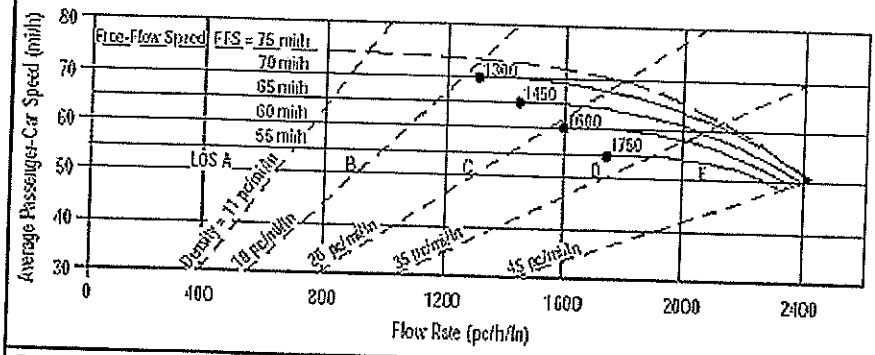
2032 Build - Preferred Alternative

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*
Project Description	Wekiva Parkway PD&E

Site Information

Highway/Direction of Travel	*I-4/Eastbound*
From/To	*Lake Mary Blvd /CR 46A/SR417*
Jurisdiction	
Analysis Year	*2032 Build*

☑ Oper.(LOS) ☑ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*6470*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.45*	l/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*0.0*	mi/h
f_N	*3.0*	mi/h
FFS	*67.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p) *2372*		pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

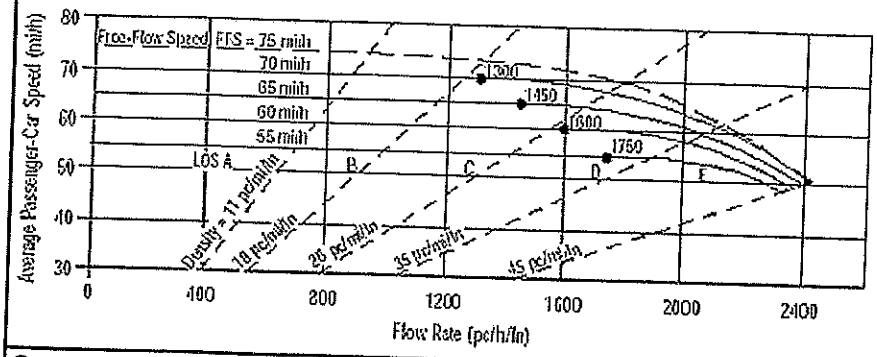
Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*I-4/Eastbound*
From/To	*CR 46A/SR 417/SR 46*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

