

Phone: Fax:  
E-mail:

-----Diverge Analysis-----

Analyst:  
Agency/Co.: Stantec  
Date performed: 11/10/2016  
Analysis time period: 2:00PM-3:00PM  
Freeway/Dir of Travel: I-85 Northbound  
Junction: I-85 NB Off Ramp to Shelby Hwy  
Jurisdiction: SCDOT  
Analysis Year: 2040 Build Conditions  
Description:

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	69.5	mph
Volume on freeway	3361	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	330	vph
Length of first accel/decel lane	696	ft
Length of second accel/decel lane		ft

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

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	217	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1675	ft

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3361	330	217	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	894	88	58	v
Trucks and buses	30	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	1.5	1.5	
Recreational vehicle PCE, ER	2.0	1.2	1.2	

Heavy vehicle adjustment, fHV	0.690	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5185	351	231	pcph

#### Estimation of V12 Diverge Areas

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

EQ

$$P = 0.614 \quad \text{Using Equation 5}$$

FD

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 3320 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5185	7185	No
$v_{FO} = v_F - v_R$	4834	7185	No
$v_R$	351	2000	No
$v_3$ or $v_{av34}$	1865 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, $v_{12A} = 3320$		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
$v_{12}$	3320	4400	No

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

Density,	$D = 4.252 + 0.0086 v_R - 0.009 \frac{L}{D}$	$= 26.5$	pc/mi/ln
Level of service for ramp-freeway junction areas of influence C			

#### Speed Estimation

Intermediate speed variable,	$D_S = 0.460$	
Space mean speed in ramp influence area,	$S_R = 56.9$	mph
Space mean speed in outer lanes,	$S_0 = 72.9$	mph
Space mean speed for all vehicles,	$S = 61.7$	mph