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-----Merge Analysis-----

Analyst: NJ
Agency/Co.: Florence & Hutcheson
Date performed: 3/24/2011
Analysis time period: AM
Freeway/Dir of Travel: I-85 NB
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	3878	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	214	vph
Length of first accel/decel lane	420	ft
Length of second accel/decel lane		ft

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

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	577	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	420	ft

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3878	214	577	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1077	59	160	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	4697	256	689	pcph

-----Estimation of V12 Merge Areas-----

$$L = 4458.39 \text{ (Equation 13-6 or 13-7)}$$

$$EQ$$

$$P = 0.980 \text{ Using Equation 3}$$

$$FM$$

$$v_{12} = v_F (P_{FM}) = 4602 \text{ pc/h}$$

-----Capacity Checks-----

	Actual	Maximum	LOS F?
v _{FO}	4953	6900	No
v ₃ or v _{av34}	95 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} = 4602		(Equation 13-15, 13-16, 13-18, or 13-19)	

-----Flow Entering Merge Influence Area-----

	Actual	Max Desirable	Violation?
v _{R12}	4953	4600	Yes

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 40.6 \text{ pc/mi/ln}$$

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

-----Speed Estimation-----

Intermediate speed variable,	M _S = 0.802	
Space mean speed in ramp influence area,	S _R = 45.6	mph
Space mean speed in outer lanes,	S ₀ = 60.0	mph
Space mean speed for all vehicles,	S = 45.8	mph