

Phone: Fax:  
E-mail:

-----Merge Analysis-----

Analyst:  
Agency/Co.: Stantec  
Date performed: 11/9/2016  
Analysis time period: 8:00AM-9:00AM  
Freeway/Dir of Travel: I-85 Northbound  
Junction: Shelby Hwy On Ramp to I-85 NB  
Jurisdiction: SCDOT  
Analysis Year: 2040 Build Conditions  
Description:

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	69.5	mph
Volume on freeway	2126	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	197	vph
Length of first accel/decel lane	560	ft
Length of second accel/decel lane		ft

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

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	235	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1675	ft

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2126	197	235	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	565	52	63	v
Trucks and buses	30	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	%	%	%	
Length	mi	mi	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	3279	210	250	pcph

#### Estimation of V12 Merge Areas

$$L = 423.49 \quad (\text{Equation 13-6 or 13-7})$$

$$EQ$$

$$P = 0.593 \quad \text{Using Equation 1}$$

$$FM$$

$$v_{12} = v_F (P_{FM}) = 1945 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
v <sub>FO</sub>	3489	7185	No
v <sub>3</sub> or v <sub>av34</sub>	1334 pc/h	(Equation 13-14 or 13-17)	
Is v <sub>3</sub> or v <sub>av34</sub> > 2700 pc/h?		No	
Is v <sub>3</sub> or v <sub>av34</sub> > 1.5 v <sub>12</sub> / 2		Yes	
If yes, v <sub>12A</sub> = 1945		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v <sub>12A</sub>	2155	4600	No

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 18.7 \quad \text{pc/mi/ln}$$

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

#### Speed Estimation

Intermediate speed variable,	M <sub>S</sub> = 0.315	
Space mean speed in ramp influence area,	S <sub>R</sub> = 60.8	mph
Space mean speed in outer lanes,	S <sub>0</sub> = 66.5	mph
Space mean speed for all vehicles,	S = 62.9	mph

Phone: Fax:  
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-----Merge Analysis-----

Analyst:  
Agency/Co.: Stantec  
Date performed: 11/9/2016  
Analysis time period: 8:00AM-9:00AM  
Freeway/Dir of Travel: I-85 Northbound  
Junction: Shelby Hwy On Ramp to I-85 NB  
Jurisdiction: SCDOT  
Analysis Year: 2040 Build Conditions  
Description:

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	69.5	mph
Volume on freeway	2126	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	197	vph
Length of first accel/decel lane	560	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	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	5100	ft

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2126	197	10	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	565	52	3	v
Trucks and buses	30	0	100	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	%	%	%	
Length	mi	mi	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	0.667	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3279	210	16	pcph

#### Estimation of V12 Merge Areas

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

$$EQ$$

$$P = 0.593 \quad \text{Using Equation 1}$$

$$FM$$

$$v_{12} = v_F (P_{FM}) = 1945 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
v <sub>FO</sub>	3489	7185	No
v <sub>3</sub> or v <sub>av34</sub>	1334 pc/h	(Equation 13-14 or 13-17)	
Is v <sub>3</sub> or v <sub>av34</sub> > 2700 pc/h?		No	
Is v <sub>3</sub> or v <sub>av34</sub> > 1.5 v <sub>12</sub> / 2		Yes	
If yes, v <sub>12A</sub> = 1945		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v <sub>12A</sub>	2155	4600	No

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 18.7 \quad \text{pc/mi/ln}$$

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

#### Speed Estimation

Intermediate speed variable,	M <sub>S</sub> = 0.315	
Space mean speed in ramp influence area,	S <sub>R</sub> = 60.8	mph
Space mean speed in outer lanes,	S <sub>0</sub> = 66.5	mph
Space mean speed for all vehicles,	S = 62.9	mph

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 E-mail: \_\_\_\_\_

\_\_\_\_\_ Merge Analysis \_\_\_\_\_

Analyst: \_\_\_\_\_  
 Agency/Co.: Stantec  
 Date performed: 11/9/2016  
 Analysis time period: 8:00AM-9:00AM  
 Freeway/Dir of Travel: I-85 Northbound  
 Junction: Gaffney Ferry On Ramp to I-85  
 Jurisdiction: SCDOT  
 Analysis Year: 2040 Build Conditions  
 Description: \_\_\_\_\_