☑ Oper.(LOS) ☑ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*4820*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.54*	I/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*0.2*	mi/h
f_N	*3.0*	mi/h
FFS	*66.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1767*	pc/h/ln
S	*65.6*	mi/h
D = v_p / S	*26.9*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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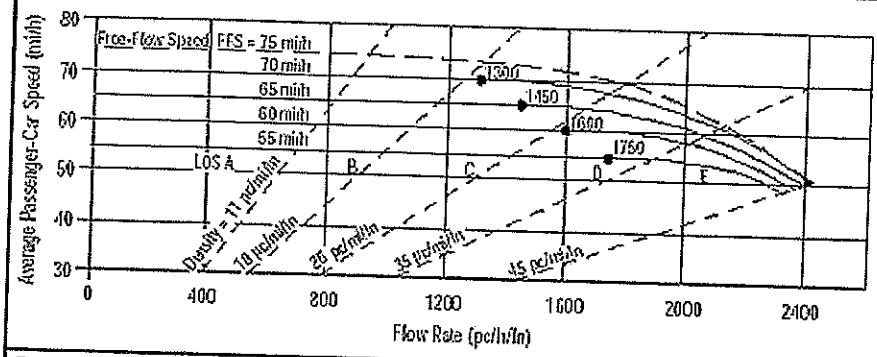
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*I-4/Eastbound*
From/To	*SR 46/US17/92*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7130*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.67*	I/mi
Number of Lanes, N	*4*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*0.9*	mi/h
f_N	*1.5*	mi/h
FFS	*67.6*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1961*	pc/h/ln
S	*63.9*	mi/h
D = v_p / S	*30.7*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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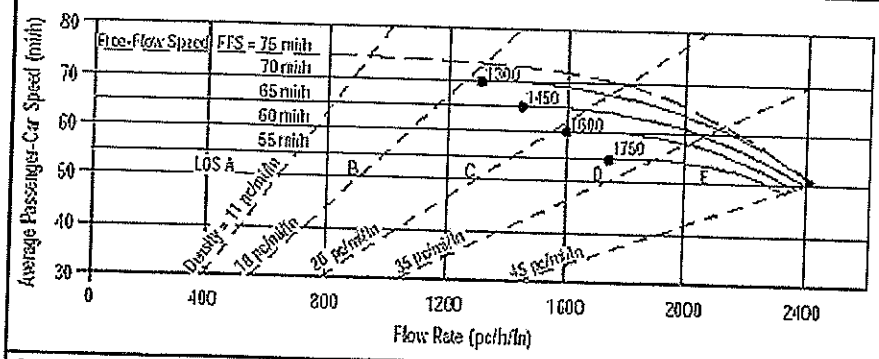
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*I-4/Eastbound*
From/To	*Us17/92 to Volusia County Line*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

☑ Oper.(LOS) ☑ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*6560*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*9*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*2.00*	I/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*7.5*	mi/h
f_N	*3.0*	mi/h
FFS	*59.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p) *2405*		pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S		mi/h
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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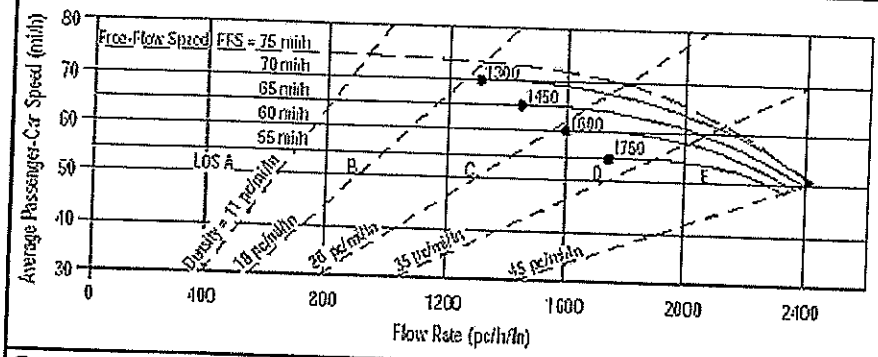
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*SR 417/Westbound*
From/To	*North of Rinehart Rd/Rinehart*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

