

**APPENDIX E:  
MINOR  
THOROUGHFARE  
INPUTS**

## Appendix E1: Urban Streets – Arterials and Collectors/Locals (also used for On-Ramps and Off Ramps, not normally associated in systems planning)

The equation below is an approximation of the “ultimate capacity” (LOS E) of an urban street (arterial). However, HCM does not provide a single equation which estimates the capacity of urban streets at other Levels of Service (e.g. at LOS D). Instead, the detailed procedures and equations described in HCM Chapters 15 and 16 must be used in order to manually calculate urban street capacity. The equation for estimating “ultimate capacity” (LOS E) of urban streets is provided below because it shows the factors which influence capacity of these facilities. Following the equation and table of adjustment factors, the HCM 2000 Urban Street Worksheet is provided because it lists additional factors which influence capacity, such as Arrival Type and Urban Street Class. See **Exhibit 3**.

NOTE: Two-way daily capacity = One-way hourly capacity/K /D.

The following equation is used to estimate the hourly one-way ultimate capacity (LOS E) of arterials and collectors.

$$c = s_o * N * f_W * f_{HV} * f_g * f_p * f_{bb} * f_a * f_{LU} * f_{LT} * f_{RT} * f_{Lpb} * f_{Rpb} * PHF * g/C$$

Where

- c = Capacity (veh/hr), by direction.
- s<sub>o</sub> = Base saturation flow rate – the maximum steady traffic flow rate for a signalized intersection approach in pc/hr/ln under ideal conditions, assuming all green time is available & no lost time is experienced. *HCM 2000, p. 10-24, Exhibit 10-12.*  
     1,900 pc/hr/ln assumed for arterials  
     1,805 pc/hr/ln assumed for collectors/locals
- N = Number of useable through lanes **at the intersection approach** per direction (excludes exclusive turn lanes, or lanes assumed unusable due to parking, transit operations, etc.)
- PHF = Peak-hour factor. Default = 0.92, *HCM 2000, p. 10-8*
- g/C = Effective green ratio, or the proportion of effective green time available to a given approach. Larger ratios are associated with higher volume/priority facilities.

See **Exhibit 2** for other adjustment factors for urban streets

*For NCDOT – TPB Level of Service D for Systems Level Planning, the NCLOS 2.1 program was used in developing the boulevard, major thoroughfares, and minor thoroughfares capacity tables.*

# Appendix E1: Urban Streets – Arterials and Collectors/Locals

(also used for On-Ramps and Off Ramps, not normally associated in systems planning)

## Exhibit 2: Adjustment Factors for Urban Streets

Factor	Formula	Definitions of Variables	Defaults / Notes
Lane width	$f_w = 1 + [(W - 12) / 30]$	W = lane width	Assume 1.0 <i>Exhibit 10-12</i>
Heavy vehicles	$f_{HV} = 100 / [100 + \%HV(E_T - 1)]$	$\%HV$ = % heavy vehicles for lane group volume	$E_T = 2.0$ pc/HV <i>Exhibit 10-12</i>
Approach grade	$f_g = 1 - [\%G / 200]$	$\%G$ = % grade on lane group approach	0% - flat 3% - moderate grades <i>p. 10-25</i>
Parking	$f_p = [N - 0.1 - (18N_m / 3600)] / N$	N = # through lanes in lane group $N_m$ = # parking maneuvers/hour	$f_p \geq 0.050$ $f_p = 1.00$ for no parking <i>See Exhibit 10-20 for <math>N_m</math></i>
Bus blockage	$f_{bb} = [N - 14.4N_B / 3600] / N$	$N_B$ = # buses stopping/hour	$f_{bb} \geq 0.050$ <i>See Exhibit 10-21 for <math>N_B</math></i>
Area type	$f_a = 0.900$ in CBD $f_a = 1.00$ in all other areas		
Lane utilization	$f_{LU} = v_g / (v_{g1}N)$	$v_g$ = unadjusted demand flow rate for the lane group, veh/h $v_{g1}$ = unadjusted demand flow rate on the single lane in the lane group with the highest volume N = number of lanes in the lane group	Assume 1.00 for exclusive left turn <i>See Exhibit 10-23 for other default values</i>
Left turns	Protected phasing Exclusive lane: $f_{LT} = 0.95$ Shared lane: $f_{LT} = 1 / [1.0 + 0.05P_{LT}]$	$P_{LT}$ = proportion of left turns in lane group	<i>See Exhibit C16-1, Appendix C, for nonprotected phasing alternatives, p. 16-122</i>
Right turns	Exclusive lane: $f_{RT} = 0.85$ Shared lane: $f_{RT} = 1.0 - (0.15)P_{RT}$ Single lane: $f_{RT} = 1.0 - (0.135)P_{RT}$	$P_{RT}$ = proportion of right turns in lane group	Assume 0.985 <i>(Unless exclusive right turn lane is provided)</i>
Pedestrian-bicycle (Left turns)	$F_{Lpb} = 1.0 - P_{LT}(1 - A_{pbT})(1 - P_{LTA})$	$P_{LT}$ = proportion of left turns in lane group $A_{pbT}$ = permitted phase adjustment $P_{LTA}$ = ratio of left turn protected green to total left turn green	Assume 1.00 <i>Refer to Appendix D for detailed procedure</i>
Pedestrian-bicycle (Right turns)	$F_{Rpb} = 1.0 - P_{RT}(1 - A_{pbT})(1 - P_{RTA})$	$P_{RT}$ = proportion of right turns in lane group $A_{pbT}$ = permitted phase adjustment $P_{RTA}$ = ratio of right turns protected green to total right turns green	Assume 1.00 <i>Refer to Appendix D for detailed procedure</i>