\_\_\_\_\_ Freeway Data \_\_\_\_\_

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	69.8	mph
Volume on freeway	2323	vph

\_\_\_\_\_ On Ramp Data \_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	10	vph
Length of first accel/decel lane	780	ft
Length of second accel/decel lane		ft

\_\_\_\_\_ Adjacent Ramp Data (if one exists) \_\_\_\_\_

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	197	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	5100	ft

\_\_\_\_\_ Conversion to pc/h Under Base Conditions \_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2323	10	197	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	618	3	52	v
Trucks and buses	30	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	%	%	%	
Length	mi	mi	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	3583	11	210	pcph

#### Estimation of V12 Merge Areas

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

$$EQ$$

$$P = 0.599 \quad \text{Using Equation 1}$$

$$FM$$

$$v_{12} = v_F (P_{FM}) = 2147 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
$v_{FO}$	3594	7194	No
$v_3$ or $v_{av34}$	1436 pc/h	(Equation 13-14 or 13-17)	
Is $v_3$ or $v_{av34} > 2700$ pc/h?		No	
Is $v_3$ or $v_{av34} > 1.5 v_{12} / 2$		Yes	
If yes, $v_{12A} = 2147$		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
$v_{12A}$	2158	4600	No

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 17.4 \quad \text{pc/mi/ln}$$

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

#### Speed Estimation

Intermediate speed variable,	$M_S = 0.300$	
Space mean speed in ramp influence area,	$S_R = 61.5$	mph
Space mean speed in outer lanes,	$S_0 = 66.4$	mph
Space mean speed for all vehicles,	$S = 63.4$	mph

Phone: Fax:  
E-mail:

-----Merge Analysis-----

Analyst:  
Agency/Co.: Stantec  
Date performed: 11/9/2016  
Analysis time period: 8:00AM-9:00AM  
Freeway/Dir of Travel: I-85 Northbound  
Junction: Gaffney Ferry On Ramp to I-85  
Jurisdiction: SCDOT  
Analysis Year: 2040 Build Conditions  
Description:

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	69.8	mph
Volume on freeway	2323	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	10	vph
Length of first accel/decel lane	780	ft
Length of second accel/decel lane		ft

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

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	4730	ft

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2323	10	2	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	618	3	1	v
Trucks and buses	30	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	%	%	%	
Length	mi	mi	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	3583	11	2	pcph

Estimation of V12 Merge Areas				
L	=	10.36	(Equation 13-6 or 13-7)	
EQ				
P	=	0.599	Using Equation 1	
FM				
v <sub>12</sub>	= v <sub>F</sub> (P <sub>FM</sub> )	=	2147	pc/h

Capacity Checks				
v <sub>FO</sub>		Actual	Maximum	LOS F?
		3594	7194	No
v <sub>3</sub> or v <sub>av34</sub>		1436 pc/h	(Equation 13-14 or 13-17)	
Is v <sub>3</sub> or v <sub>av34</sub>	> 2700 pc/h?		No	
Is v <sub>3</sub> or v <sub>av34</sub>	> 1.5 v <sub>12</sub> /2		Yes	
If yes, v <sub>12A</sub>	= 2147	(Equation 13-15, 13-16, 13-18, or 13-19)		

Flow Entering Merge Influence Area			
v <sub>12A</sub>	Actual	Max Desirable	Violation?
	2158	4600	No

Level of Service Determination (if not F)				
Density, D <sub>R</sub>	=	5.475 + 0.00734 v <sub>R</sub> + 0.0078 v <sub>12</sub> - 0.00627 L <sub>A</sub>	=	17.4 pc/mi/ln
Level of service for ramp-freeway junction areas of influence B				

Speed Estimation			
Intermediate speed variable,	M <sub>S</sub>	=	0.300
Space mean speed in ramp influence area,	S <sub>R</sub>	=	61.5 mph
Space mean speed in outer lanes,	S <sub>0</sub>	=	66.4 mph
Space mean speed for all vehicles,	S	=	63.4 mph