☑ Oper.(LOS) ☑ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*6150*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.40*	I/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*0.0*	mi/h
f_N	*3.0*	mi/h
FFS	*67.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2266*	pc/h/ln
S	*56.3*	mi/h
D = v_p / S	*40.3*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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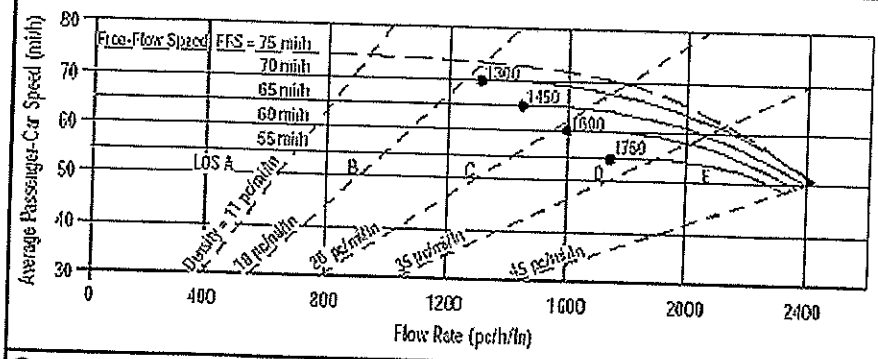
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*SR 417/Westbound*
From/To	*Rinehart Rd to I-4*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5420*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*2.00*	I/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*7.5*	mi/h
f_N	*3.0*	mi/h
FFS	*59.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1997*	pc/h/ln
S	*57.6*	mi/h
D = v_p / S	*34.7*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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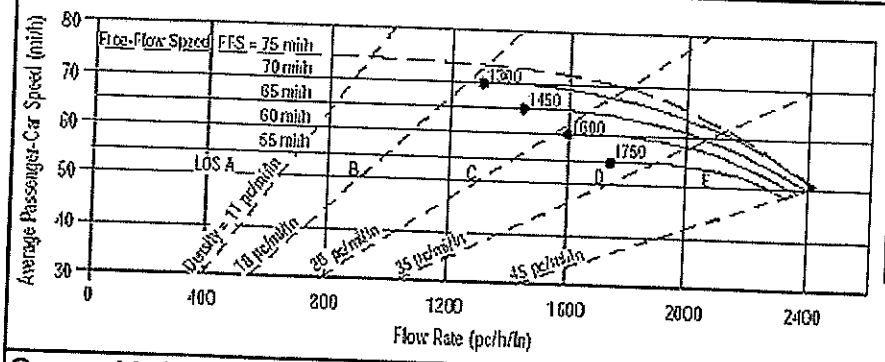
BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*SR 417/Westbound*
From/To	*I-4 to CD Road*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4460*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*10*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*2.00*	I/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*7.5*	mi/h
f_N	*3.0*	mi/h
FFS	*59.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1643*	pc/h/ln
S	*59.5*	mi/h
D = v_p / S	*27.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	mi/h
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
f_p - Page 23-12	f_N - Exhibit 23-6
LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7

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SR 417 WB ON from Rinehart.txt

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	SR 417 WB
Junction:	On Ramp from Rinehart Rd
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4800	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	660	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	1350	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4800		660		1350		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1304		179		367		v
Trucks and buses	10		10		10		%
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	0.952		0.952		0.952		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 5478 753 1541 pcph

Estimation of V12 Merge Areas

L_{EQ} = 1427.63 (Equation 25-2 or 25-3)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3394 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6231	6750	No
v_3 or v_{av34}	2084 pc/h	(Equation 25-4 or 25-5)	
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} = 3394		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3394	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.463

Space mean speed in ramp influence area, S_R = 49.0 mph

Space mean speed in outer lanes, S_O = 49.3 mph

Space mean speed for all vehicles, S = 49.1 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	SR 417 EB
Junction:	Off Ramp to Rinehart Rd
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5460	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	660	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	1350	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2402	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5460		660		1350	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	1484		179		367	v
Trucks and buses	10		10		9	%
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	0.952		0.952		0.957	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp 6232 753 1533 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3142 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6232	9000	No
$v_{FO} = v_F - v_R$	5479	9000	No
v_R	753	2000	No
v_3 or v_{av34}	1545 pc/h	(Equation 25-15 or 25-16)	
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} = 3142		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3142	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 31.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.496

Space mean speed in ramp influence area, S_R = 48.6 mph

Space mean speed in outer lanes, S_O = 58.2 mph

Space mean speed for all vehicles, S = 52.9 mph

SR 417 EB ON from Rinehart.txt

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	SR 417 EB
Junction:	On Ramp from Rinehart Rd
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4800	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	1350	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	660	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2402	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4800	1350	660	vph
Peak-hour factor, PHF	0.95	0.95	0.95	
Peak 15-min volume, v15	1263	355	174	v
Trucks and buses	10	10	10	%
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	0.952	0.952	0.952	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 5305 1492 729 pcph

Estimation of V12 Merge Areas

L_{EQ} = 1326.76 (Equation 25-2 or 25-3)