Figure adapted from HCM 2000 Exhibit 16-7

# Appendix E1: Urban Streets – Arterials and Collectors/Locals (also used for On-Ramps and Off Ramps, not normally associated in systems planning)

## Exhibit 3: HCM 2000 Urban Streets Worksheet

EXHIBIT 15-14. URBAN STREET WORKSHEET

URBAN STREET WORKSHEET									
<b>General Information</b>				<b>Site Information</b>					
Analyst	_____	Urban Street	_____	Direction of Travel	_____	Jurisdiction	_____	Analysis Year	_____
Agency or Company	_____								
Date Performed	_____								
Analysis Time Period	_____								
<input type="checkbox"/> Operational (LOS)		<input type="checkbox"/> Design ( $v_p$ )		<input type="checkbox"/> Planning (LOS)		<input type="checkbox"/> Planning ( $v_p$ )		Analysis Period, T = _____ h	
<b>Input Parameters</b>									
	Segments								
	1	2	3	4	5	6	7	8	
Cycle length, C (s)									
Effective green-to-cycle-length ratio, g/C									
v/c ratio for lane group, X									
Capacity of lane group, c (veh/h)									
Arrival type, AT									
Length of segment, L (mi)									
Initial queue, $Q_b$ (veh)									
Urban street class, SC (Exhibit 10-3)									
Free-flow speed, FFS (mi/h) (Exhibit 15-2)									
Running time, $T_R$ (s) (Exhibit 15-3)									
<b>Delay Computation</b>									
Uniform delay, $d_1$ (s) $d_1 = \frac{0.5C[(1 - g/C)^2]}{1 - [(g/C)\min(X, 1.0)]}$									
Signal control adjustment factor, k (Exhibit 15-6)									
Upstream filtering/metering adjustment factor, I (Exhibit 15-7)									
Incremental delay, $d_2$ (s) $d_2 = 900T \left[ (X - 1) + \sqrt{(X - 1)^2 + \frac{8kIX}{cT}} \right]$									
Initial queue delay, $d_3$ (s) (Ch. 16 Appendix F)									
Progression adjustment factor, PF (Exhibit 15-5)									
Control delay, d (s) $d = (d_1 * PF) + d_2 + d_3$									
<b>Segment LOS Determination</b>									
Segment travel time, ST (s) $ST = T_R + d + \text{Other delay}$									
Segment travel speed, $S_A$ (mi/h) $S_A = \frac{3600(L)}{ST}$									
Segment LOS (Exhibit 15-2)									
<b>Urban Street LOS Determination</b>									
Total travel time = $\sum ST$	_____ s								
Total length = $\sum L$	_____ mi								
Total travel speed, $S_A = \frac{3600 * \text{Total length}}{\text{Total travel time}}$	_____ mi/h								
Total urban street LOS (Exhibit 15-2)	_____								

