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_____Merge Analysis_____

Analyst: JP
Agency/Co.: Florence & Hutcheson
Date performed: 9/29/2011
Analysis time period: PM
Freeway/Dir of Travel: I-85 NB
Junction: Woodruff NB to I-85NB C-D
Jurisdiction: Greenville, SC
Analysis Year: 2010
Description: I-85/I-385 Existing

_____Freeway Data_____

| | | |
|----------------------------|-------|-----|
| Type of analysis | Merge | |
| Number of lanes in freeway | 2 | |
| Free-flow speed on freeway | 55.0 | mph |
| Volume on freeway | 1486 | vph |

_____On Ramp Data_____

| | | |
|-----------------------------------|-------|-----|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 903 | vph |
| Length of first accel/decel lane | 700 | ft |
| Length of second accel/decel lane | | ft |

_____Adjacent Ramp Data (if one exists)_____

| | | |
|---------------------------|----------|-----|
| Does adjacent ramp exist? | Yes | |
| Volume on adjacent Ramp | 846 | vph |
| Position of adjacent Ramp | Upstream | |
| Type of adjacent Ramp | On | |
| Distance to adjacent Ramp | 700 | ft |

_____Conversion to pc/h Under Base Conditions_____

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|------------------------------|---------|-------|---------------|-----|
| Volume, V (vph) | 1486 | 903 | 846 | vph |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | |
| Peak 15-min volume, v15 | 413 | 251 | 235 | v |
| Trucks and buses | 18 | 18 | 18 | % |
| Recreational vehicles | 0 | 0 | 0 | % |
| Terrain type: | Level | Level | Level | |
| Grade | % | % | % | |
| Length | mi | mi | 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 | 1800 | 1094 | 1025 | pcph |

-----Estimation of V12 Merge Areas-----

$$L = \text{(Equation 13-6 or 13-7)}$$

$$EQ$$

$$P = 1.000 \quad \text{Using Equation } 0$$

$$FM$$

$$v_{12} = v_F(P_{FM}) = 1800 \quad \text{pc/h}$$

-----Capacity Checks-----

| | | | | |
|--|---|--------|--|--------|
| | | Actual | Maximum | LOS F? |
| v _{FO} | | 2894 | 4500 | No |
| v ₃ or v _{av34} | 0 | 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} = 1800 | | | (Equation 13-15, 13-16, 13-18, or 13-19) | |

-----Flow Entering Merge Influence Area-----

| | | | |
|------------------|--------|---------------|------------|
| | Actual | Max Desirable | Violation? |
| v _{R12} | 2894 | 4600 | No |

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 23.2 \quad \text{pc/mi/ln}$$

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

-----Speed Estimation-----

| | | | |
|--|----------------|---------|-----|
| Intermediate speed variable, | M | = 0.328 | |
| Space mean speed in ramp influence area, | S _R | = 50.7 | mph |
| Space mean speed in outer lanes, | S ₀ | = N/A | mph |
| Space mean speed for all vehicles, | S | = 50.7 | mph |