

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 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	3297	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	287	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	4	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)	3297	287	4	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	877	76	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	5086	305	4	pcph

Estimation of V12 Diverge Areas

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

EQ

$$P = 0.619 \quad \text{Using Equation 5}$$

FD

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 3264 \quad \text{pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5086	7194	No
$v_{FO} = v_F - v_R$	4781	7194	No
v_R	305	2000	No
v_3 or v_{av34}	1822 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, $v_{12A} = 3264$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3264	4400	No

Level of Service Determination (if not F)

Density,	$D = 4.252 + 0.0086 v_R - 0.009 \frac{L}{D}$	$= 28.9$	pc/mi/ln
Level of service for ramp-freeway junction areas of influence D			

Speed Estimation

Intermediate speed variable,	$D_S = 0.455$	
Space mean speed in ramp influence area,	$S_R = 57.1$	mph
Space mean speed in outer lanes,	$S_0 = 73.4$	mph
Space mean speed for all vehicles,	$S = 62.1$	mph