## Appendix E2: Coastal Minor Thoroughfares - 55 MPH

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type*	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	I	I	I	I	I	I	I	I	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>14</b>	<b>14</b>	<b>14</b>	12	12	12	<b>11</b>	<b>11</b>	<b>11</b>
D Factor	60	60	60	60	60	60	60	60	60
Arrival Type	3	3	3	3	3	3	3	3	3
Left Turn %	5	5	5	5	5	5	5	5	5
Cycle Length	200	200	200	200	200	200	200	200	200
g/C Ratio	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
FFS	55	55	55	55	55	55	55	55	55
Total Segment Length	3	3	3	3	3	3	3	3	3
Signals Per Mile	2	1.5	1	2	1.5	1	2	1.5	1
<b>Maximum AADT</b>	<b>13000</b>	<b>13500</b>	<b>14000</b>	<b>15100</b>	<b>15800</b>	<b>16400</b>	<b>16500</b>	<b>17200</b>	<b>17800</b>

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction WCLTL								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type*	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	I	I	I	I	I	I	I	I	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>14</b>	<b>13</b>	<b>14</b>	12	12	12	<b>11</b>	<b>11</b>	<b>11</b>
D Factor	60	60	60	60	60	60	60	60	60
Arrival Type	4	4	4	4	4	4	4	4	4
Left Turn %	10	10	10	10	10	10	10	10	10
Cycle Length	200	200	200	200	200	200	200	200	200
g/C Ratio	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
FFS	55	55	55	55	55	55	55	55	55
Total Segment Length	3	3	3	3	3	3	3	3	3
Signals Per Mile	2	1.5	1	2	1.5	1	2	1.5	1
<b>Maximum AADT</b>	<b>14300</b>	<b>14800</b>	<b>15300</b>	<b>16600</b>	<b>17200</b>	<b>17800</b>	<b>18100</b>	<b>18800</b>	<b>19500</b>

\* PAHSI = Principal Arterial - High Speed (I)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**

## Appendix E2: Coastal Minor Thoroughfares - 45 MPH

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type*	MASII	MASII	PAHSI	MASII	MASII	PAHSI	MASII	MASII	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	II	II	I	II	II	I	II	II	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>13</b>	<b>13</b>	<b>14</b>	12	12	13	<b>11</b>	<b>11</b>	<b>12</b>
D Factor	60	60	60	60	60	60	60	60	60
Arrival Type	3	3	3	3	3	3	3	3	3
Left Turn %	5	5	5	5	5	5	5	5	5
Cycle Length	120	120	200	120	120	200	120	120	200
g/C Ratio	0.55	0.55	0.6	0.55	0.55	0.6	0.55	0.55	0.6
FFS	45	45	45	45	45	45	45	45	45
Total Segment Length	2	2	3	2	2	3	2	2	3
Signals Per Mile	4	3	1	4	3	1	4	3	1
<b>Maximum AADT</b>	<b>11700</b>	<b>12200</b>	<b>13600</b>	<b>12700</b>	<b>13300</b>	<b>14600</b>	<b>13900</b>	<b>14500</b>	<b>15900</b>

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction WCLTL								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type*	MASII	MASII	PAHSI	MASII	MASII	PAHSI	MASII	MASII	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	II	II	I	II	II	I	II	II	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>13</b>	<b>13</b>	<b>14</b>	12	12	13	<b>11</b>	<b>11</b>	<b>12</b>
D Factor	60	60	60	60	60	60	60	60	60
Arrival Type	4	4	4	4	4	4	4	4	4
Left Turn %	10	10	10	10	10	10	10	10	10
Cycle Length	120	120	200	120	120	200	120	120	200
g/C Ratio	0.55	0.55	0.6	0.55	0.55	0.6	0.55	0.55	0.6
FFS	45	45	45	45	45	45	45	45	45
Total Segment Length	2	2	3	2	2	3	2	2	3
Signals Per Mile	4	3	1	4	3	1	4	3	1
<b>Maximum AADT</b>	<b>13100</b>	<b>13200</b>	<b>14900</b>	<b>14200</b>	<b>14300</b>	<b>16000</b>	<b>15500</b>	<b>15600</b>	<b>17300</b>

\* MASII = Minor Arterial - Suburban (II)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**

