

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 US 29
 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	70.7	mph
Volume on freeway	2941	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	110	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

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

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	113	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	745	ft

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2941	110	113	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	782	29	30	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	4537	117	120	pcph

Estimation of V12 Diverge Areas

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

EQ

$$P = 0.641 \quad \text{Using Equation 5}$$

FD

$$v_{12} = v_R + (v_F - v_R) P = 2951 \quad \text{pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4537	7200	No
$v_{FO} = v_F - v_R$	4420	7200	No
v_R	117	2000	No
v_3 or v_{av34}	1586 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, $v_{12A} = 2951$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2951	4400	No

Level of Service Determination (if not F)

Density,	$D = 4.252 + 0.0086 v_R - 0.009 L_D$	$= 16.1$	pc/mi/ln
Level of service for ramp-freeway junction areas of influence B			

Speed Estimation

Intermediate speed variable,	$D_S = 0.439$	
Space mean speed in ramp influence area,	$S_R = 58.1$	mph
Space mean speed in outer lanes,	$S_0 = 75.3$	mph
Space mean speed for all vehicles,	$S = 63.1$	mph