

Phone: Fax:  
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### Diverge Analysis

Analyst:  
Agency/Co.: Stantec  
Date performed: 11/9/2016  
Analysis time period: 8:00AM-9:00AM  
Freeway/Dir of Travel: I-85 Northbound  
Junction: I-85 NB Off Ramp to Blacksburg  
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	69.8	mph
Volume on freeway	1932	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	399	vph
Length of first accel/decel lane	385	ft
Length of second accel/decel lane		ft

### Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	2	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	6362	ft

### Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1932	399	2	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	514	106	1	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	2980	424	2	pcph

#### Estimation of V12 Diverge Areas

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

EQ

$$P = 0.666 \quad \text{Using Equation 5}$$

FD

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 2126 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2980	7194	No
$v_{FO} = v_F - v_R$	2556	7194	No
$v_R$	424	2000	No
$v_3$ or $v_{av34}$	854 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, $v_{12A} = 2126$		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
$v_{12}$	2126	4400	No

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

Density,	$D = 4.252 + 0.0086 v_R - 0.009 L_D$	$= 19.1$	pc/mi/ln
Level of service for ramp-freeway junction areas of influence B			

#### Speed Estimation

Intermediate speed variable,	$D_S = 0.466$	
Space mean speed in ramp influence area,	$S_R = 56.8$	mph
Space mean speed in outer lanes,	$S_0 = 76.6$	mph
Space mean speed for all vehicles,	$S = 61.4$	mph