

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: 3/29/2011  
Analysis time period: PM  
Freeway/Dir of Travel: I-385 NB  
Junction: I-85 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	2	
Free-flow speed on freeway	60.0	mph
Volume on freeway	2854	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	55.0	mph
Volume on ramp	1629	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	759	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3100	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2854	1629	759	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	793	453	211	v
Trucks and buses	18	18	18	%
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	0.917	0.917	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3457	1973	919	pcph

#### Estimation of V12 Merge Areas

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

$$EQ$$

$$P = 1.000 \quad \text{Using Equation } 0$$

$$FM$$

$$v_{12} = v_F (P_{FM}) = 3457 \quad \text{pc/h}$$

#### Capacity Checks

		Actual	Maximum	LOS F?
v <sub>FO</sub>		5430	4600	Yes
v <sub>3</sub> or v <sub>av34</sub>	0	pc/h	(Equation 13-14 or 13-17)	
Is v <sub>3</sub> or v <sub>av34</sub> > 2700 pc/h?			No	
Is v <sub>3</sub> or v <sub>av34</sub> > 1.5 v <sub>12</sub> / 2			No	
If yes, v <sub>12A</sub> = 3457			(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v <sub>R12</sub>	5430	4600	Yes

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 18.7 \quad \text{pc/mi/ln}$$

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

#### Speed Estimation

Intermediate speed variable,	M	= 0.716	
Space mean speed in ramp influence area,	S <sub>R</sub>	= 47.1	mph
Space mean speed in outer lanes,	S <sub>0</sub>	= N/A	mph
Space mean speed for all vehicles,	S	= 47.1	mph