## Appendix E2: Coastal Minor Thoroughfares - 35 MPH

	MINIMUM		STANDARD		MAXIMUM	
	1 Lane Per Direction					
	Urban	Suburban	Urban	Suburban	Urban	Suburban
Arterial Type	MAIII	MAII	MAIII	MAII	MAIII	MAII
LOS	D	D	D	D	D	D
Street Class	III	II	III	II	III	II
PHF	0.92	0.9	0.92	0.9	0.92	0.9
Driver Pop Factor	1	1	1	1	1	1
K Factor	<b>13</b>	<b>13</b>	12	12	<b>11</b>	<b>11</b>
D Factor	60	60	60	60	60	60
Arrival Type	4	3	4	3	4	3
Left Turn %	8	5	8	5	8	5
Cycle Length	120	120	120	120	120	120
g/C Ratio	0.5	0.55	0.5	0.55	0.5	0.55
FFS	35	35	35	35	35	35
Total Segment Length	2	2	2	2	2	2
Signals Per Mile	6	4	6	4	6	4
<b>Maximum AADT</b>	<b>9700</b>	<b>10200</b>	<b>10500</b>	<b>11000</b>	<b>11500</b>	<b>12000</b>

	MINIMUM		STANDARD		MAXIMUM	
	1 Lane Per Direction WCLTL					
	Urban	Suburban	Urban	Suburban	Urban	Suburban
Arterial Type	MAIII	MAII	MAIII	PASII	MAIII	MAII
LOS	D	D	D	D	D	D
Street Class	III	II	III	II	III	II
PHF	0.92	0.9	0.92	0.9	0.92	0.9
Driver Pop Factor	1	1	1	1	1	1
K Factor	<b>13</b>	<b>13</b>	12	12	<b>11</b>	<b>11</b>
D Factor	60	60	60	60	60	60
Arrival Type	4	4	4	4	4	4
Left Turn %	16	10	16	10	16	10
Cycle Length	120	120	120	120	120	120
g/C Ratio	0.5	0.55	0.5	0.55	0.5	0.55
FFS	35	35	35	35	35	35
Total Segment Length	2	2	2	2	2	2
Signals Per Mile	6	4	6	4	6	4
<b>Maximum AADT</b>	<b>10600</b>	<b>12700</b>	<b>11500</b>	<b>13700</b>	<b>12600</b>	<b>15000</b>

MASII = Minor Arterial - Suburban (II)

MAIII = Minor Arterial - Intermediate (III)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**

## Appendix E2: Coastal Minor Thoroughfares - 25 MPH

	MINIMUM	STANDARD	MAXIMUM
	1 Lane Per Direction		
	Urban	Urban	Urban
Arterial Type	MAUIV	MAUIV	MAUIV
LOS	D	D	D
Street Class	IV	IV	IV
PHF	0.92	0.92	0.92
Driver Pop Factor	1	1	1
K Factor	<b>13</b>	12	<b>11</b>
D Factor	60	60	60
Arrival Type	4	4	4
Left Turn %	5	5	5
Cycle Length	90	90	90
g/C Ratio	0.42	0.42	0.42
FFS	35	35	35
Total Segment Length	1	1	1
Signals Per Mile	6	6	6
<b>Maximum AADT</b>	<b>9200</b>	<b>10000</b>	<b>10900</b>

	MINIMUM	STANDARD	MAXIMUM
	1 Lane Per Direction WCLTL		
	Urban	Urban	Urban
Arterial Type	MAUIV	MAUIV	MAUIV
LOS	D	D	D
Street Class	IV	IV	IV
PHF	0.92	0.92	0.92
Driver Pop Factor	1	1	1
K Factor	<b>13</b>	12	<b>11</b>
D Factor	60	60	60
Arrival Type	4	4	4
Left Turn %	16	16	16
Cycle Length	90	90	90
g/C Ratio	0.42	0.42	0.42
FFS	35	35	35
Total Segment Length	1	1	1
Signals Per Mile	6	6	6
<b>Maximum AADT</b>	<b>10400</b>	<b>11300</b>	<b>12300</b>

MAUIV = Minor Arterial - Urban (IV)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**



