |       |        |       |        |       |       |
| Assigned Movement                     | 0     | 2     | 0     | 4      | 0     | 6      | 0     | 8     |
| Lane Assignment                       |       |       |       |        |       |        |       |       |
| Lanes in Group                        | 0     | 0     | 0     | 0      | 0     | 0      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Lane Group Capacity (c), veh/h        | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.000 | 0.000 | 0.000  | 0.000 | 0.000  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 0.000 | 0.000 | 0.000  | 0.000 | 0.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000 | 0.000 | 1.000  | 0.000 | 1.000  | 0.000 | 1.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00   | 0.00  | 0.00  |

HCM 2010 Signalized Intersection Capacity Analysis  
 24: 5th St & Sarah St

3/11/2015

|                                  |     |     |     |     |     |     |     |     |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Initial Queue (Qb), veh          | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Final (Residual) Queue (Qe), veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Delay (ds), s/veh      | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Queue (Qs), veh        | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Saturated Capacity (cs), veh/h   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Initial Queue Clear Time (tc), h | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Right Lane Group Data**

|                                       |       |        |       |       |       |        |       |       |
|---------------------------------------|-------|--------|-------|-------|-------|--------|-------|-------|
| Assigned Movement                     | 0     | 12     | 0     | 14    | 0     | 16     | 0     | 18    |
| Lane Assignment                       | T+R   |        |       | R     |       |        |       |       |
| Lanes in Group                        | 0     | 1      | 0     | 0     | 0     | 1      | 0     | 0     |
| Group Volume (v), veh/h               | 0.0   | 224.7  | 0.0   | 0.0   | 0.0   | 243.0  | 0.0   | 0.0   |
| Group Sat. Flow (s), veh/h/ln         | 0.0   | 1497.7 | 0.0   | 0.0   | 0.0   | 1402.6 | 0.0   | 0.0   |
| Queue Serve Time (g_s), s             | 0.0   | 5.2    | 0.0   | 0.0   | 0.0   | 6.1    | 0.0   | 0.0   |
| Cycle Queue Clear Time (g_c), s       | 0.0   | 5.2    | 0.0   | 0.0   | 0.0   | 6.1    | 0.0   | 0.0   |
| Prot RT Sat Flow Rate (s_R), veh/h/ln | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Prot RT Eff. Green (g_R), s           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Proportion RT Outside Lane (P_R)      | 0.000 | 0.571  | 0.000 | 0.188 | 0.000 | 1.000  | 0.000 | 0.026 |
| Lane Group Capacity (c), veh/h        | 0.0   | 449.9  | 0.0   | 0.0   | 0.0   | 421.4  | 0.0   | 0.0   |
| Volume-to-Capacity Ratio (X)          | 0.000 | 0.499  | 0.000 | 0.000 | 0.000 | 0.577  | 0.000 | 0.000 |
| Available Capacity (c_a), veh/h       | 0.0   | 1253.0 | 0.0   | 0.0   | 0.0   | 821.4  | 0.0   | 0.0   |
| Upstream Filter Factor (I)            | 0.000 | 1.000  | 0.000 | 0.000 | 0.000 | 1.000  | 0.000 | 0.000 |
| Uniform Delay (d1), s/veh             | 0.0   | 12.0   | 0.0   | 0.0   | 0.0   | 12.4   | 0.0   | 0.0   |
| Incremental Delay (d2), s/veh         | 0.0   | 0.9    | 0.0   | 0.0   | 0.0   | 1.2    | 0.0   | 0.0   |
| Initial Queue Delay (d3), s/veh       | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Control Delay (d), s/veh              | 0.0   | 12.9   | 0.0   | 0.0   | 0.0   | 13.6   | 0.0   | 0.0   |
| First-Term Queue (Q1), veh/ln         | 0.0   | 1.4    | 0.0   | 0.0   | 0.0   | 1.5    | 0.0   | 0.0   |
| Second-Term Queue (Q2), veh/ln        | 0.0   | 0.1    | 0.0   | 0.0   | 0.0   | 0.1    | 0.0   | 0.0   |
| Third-Term Queue (Q3), veh/ln         | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Percentile bk-of-que factor (f_B%)    | 0.000 | 1.000  | 0.000 | 1.000 | 0.000 | 1.000  | 0.000 | 1.000 |
| Percentile Back of Queue (Q%), veh/ln | 0.0   | 1.6    | 0.0   | 0.0   | 0.0   | 1.6    | 0.0   | 0.0   |
| Percentile Storage Ratio (RQ%)        | 0.00  | 0.09   | 0.00  | 0.00  | 0.00  | 0.27   | 0.00  | 0.00  |
| Initial Queue (Qb), veh               | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Final (Residual) Queue (Qe), veh      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Delay (ds), s/veh           | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Queue (Qs), veh             | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Saturated Capacity (cs), veh/h        | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |
| Initial Queue Clear Time (tc), h      | 0.0   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0    | 0.0   | 0.0   |

