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Diverge Analysis

Analyst: JP
Agency/Co.: Florence & Hutcheson
Date performed: 8/25/2011
Analysis time period: AM
Freeway/Dir of Travel: I-385 SB
Junction: I-385 SB to Woodruff
Jurisdiction: Greenville, SC
Analysis Year: 2035
Description: I-85/I-385 Alternate 4A

Freeway Data

| | | |
|----------------------------|---------|-----|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 55.0 | mph |
| Volume on freeway | 3060 | vph |

Off Ramp Data

| | | |
|-----------------------------------|-------|-----|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 818 | vph |
| Length of first accel/decel lane | 0 | ft |
| Length of second accel/decel lane | | ft |

Adjacent Ramp Data (if one exists)

| | | |
|---------------------------|----------|-----|
| Does adjacent ramp exist? | Yes | |
| Volume on adjacent ramp | 2537 | vph |
| Position of adjacent ramp | Upstream | |
| Type of adjacent ramp | Off | |
| Distance to adjacent ramp | 1250 | ft |

Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|------------------------------|---------|---------|---------------|-----|
| Volume, V (vph) | 3060 | 818 | 2537 | vph |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | |
| Peak 15-min volume, v15 | 850 | 227 | 705 | v |
| Trucks and buses | 18 | 18 | 18 | % |
| Recreational vehicles | 0 | 0 | 0 | % |
| Terrain type: | Level | Level | Level | |
| Grade | 0.00 % | 0.00 % | 0.00 % | |
| Length | 0.00 mi | 0.00 mi | 0.00 mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | 1.2 | |

| | | | | |
|-------------------------------|-------|-------|-------|------|
| Heavy vehicle adjustment, fHV | 0.917 | 0.917 | 0.917 | |
| Driver population factor, fP | 1.00 | 1.00 | 1.00 | |
| Flow rate, vp | 3706 | 991 | 3073 | pcph |

Estimation of V12 Diverge Areas

L = (Equation 13-12 or 13-13)

EQ

P = 0.622 Using Equation 5

FD

$v_{12} = v_R + (v_F - v_R) P = 2679$ pc/h

Capacity Checks

| | Actual | Maximum | LOS F? |
|---|-----------|--|--------|
| $v_{Fi} = v_F$ | 3706 | 6750 | No |
| $v_{FO} = v_F - v_R$ | 2715 | 6750 | No |
| v_R | 991 | 2100 | No |
| v_3 or v_{av34} | 1027 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, $v_{12A} = 2679$ | | (Equation 13-15, 13-16, 13-18, or 13-19) | |

Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|----------|--------|---------------|------------|
| v_{12} | 2679 | 4400 | No |

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D = 27.3$ pc/mi/ln

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

Speed Estimation

| | | |
|--|---------------|-----|
| Intermediate speed variable, | $D_S = 0.387$ | |
| Space mean speed in ramp influence area, | $S_R = 50.0$ | mph |
| Space mean speed in outer lanes, | $S_0 = 60.2$ | mph |
| Space mean speed for all vehicles, | $S = 52.4$ | mph |