## Appendix E3: Piedmont Minor Thoroughfares - 55 MPH

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type*	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	I	I	I	I	I	I	I	I	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>14</b>	<b>14</b>	<b>14</b>	13	13	13	<b>12</b>	<b>12</b>	<b>12</b>
D Factor	65	60	60	65	60	60	<b>60</b>	60	60
Arrival Type	3	3	3	3	3	3	3	3	3
Left Turn %	5	5	5	5	5	5	5	5	5
Cycle Length	200	200	200	200	200	200	200	200	200
g/C Ratio	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
FFS	55	55	55	55	55	55	55	55	55
Total Segment Length	3	3	3	3	3	3	3	3	3
Signals Per Mile	2	1.5	1	2	1.5	1	2	1.5	1
<b>Maximum AADT</b>	<b>12000</b>	<b>13500</b>	<b>14000</b>	<b>12900</b>	<b>14600</b>	<b>15100</b>	<b>15100</b>	<b>15800</b>	<b>16400</b>

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction WCLTL								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type*	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	I	I	I	I	I	I	I	I	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>14</b>	<b>14</b>	<b>14</b>	13	13	13	<b>12</b>	<b>12</b>	<b>12</b>
D Factor	65	60	60	65	60	60	<b>60</b>	60	60
Arrival Type	4	4	4	4	4	4	4	4	4
Left Turn %	10	10	10	10	10	10	10	10	10
Cycle Length	200	200	200	200	200	200	200	200	200
g/C Ratio	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
FFS	55	55	55	55	55	55	55	55	55
Total Segment Length	3	3	3	3	3	3	3	3	3
Signals Per Mile	2	1.5	1	2	1.5	1	2	1.5	1
<b>Maximum AADT</b>	<b>13200</b>	<b>14800</b>	<b>15300</b>	<b>14200</b>	<b>15900</b>	<b>16500</b>	<b>16600</b>	<b>17200</b>	<b>17800</b>

\* PAHSI = Principal Arterial - High Speed (I)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**

## Appendix E3: Piedmont Minor Thoroughfares - 45 MPH

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type	MASII	MASII	PAHSI	MASII	MASII	PAHSI	MASII	MASII	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	II	II	I	II	II	I	II	II	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>13</b>	<b>14</b>	<b>14</b>	12	13	13	<b>11</b>	<b>12</b>	<b>12</b>
D Factor	65	60	60	65	60	60	65	60	60
Arrival Type	3	3	3	3	3	3	3	3	3
Left Turn %	5	5	5	5	5	5	5	5	5
Cycle Length	120	120	200	120	120	200	120	120	200
g/C Ratio	0.55	0.55	0.6	0.55	0.55	0.6	0.55	0.55	0.6
FFS	45	45	45	45	45	45	45	45	45
Total Segment Length	2	2	3	2	2	3	2	2	3
Signals Per Mile	4	3	1	4	3	1	4	3	1
<b>Maximum AADT</b>	<b>10800</b>	<b>11400</b>	<b>13600</b>	<b>11700</b>	<b>12200</b>	<b>14600</b>	<b>12800</b>	<b>13300</b>	<b>15900</b>

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction WCLTL								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type	MASII	MASII	PAHSI	MASII	MASII	PAHSI	MASII	MASII	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	II	II	I	II	II	I	II	II	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>13</b>	<b>14</b>	<b>14</b>	12	13	13	<b>11</b>	<b>12</b>	<b>12</b>
D Factor	65	60	60	65	60	60	65	60	60
Arrival Type	4	4	4	4	4	4	4	4	4
Left Turn %	10	10	10	10	10	10	10	10	10
Cycle Length	120	120	200	120	120	200	120	120	200
g/C Ratio	0.55	0.55	0.6	0.55	0.55	0.6	0.55	0.55	0.6
FFS	45	45	45	45	45	45	45	45	45
Total Segment Length	2	2	3	2	2	3	2	2	3
Signals Per Mile	4	3	1	4	3	1	4	3	1
<b>Maximum AADT</b>	<b>12100</b>	<b>12300</b>	<b>14900</b>	<b>13100</b>	<b>13200</b>	<b>16000</b>	<b>14300</b>	<b>14300</b>	<b>17300</b>

MASII = Minor Arterial - Suburban (II)

