

Florence & Hutcheson
501 Huger Street
Columbia, SC 29201

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

Fax: (803)929-0334

Diverge 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 OFF-RAMP
Jurisdiction: Greenville, SC
Analysis Year: 2010
Description: I-85/I-385 Existing

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	60.0	mph
Volume on freeway	4134	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	30.0	mph
Volume on ramp	256	vph
Length of first accel/decel lane	700	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	214	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	500	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4134		256		214	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1148		71		59	v
Trucks and buses	18		15		15	%
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	0.930	0.930	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5007	306	256	pcph

Estimation of V12 Diverge Areas

L = (Equation 13-12 or 13-13)

EQ

P = 0.621 Using Equation 5

FD

$v_{12} = v_R + (v_F - v_R) P_{FD} = 3224 \text{ pc/h}$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5007	6900	No
$v_{FO} = v_F - v_R$	4701	6900	No
v_R	306	2000	No
v_3 or v_{av34}	1783 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700 \text{ pc/h?}$		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3224$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3224	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 25.7 \text{ pc/mi/ln}$

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

Speed Estimation

Intermediate speed variable,	$D_S = 0.521$	
Space mean speed in ramp influence area,	$S_R = 50.6$	mph
Space mean speed in outer lanes,	$S_0 = 62.8$	mph
Space mean speed for all vehicles,	$S = 54.4$	mph