

Florence & Hutcheson  
501 Huger Street  
Columbia, SC 29201

Phone: (803)254-5800  
E-mail:

Fax: (803)929-0334

### \_\_\_\_\_Merge Analysis\_\_\_\_\_

Analyst: NJ  
Agency/Co.: Florence & Hutcheson  
Date performed: 3/24/2011  
Analysis time period: AM  
Freeway/Dir of Travel: I-85 SB  
Junction: US 276 EB ON-RAMP  
Jurisdiction: Greenville, SC  
Analysis Year: 2010  
Description: I-85/I-385 Existing

### \_\_\_\_\_Freeway Data\_\_\_\_\_

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	60.0	mph
Volume on freeway	4256	vph

### \_\_\_\_\_On Ramp Data\_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	424	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

### \_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	681	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	470	ft

### \_\_\_\_\_Conversion to pc/h Under Base Conditions\_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4256	424	681	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1182	118	189	v
Trucks and buses	18	15	15	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.917	0.930	0.930	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5154	506	813	pcph

#### Estimation of V12 Merge Areas

$$L = 338.24 \quad (\text{Equation 13-6 or 13-7})$$

$$EQ$$

$$P = 0.591 \quad \text{Using Equation 1}$$

$$FM$$

$$v_{12} = v_F(P) = 3049 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
$v_{FO}$	5660	6900	No
$v_3$ or $v_{av34}$	2105 pc/h	(Equation 13-14 or 13-17)	
Is $v_3$ or $v_{av34} > 2700$ pc/h?		No	
Is $v_3$ or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3049$		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
$v_{R12}$	5660	4600	No

#### Level of Service Determination (if not F)

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 29.8 \quad \text{pc/mi/ln}$$

Level of service for ramp-freeway junction areas of influence D

#### Speed Estimation

Intermediate speed variable,	$M_S = 0.432$	
Space mean speed in ramp influence area,	$S_R = 52.2$	mph
Space mean speed in outer lanes,	$S_0 = 54.2$	mph
Space mean speed for all vehicles,	$S = 52.9$	mph