**Intersection Summary**

|                           |      |
|---------------------------|------|
| HCM Average Control Delay | 12.4 |
| HCM Level of Service      | B    |

# HCM Signalized Intersection Capacity Analysis

## 20: McConnell St & 4th St

3/11/2015



| Movement               | EBL  | EBT  | EBR  | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL  | SBT   | SBR  |
|------------------------|------|------|------|------|-------|------|------|------|------|------|-------|------|
| Lane Configurations    |      | ↔    |      |      | ↔     |      |      |      |      |      | ↕     | ↕    |
| Volume (vph)           | 0    | 90   | 19   | 122  | 1     | 0    | 0    | 0    | 0    | 142  | 765   | 0    |
| Ideal Flow (vphpl)     | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 |
| Lane Width             | 15   | 15   | 15   | 14   | 14    | 14   | 12   | 12   | 12   | 14   | 14    | 14   |
| Grade (%)              |      | 1%   |      |      | -1%   |      |      | 0%   |      |      | 1%    |      |
| Total Lost time (s)    |      | 4.0  |      |      | 5.0   |      |      |      |      |      | 4.0   |      |
| Lane Util. Factor      |      | 1.00 |      |      | 1.00  |      |      |      |      |      | 0.95  |      |
| Frt                    |      | 0.98 |      |      | 1.00  |      |      |      |      |      | 1.00  |      |
| Flt Protected          |      | 1.00 |      |      | 0.95  |      |      |      |      |      | 0.99  |      |
| Satd. Flow (prot)      |      | 862  |      |      | 1729  |      |      |      |      |      | 1459  |      |
| Flt Permitted          |      | 1.00 |      |      | 0.48  |      |      |      |      |      | 0.99  |      |
| Satd. Flow (perm)      |      | 862  |      |      | 872   |      |      |      |      |      | 1459  |      |
| Peak-hour factor, PHF  | 0.92 | 0.75 | 0.79 | 0.78 | 0.92  | 0.92 | 0.92 | 0.92 | 0.92 | 0.85 | 0.89  | 0.92 |
| Adj. Flow (vph)        | 0    | 120  | 24   | 156  | 1     | 0    | 0    | 0    | 0    | 167  | 860   | 0    |
| RTOR Reduction (vph)   | 0    | 5    | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0     | 0    |
| Lane Group Flow (vph)  | 0    | 139  | 0    | 0    | 157   | 0    | 0    | 0    | 0    | 0    | 1027  | 0    |
| Heavy Vehicles (%)     | 0%   | 0%   | 0%   | 1%   | 0%    | 0%   | 0%   | 0%   | 0%   | 1%   | 1%    | 0%   |
| Turn Type              |      | NA   |      | Perm | NA    |      |      |      |      | Perm | NA    |      |
| Protected Phases       |      | 4    |      |      | 8     |      |      |      |      |      | 6     |      |
| Permitted Phases       |      |      |      | 8    |       |      |      |      |      | 6    |       |      |
| Actuated Green, G (s)  |      | 28.1 |      |      | 28.1  |      |      |      |      |      | 111.9 |      |
| Effective Green, g (s) |      | 29.1 |      |      | 28.1  |      |      |      |      |      | 112.9 |      |
| Actuated g/C Ratio     |      | 0.19 |      |      | 0.19  |      |      |      |      |      | 0.75  |      |
| Clearance Time (s)     |      | 5.0  |      |      | 5.0   |      |      |      |      |      | 5.0   |      |
| Vehicle Extension (s)  |      | 3.0  |      |      | 3.0   |      |      |      |      |      | 3.0   |      |
| Lane Grp Cap (vph)     |      | 167  |      |      | 163   |      |      |      |      |      | 1098  |      |
| v/s Ratio Prot         |      | 0.16 |      |      |       |      |      |      |      |      |       |      |
| v/s Ratio Perm         |      |      |      |      | 0.18  |      |      |      |      |      | 0.70  |      |
| v/c Ratio              |      | 0.83 |      |      | 0.96  |      |      |      |      |      | 0.94  |      |
| Uniform Delay, d1      |      | 58.1 |      |      | 60.4  |      |      |      |      |      | 15.5  |      |
| Progression Factor     |      | 1.00 |      |      | 1.00  |      |      |      |      |      | 0.86  |      |
| Incremental Delay, d2  |      | 28.4 |      |      | 59.2  |      |      |      |      |      | 12.0  |      |
| Delay (s)              |      | 86.6 |      |      | 119.6 |      |      |      |      |      | 25.3  |      |
| Level of Service       |      | F    |      |      | F     |      |      |      |      |      | C     |      |
| Approach Delay (s)     |      | 86.6 |      |      | 119.6 |      |      | 0.0  |      |      | 25.3  |      |
| Approach LOS           |      | F    |      |      | F     |      |      | A    |      |      | C     |      |

