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Diverge Analysis

Analyst: JP
Agency/Co.: Florence & Hutcheson
Date performed: 4/5/2011
Analysis time period: PM
Freeway/Dir of Travel: I-385 SB
Junction: I-85
Jurisdiction: Greenville, SC
Analysis Year: 2015
Description: I-85/I-385 No-Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6594	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	2730	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	1796	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1600	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6594		2730		1796	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1832		758		499	v
Trucks and buses	18		18		18	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	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	7986	3306	2175	pcph

Estimation of V12 Diverge Areas

$$L = \text{(Equation 13-12 or 13-13)}$$

EQ

$$P = 0.260 \quad \text{Using Equation 0}$$

FD

$$v_{12} = v_R + (v_F - v_R) P = 4523 \quad \text{pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7986	9000	No
$v_{FO} = v_F - v_R$	4680	9000	No
v_R	3306	4200	No
v_3 or v_{av34}	1731 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, $v_{12A} = 4523$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4523	4400	Yes

Level of Service Determination (if not F)

Density,	$D = 4.252 + 0.0086 v_R - 0.009 L_D$	$= 2.6$	pc/mi/ln
Level of service for ramp-freeway junction areas of influence A			

Speed Estimation

Intermediate speed variable,	$D = 0.596$	
Space mean speed in ramp influence area,	$S_R = 47.3$	mph
Space mean speed in outer lanes,	$S_0 = 57.5$	mph
Space mean speed for all vehicles,	$S = 51.2$	mph