

Phone: Fax:
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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 Frontage
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	70.3	mph
Volume on freeway	3584	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	4	vph
Length of first accel/decel lane	453	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	10	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	4730	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3584	4	10	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	953	1	3	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	5529	4	11	pcph

Estimation of V12 Diverge Areas

$$L = 55.59 \quad (\text{Equation 13-12 or 13-13})$$

$$EQ$$

$$P = 0.622 \quad \text{Using Equation 5}$$

$$FD$$

$$v_{12R} = v_F + (v_R - v_F) P = 3438 \quad \text{pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5529	7200	No
$v_{FO} = v_F - v_R$	5525	7200	No
v_R	4	2000	No
v_3 or v_{av34}	2091 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, $v_{12A} = 3438$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3438	4400	No

Level of Service Determination (if not F)

$$\text{Density, } D = 4.252 + 0.0086 v_R - 0.009 L_D = 29.7 \quad \text{pc/mi/ln}$$

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

Speed Estimation

Intermediate speed variable,	$D_S = 0.428$	
Space mean speed in ramp influence area,	$S_R = 58.2$	mph
Space mean speed in outer lanes,	$S_0 = 72.9$	mph
Space mean speed for all vehicles,	$S = 63.0$	mph