### Intersection Summary

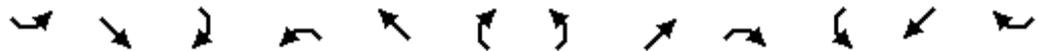
|                                   |       |                      |     |
|-----------------------------------|-------|----------------------|-----|
| HCM Average Control Delay         | 43.1  | HCM Level of Service | D   |
| HCM Volume to Capacity ratio      | 0.94  |                      |     |
| Actuated Cycle Length (s)         | 150.0 | Sum of lost time (s) | 9.0 |
| Intersection Capacity Utilization | 49.8% | ICU Level of Service | A   |
| Analysis Period (min)             | 15    |                      |     |

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 21: McConnell St & 3rd St

3/11/2015



| Movement               | SEL  | SET   | SER  | NWL  | NWT  | NWR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|------------------------|------|-------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations    |      |       |      |      |      |      |      |      |      |      |      |      |
| Volume (vph)           | 0    | 105   | 72   | 16   | 126  | 0    | 0    | 0    | 0    | 9    | 941  | 115  |
| Ideal Flow (vphpl)     | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width             | 11   | 11    | 11   | 12   | 12   | 12   | 12   | 12   | 12   | 13   | 11   | 14   |
| Grade (%)              |      | 1%    |      |      | -2%  |      |      | 0%   |      |      | -1%  |      |
| Total Lost time (s)    |      | 4.0   |      |      | 4.0  |      |      |      |      |      | 4.0  | 4.0  |
| Lane Util. Factor      |      | 1.00  |      |      | 1.00 |      |      |      |      |      | 0.95 | 1.00 |
| Frt                    |      | 0.95  |      |      | 1.00 |      |      |      |      |      | 1.00 | 0.85 |
| Flt Protected          |      | 1.00  |      |      | 0.99 |      |      |      |      |      | 1.00 | 1.00 |
| Satd. Flow (prot)      |      | 1762  |      |      | 1857 |      |      |      |      |      | 1931 | 1558 |
| Flt Permitted          |      | 1.00  |      |      | 0.87 |      |      |      |      |      | 1.00 | 1.00 |
| Satd. Flow (perm)      |      | 1762  |      |      | 1857 |      |      |      |      |      | 1931 | 1558 |
| Peak-hour factor, PHF  | 0.92 | 0.80  | 0.90 | 0.57 | 0.96 | 0.92 | 0.92 | 0.92 | 0.92 | 0.56 | 0.97 | 0.74 |
| Adj. Flow (vph)        | 0    | 131   | 80   | 28   | 131  | 0    | 0    | 0    | 0    | 16   | 970  | 155  |
| RTOR Reduction (vph)   | 0    | 35    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 47   |
| Lane Group Flow (vph)  | 0    | 176   | 0    | 0    | 159  | 0    | 0    | 0    | 0    | 0    | 986  | 108  |
| Heavy Vehicles (%)     | 0%   | 0%    | 1%   | 0%   | 0%   | 0%   | 0%   | 0%   | 0%   | 0%   | 1%   | 0%   |