Phone: Fax:  
E-mail:

### Merge Analysis

Analyst:  
Agency/Co.: Stantec  
Date performed: 11/9/2016  
Analysis time period: 8:00AM-9:00AM  
Freeway/Dir of Travel: I-85 Northbound  
Junction: Blacksburg On Ramp to I-85 NB  
Jurisdiction: SCDOT  
Analysis Year: 2040 Build Conditions  
Description:

### Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	69.8	mph
Volume on freeway	1932	vph

### On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	102	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane		ft

### Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	399	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1440	ft

### Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1932	102	399	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	514	27	106	v
Trucks and buses	30	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	%	%	%	
Length	mi	mi	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	2980	109	424	pcph

#### Estimation of V12 Merge Areas

$$L = 488.85 \quad (\text{Equation 13-6 or 13-7})$$

$$EQ$$

$$P = 0.603 \quad \text{Using Equation 1}$$

$$FM$$

$$v_{12} = v_F (P_{FM}) = 1796 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
v <sub>FO</sub>	3089	7194	No
v <sub>3</sub> or v <sub>av34</sub>	1184 pc/h	(Equation 13-14 or 13-17)	
Is v <sub>3</sub> or v <sub>av34</sub> > 2700 pc/h?		No	
Is v <sub>3</sub> or v <sub>av34</sub> > 1.5 v <sub>12</sub> / 2		Yes	
If yes, v <sub>12A</sub> = 1796		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v <sub>12A</sub>	1905	4600	No

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 14.6 \quad \text{pc/mi/ln}$$

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

#### Speed Estimation

Intermediate speed variable,	M <sub>S</sub> = 0.284	
Space mean speed in ramp influence area,	S <sub>R</sub> = 61.9	mph
Space mean speed in outer lanes,	S <sub>0</sub> = 67.3	mph
Space mean speed for all vehicles,	S = 63.9	mph

Phone: Fax:  
E-mail:

### Merge Analysis

Analyst:  
Agency/Co.: Stantec  
Date performed: 11/9/2016  
Analysis time period: 8:00AM-9:00AM  
Freeway/Dir of Travel: I-85 Northbound  
Junction: SC 5 On Ramp to I-85 NB  
Jurisdiction: SCDOT  
Analysis Year: 2040 Build Conditions  
Description:

### Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.7	mph
Volume on freeway	1691	vph

### On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	186	vph
Length of first accel/decel lane	1375	ft
Length of second accel/decel lane		ft

### Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	343	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3940	ft

### Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1691	186	343	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	450	49	91	v
Trucks and buses	30	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	%	%	%	
Length	mi	mi	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	2608	198	365	pcph

#### Estimation of V12 Merge Areas

$$L = 639.18 \quad (\text{Equation 13-6 or 13-7})$$

$$EQ$$

$$P = 0.616 \quad \text{Using Equation 1}$$

$$FM$$

$$v_{12} = v_F(P_{FM}) = 1607 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
v <sub>FO</sub>	2806	7200	No
v <sub>3</sub> or v <sub>av34</sub>	1001 pc/h	(Equation 13-14 or 13-17)	
Is v <sub>3</sub> or v <sub>av34</sub> > 2700 pc/h?		No	
Is v <sub>3</sub> or v <sub>av34</sub> > 1.5 v <sub>12</sub> / 2		Yes	
If yes, v <sub>12A</sub> = 1607		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v <sub>12A</sub>	1805	4600	No

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 10.8 \quad \text{pc/mi/ln}$$

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

#### Speed Estimation

Intermediate speed variable,	M <sub>S</sub> = 0.248	
Space mean speed in ramp influence area,	S <sub>R</sub> = 63.6	mph
Space mean speed in outer lanes,	S <sub>0</sub> = 68.9	mph
Space mean speed for all vehicles,	S = 65.4	mph

Phone: Fax:  
E-mail:

### Merge Analysis

Analyst:  
Agency/Co.: Stantec  
Date performed: 11/9/2016  
Analysis time period: 8:00AM-9:00AM  
Freeway/Dir of Travel: I-85 Northbound  
Junction: Tribal Rd On Ramp to I-85 NB  
Jurisdiction: SCDOT  
Analysis Year: 2040 Build Conditions  
Description:

### Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.3	mph
Volume on freeway	1678	vph

### On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	141	vph
Length of first accel/decel lane	1064	ft
Length of second accel/decel lane		ft

### Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	199	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1111	ft

### Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1678	141	199	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	446	38	53	v
Trucks and buses	30	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	%	%	%	
Length	mi	mi	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	2588	150	212	pcph

#### Estimation of V12 Merge Areas

$$L = 486.55 \quad (\text{Equation 13-6 or 13-7})$$

$$EQ$$

$$P = 0.607 \quad \text{Using Equation 1}$$

$$FM$$

$$v_{12} = v_F (P_{FM}) = 1572 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
v <sub>FO</sub>	2738	7200	No
v <sub>3</sub> or v <sub>av34</sub>	1016 pc/h	(Equation 13-14 or 13-17)	
Is v <sub>3</sub> or v <sub>av34</sub> > 2700 pc/h?		No	
Is v <sub>3</sub> or v <sub>av34</sub> > 1.5 v <sub>12</sub> / 2		Yes	
If yes, v <sub>12A</sub> = 1572		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v <sub>12A</sub>	1722	4600	No

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 12.2 \quad \text{pc/mi/ln}$$

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

#### Speed Estimation

Intermediate speed variable,	M <sub>S</sub> = 0.268	
Space mean speed in ramp influence area,	S <sub>R</sub> = 62.7	mph
Space mean speed in outer lanes,	S <sub>0</sub> = 68.4	mph
Space mean speed for all vehicles,	S = 64.7	mph

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 E-mail: \_\_\_\_\_

\_\_\_\_\_ Merge Analysis \_\_\_\_\_

Analyst: \_\_\_\_\_  
 Agency/Co.: Stantec  
 Date performed: 11/9/2016  
 Analysis time period: 8:00AM-9:00AM  
 Freeway/Dir of Travel: I-85 Northbound  
 Junction: US 29 On Ramp to I-85 NB  
 Jurisdiction: SCDOT  
 Analysis Year: 2040 Build Conditions  
 Description: \_\_\_\_\_

\_\_\_\_\_ Freeway Data \_\_\_\_\_

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.7	mph
Volume on freeway	1758	vph

\_\_\_\_\_ On Ramp Data \_\_\_\_\_

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	113	vph
Length of first accel/decel lane	580	ft
Length of second accel/decel lane		ft

\_\_\_\_\_ Adjacent Ramp Data (if one exists) \_\_\_\_\_

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	61	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	745	ft

\_\_\_\_\_ Conversion to pc/h Under Base Conditions \_\_\_\_\_

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1758	113	61	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	468	30	16	v
Trucks and buses	30	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	%	%	%	
Length	mi	mi	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	2712	120	65	pcph

#### Estimation of V12 Merge Areas

$$L = 291.77 \quad (\text{Equation 13-6 or 13-7})$$

EQ

$$P = 0.594 \quad \text{Using Equation 1}$$

FM

$$v_{12} = v_F (P_{FM}) = 1610 \quad \text{pc/h}$$

12 F FM

#### Capacity Checks

	Actual	Maximum	LOS F?
v <sub>FO</sub>	2832	7200	No
v <sub>3</sub> or v <sub>av34</sub>	1102 pc/h	(Equation 13-14 or 13-17)	
Is v <sub>3</sub> or v <sub>av34</sub> > 2700 pc/h?		No	
Is v <sub>3</sub> or v <sub>av34</sub> > 1.5 v <sub>12</sub> / 2		Yes	
If yes, v <sub>12A</sub> = 1610		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v <sub>12A</sub>	1730	4600	No

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 15.3 \quad \text{pc/mi/ln}$$

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

#### Speed Estimation

Intermediate speed variable,	M <sub>S</sub> = 0.302	
Space mean speed in ramp influence area,	S <sub>R</sub> = 62.0	mph
Space mean speed in outer lanes,	S <sub>0</sub> = 68.5	mph
Space mean speed for all vehicles,	S = 64.4	mph