## Appendix E3: Piedmont Minor Thoroughfares - 35 MPH

	MINIMUM		STANDARD		MAXIMUM	
	1 Lane Per Direction					
	Urban	Suburban	Urban	Suburban	Urban	Suburban
Arterial Type	MAIII	MASII	MAIII	MASII	MAIII	MASII
LOS	D	D	D	D	D	D
Street Class	III	II	III	II	III	II
PHF	0.92	0.9	0.92	0.9	0.92	0.9
Driver Pop Factor	1	1	1	1	1	1
K Factor	<b>13</b>	<b>14</b>	12	13	<b>11</b>	<b>12</b>
D Factor	60	60	60	60	60	60
Arrival Type	4	3	4	3	4	3
Left Turn %	5	5	5	5	5	5
Cycle Length	120	120	120	120	120	120
g/C Ratio	0.5	0.55	0.5	0.55	0.5	0.55
FFS	35	35	35	35	35	35
Total Segment Length	2	2	2	2	2	2
Signals Per Mile	6	4	6	4	6	4
<b>Maximum AADT</b>	<b>9400</b>	<b>9400</b>	<b>10200</b>	<b>10200</b>	<b>11100</b>	<b>11000</b>

	MINIMUM		STANDARD		MAXIMUM	
	1 Lane Per Direction WCLTL					
	Urban	Suburban	Urban	Suburban	Urban	Suburban
Arterial Type	MAIII	MASII	MAIII	MASII	MAIII	MASII
LOS	D	D	D	D	D	D
Street Class	III	II	III	II	III	II
PHF	0.92	0.9	0.92	0.9	0.92	0.9
Driver Pop Factor	1	1	1	1	1	1
K Factor	<b>12</b>	<b>14</b>	11	13	<b>10</b>	<b>12</b>
D Factor	60	60	60	60	60	60
Arrival Type	4	4	4	4	4	4
Left Turn %	10	10	10	10	10	10
Cycle Length	120	120	120	120	120	120
g/C Ratio	0.5	0.55	0.5	0.55	0.5	0.55
FFS	35	35	35	35	35	35
Total Segment Length	2	2	2	2	2	2
Signals Per Mile	6	4	6	4	6	4
<b>Maximum AADT</b>	<b>10700</b>	<b>11800</b>	<b>11700</b>	<b>12700</b>	<b>12900</b>	<b>13700</b>

MASII = Minor Arterial - Suburban (II)

MAIII = Minor Arterial - Intermediate (III)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**

## Appendix E3: Piedmont Minor Thoroughfares - 25 MPH

	MINIMUM	STANDARD	MAXIMUM
	1 Lane Per Direction		
	Urban	Urban	Urban
Arterial Type	PAUIV	PAUIV	PAUIV
LOS	D	D	D
Street Class	IV	IV	IV
PHF	0.92	0.92	0.92
Driver Pop Factor	1	1	1
K Factor	<b>13</b>	12	<b>11</b>
D Factor	60	60	60
Arrival Type	4	4	4
Left Turn %	5	5	5
Cycle Length	90	90	90
g/C Ratio	0.42	0.42	0.42
FFS	30	30	30
Total Segment Length	1	1	1
Signals Per Mile	6	6	6
<b>Maximum AADT</b>	<b>9200</b>	<b>10000</b>	<b>10900</b>

	MINIMUM	STANDARD	MAXIMUM
	1 Lane Per Direction WCLTL		
	Urban	Urban	Urban
Arterial Type	PAUIV	PAUIV	PAUIV
LOS	D	D	D
Street Class	IV	IV	IV
PHF	0.92	0.92	0.92
Driver Pop Factor	1	1	1
K Factor	<b>13</b>	12	<b>11</b>
D Factor	60	60	60
Arrival Type	4	4	4
Left Turn %	16	16	16
Cycle Length	90	90	90
g/C Ratio	0.42	0.42	0.42
FFS	30	30	30
Total Segment Length	1	1	1
Signals Per Mile	6	6	6
<b>Maximum AADT</b>	<b>10400</b>	<b>11300</b>	<b>12300</b>

MAUIV = Minor Arterial - Urban (IV)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**