| Turn Type              |      | NA    |      | Perm | NA   |      |      |      |      | Perm | NA   | Perm |
| Protected Phases       |      | 4     |      |      | 8    |      |      |      |      |      | 6    |      |
| Permitted Phases       |      |       |      | 8    |      |      |      |      |      | 6    |      | 6    |
| Actuated Green, G (s)  |      | 13.6  |      |      | 13.6 |      |      |      |      |      | 51.4 | 51.4 |
| Effective Green, g (s) |      | 14.6  |      |      | 14.6 |      |      |      |      |      | 52.4 | 52.4 |
| Actuated g/C Ratio     |      | 0.19  |      |      | 0.19 |      |      |      |      |      | 0.70 | 0.70 |
| Clearance Time (s)     |      | 5.0   |      |      | 5.0  |      |      |      |      |      | 5.0  | 5.0  |
| Vehicle Extension (s)  |      | 3.0   |      |      | 3.0  |      |      |      |      |      | 3.0  | 3.0  |
| Lane Grp Cap (vph)     |      | 343   |      |      | 361  |      |      |      |      |      | 1349 | 1089 |
| v/s Ratio Prot         |      | c0.10 |      |      |      |      |      |      |      |      |      |      |
| v/s Ratio Perm         |      |       |      |      | 0.09 |      |      |      |      |      | 0.51 | 0.07 |
| v/c Ratio              |      | 0.51  |      |      | 0.44 |      |      |      |      |      | 0.73 | 0.10 |
| Uniform Delay, d1      |      | 27.0  |      |      | 26.6 |      |      |      |      |      | 7.0  | 3.7  |
| Progression Factor     |      | 1.00  |      |      | 1.00 |      |      |      |      |      | 1.00 | 1.00 |
| Incremental Delay, d2  |      | 1.3   |      |      | 0.9  |      |      |      |      |      | 3.5  | 0.2  |
| Delay (s)              |      | 28.3  |      |      | 27.5 |      |      |      |      |      | 10.5 | 3.8  |
| Level of Service       |      | C     |      |      | C    |      |      |      |      |      | B    | A    |
| Approach Delay (s)     |      | 28.3  |      |      | 27.5 |      |      | 0.0  |      |      | 9.6  |      |
| Approach LOS           |      | C     |      |      | C    |      |      | A    |      |      | A    |      |

### Intersection Summary

|                                   |       |                      |     |
|-----------------------------------|-------|----------------------|-----|
| HCM Average Control Delay         | 14.1  | HCM Level of Service | B   |
| HCM Volume to Capacity ratio      | 0.68  |                      |     |
| Actuated Cycle Length (s)         | 75.0  | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 58.1% | ICU Level of Service | B   |
| Analysis Period (min)             | 15    |                      |     |

c Critical Lane Group