## Appendix E4: Mountain Minor Thoroughfares - 55 MPH

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type*	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	I	I	I	I	I	I	I	I	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>14</b>	<b>14</b>	<b>14</b>	13	13	13	<b>12</b>	<b>12</b>	<b>12</b>
D Factor	60	60	60	60	60	60	60	60	60
Arrival Type	3	3	3	3	3	3	3	3	3
Left Turn %	5	5	5	5	5	5	5	5	5
Cycle Length	200	200	200	200	200	200	200	200	200
g/C Ratio	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
FFS	55	55	55	55	55	55	55	55	55
Total Segment Length	3	3	3	3	3	3	3	3	3
Signals Per Mile	2	1.5	1	2	1.5	1	2	1.5	1
<b>Maximum AADT</b>	<b>13000</b>	<b>13500</b>	<b>14000</b>	<b>14000</b>	<b>14600</b>	<b>15100</b>	<b>15100</b>	<b>15800</b>	<b>16400</b>

	MINIMUM			STANDARD			MAXIMUM		
	1 Lane Per Direction WCLTL								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type*	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	I	I	I	I	I	I	I	I	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>14</b>	<b>14</b>	<b>14</b>	13	13	13	<b>12</b>	<b>12</b>	<b>12</b>
D Factor	60	60	60	60	60	60	60	60	60
Arrival Type	4	4	4	4	4	4	4	4	4
Left Turn %	10	10	10	10	10	10	10	10	10
Cycle Length	200	200	200	200	200	200	200	200	200
g/C Ratio	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
FFS	55	55	55	55	55	55	55	55	55
Total Segment Length	3	3	3	3	3	3	3	3	3
Signals Per Mile	2	1.5	1	2	1.5	1	2	1.5	1
<b>Maximum AADT</b>	<b>14300</b>	<b>14800</b>	<b>15300</b>	<b>15300</b>	<b>15900</b>	<b>16500</b>	<b>16600</b>	<b>17200</b>	<b>17800</b>

\* PAHSI = Principal Arterial - High Speed (I)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**

## Appendix E4: Mountain Minor Thoroughfares - 45 MPH

	MINIMUM			DEFAULT			MAXIMUM		
	1 Lane Per Direction								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type	MASII	MASII	PAHSI	MASII	MASII	PAHSI	MASII	MASII	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	II	II	I	II	II	I	II	II	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>14</b>	<b>14</b>	<b>14</b>	13	13	13	<b>12</b>	<b>12</b>	<b>12</b>
D Factor	60	60	60	60	60	60	60	60	60
Arrival Type	3	3	3	3	3	3	3	3	3
Left Turn %	5	5	5	5	5	5	5	5	5
Cycle Length	120	120	200	120	120	200	120	120	200
g/C Ratio	0.55	0.55	0.6	0.55	0.55	0.6	0.55	0.55	0.6
FFS	45	45	45	45	45	45	45	45	45
Total Segment Length	2	2	3	2	2	3	2	2	3
Signals Per Mile	4	3	1	4	3	1	4	3	1
<b>Maximum AADT</b>	<b>10800</b>	<b>11400</b>	<b>13600</b>	<b>11700</b>	<b>12200</b>	<b>14600</b>	<b>12700</b>	<b>13300</b>	<b>15900</b>

	MINIMUM			DEFAULT			MAXIMUM		
	1 Lane Per Direction WCLTL								
	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Arterial Type	MASII	MASII	PAHSI	MASII	MASII	PAHSI	MASII	MASII	PAHSI
LOS	D	D	D	D	D	D	D	D	D
Street Class	II	II	I	II	II	I	II	II	I
PHF	0.92	0.9	0.88	0.92	0.9	0.88	0.92	0.9	0.88
Driver Pop Factor	1	1	1	1	1	1	1	1	1
K Factor	<b>14</b>	<b>14</b>	<b>14</b>	13	13	13	<b>12</b>	<b>12</b>	<b>12</b>
D Factor	60	60	60	60	60	60	60	60	60
Arrival Type	4	4	4	4	4	4	4	4	4
Left Turn %	10	10	10	10	10	10	10	10	10
Cycle Length	120	120	200	120	120	200	120	120	200
g/C Ratio	0.55	0.55	0.6	0.55	0.55	0.6	0.55	0.55	0.6
FFS	45	45	45	45	45	45	45	45	45
Total Segment Length	2	2	3	2	2	3	2	2	3
Signals Per Mile	4	3	1	4	3	1	4	3	1
<b>Maximum AADT</b>	<b>12200</b>	<b>12300</b>	<b>14900</b>	<b>13100</b>	<b>13200</b>	<b>16000</b>	<b>14200</b>	<b>14300</b>	<b>17300</b>

MASII = Minor Arterial - Suburban (II)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**

## Appendix E4: Mountain Minor Thoroughfares - 35 MPH

	MINIMUM		STANDARD		MAXIMUM	
	1 Lane Per Direction					
	Urban	Suburban	Urban	Suburban	Urban	Suburban
Arterial Type	MAIII	MASII	MAIII	MASII	MAIII	MASII
LOS	Level	Level	Level	Level	Level	Level
Street Class	D	D	D	D	D	D
PHF	0.92	0.9	0.92	0.9	0.92	0.9
Driver Pop Factor	1	1	1	1	1	1
K Factor	<b>13</b>	<b>14</b>	12	13	<b>11</b>	<b>12</b>
D Factor	60	60	60	60	60	60
Arrival Type	4	3	4	3	4	3
Left Turn %	5	5	5	5	5	5
Cycle Length	120	120	120	120	120	120
g/C Ratio	0.5	0.55	0.5	0.55	0.5	0.55
FFS	35	35	35	35	35	35
Total Segment Length	1	2	1	2	1	2
Signals Per Mile	6	4	6	4	6	4
<b>Maximum AADT</b>	<b>9400</b>	<b>9400</b>	<b>10200</b>	<b>10200</b>	<b>11100</b>	<b>11000</b>

	MINIMUM		STANDARD		MAXIMUM	
	1 Lane Per Direction WCLTL					
	Urban	Suburban	Urban	Suburban	Urban	Suburban
Arterial Type	MAIII	MASII	MAIII	MASII	MAIII	MASII
LOS	Level	Level	Level	Level	Level	Level
Street Class	D	D	D	D	D	D
PHF	0.92	0.9	0.92	0.9	0.92	0.9
Driver Pop Factor	1	1	1	1	1	1
K Factor	<b>13</b>	<b>14</b>	12	13	<b>11</b>	<b>12</b>
D Factor	60	60	60	60	60	60
Arrival Type	4	4	4	4	4	4
Left Turn %	16	8	16	8	16	8
Cycle Length	120	120	120	120	120	120
g/C Ratio	0.5	0.55	0.5	0.55	0.5	0.55
FFS	35	35	35	35	35	35
Total Segment Length	1	2	1	2	1	2
Signals Per Mile	6	4	6	4	6	4
<b>Maximum AADT</b>	<b>10600</b>	<b>11800</b>	<b>11500</b>	<b>12700</b>	<b>12600</b>	<b>13700</b>

MASII = Minor Arterial - Suburban (II)

MAIII = Minor Arterial - Intermediate (III)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**

## Appendix E4: Mountain Minor Thoroughfares - 25 MPH

	MINIMUM	STANDARD	MAXIMUM
	1 Lane Per Direction		
	Urban	Urban	Urban
Arterial Type	MAUIV	MAUIV	MAUIV
LOS	Level	Level	Level
Street Class	D	D	D
PHF	0.92	0.92	0.92
Driver Pop Factor	1	1	1
K Factor	<b>13</b>	12	<b>11</b>
D Factor	60	60	60
Arrival Type	4	4	4
Left Turn %	5	5	5
Cycle Length	90	90	90
g/C Ratio	0.42	0.42	0.42
FFS	30	30	30
Total Segment Length	1	1	1
Signals Per Mile	6	6	6
<b>Maximum AADT</b>	<b>9200</b>	<b>10000</b>	<b>10900</b>

	MINIMUM	STANDARD	MAXIMUM
	1 Lane Per Direction WCLTL		
	Urban	Urban	Urban
Arterial Type	MAUIV	MAUIV	MAUIV
LOS	Level	Level	Level
Street Class	D	D	D
PHF	0.92	0.92	0.92
Driver Pop Factor	1	1	1
K Factor	<b>13</b>	12	<b>11</b>
D Factor	60	60	60
Arrival Type	4	4	4
Left Turn %	16	16	16
Cycle Length	90	90	90
g/C Ratio	0.42	0.42	0.42
FFS	30	30	30
Total Segment Length	1	1	1
Signals Per Mile	6	6	6
<b>Maximum AADT</b>	<b>10400</b>	<b>11300</b>	<b>12300</b>

MAUIV = Minor Arterial - Urban (IV)

**NOTE: Inputs assume 12-foot lanes. To adjust lane-width downward, subtract 3.33% per foot of pavement and round to the nearest hundred**