P_{FM} = 0.605 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3212 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6797	6750	Yes
$v_{3 \text{ or } av34}$	2093 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3212		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3212	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 35.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.682

Space mean speed in ramp influence area, S_R = 46.1 mph

Space mean speed in outer lanes, S_O = 49.3 mph

Space mean speed for all vehicles, S = 47.1 mph

SR 417 WB OFF to Rinehart.txt

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	SR 417 WB
Junction:	Off Ramp to Rinehart Rd
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6150	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1350	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	660	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1833	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6150		1350		660		vph
Peak-hour factor, PHF	0.95		0.95		0.95		
Peak 15-min volume, v15	1618		355		174		v
Trucks and buses	10		10		10		%
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	0.952		0.952		0.952		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 6797 1492 729 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3879 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6797	6750	Yes
$v_{FO} = v_F - v_R$	5305	6750	No
v_R	1492	3800	No
v_3 or v_{av34}	2918 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	
If yes, v_{12A} = 4097		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4097	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 30.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.562

Space mean speed in ramp influence area, S_R = 47.7 mph

Space mean speed in outer lanes, S_O = 53.7 mph

Space mean speed for all vehicles, S = 49.9 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	1/2/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. WB CD
Junction:	Off Ramp to Wekiva Pkwy. WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	540	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	520	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	330	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	540		520		330		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	150		144		92		v
Trucks and buses	0		0		0		%
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	1.000		1.000		1.000		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	600		578		367		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 600 pc/h

Capacity Checks

		Actual		Maximum	LOS F?
$v_{Fi} = v_F$		600		4500	No
$v_{FO} = v - v_R$		22		4500	No
v_R		578		2000	No
v_3 or v_{av34}		0	pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?			No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2			No	

If yes, $v_{12A} = v_{12} - v_{34av}$ or v_{12} (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	600	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 4.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.480	
Space mean speed in ramp influence area,	S_R = 48.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 48.8	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	12/28/2006
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (East of I-4) EB
Junction:	Off Ramp to I-4 NB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2270	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	990	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	990	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3010	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2270		990		990		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	631		275		275		v
Trucks and buses	0		0		0		%
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	1.000		1.000		1.000		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	2522		1100		1100		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1740 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
$v_{Fi} = v_F$		2522	6750	No
$v_{FO} = v_F - v_R$		1422	6750	No
v_R		1100	3800	No
v_3 or v_{av34}		782 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?		No	
Is v_3 or v_{av34}	> 1.5 v_R /2		No	

If yes, $v_{12A} = v_{av34} + v_{12}$ (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1740	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 6.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.527	
Space mean speed in ramp influence area,	S_R = 48.1	mph
Space mean speed in outer lanes,	S_O = 60.3	mph
Space mean speed for all vehicles,	S = 51.0	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (West of I-4) WB
Junction:	On Ramp from SR 46 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1270	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	1840	vph
Length of first accel/decel lane	600	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	900	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1320	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1270	1840	900	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	345	500	245	v
Trucks and buses	9	9	9	%
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	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp	1443	2090	1022	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1443 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3533	4500	No
v_3 or v_{av34}	0 pc/h	(Equation 25-4 or 25-5)	
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} = 1443		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1443	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.412	
Space mean speed in ramp influence area,	S_R = 49.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.6	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	3/11/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from SR 46
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5810	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1320	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	990	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3172	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5810	1320	990	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1614	367	275	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6456	1467	1100	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1349 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7923	9000	No
v_3 or v_{av34}	2553 pc/h	(Equation 25-4 or 25-5)	
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} = 2582		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2582	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.440	
Space mean speed in ramp influence area,	S_R = 49.3	mph
Space mean speed in outer lanes,	S_O = 49.8	mph
Space mean speed for all vehicles,	S = 49.5	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 WB
Junction:	Off Ramp to SR 46
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7130	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1320	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	3260	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	6098	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7130		1320		3260	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	1937		359		886	v
Trucks and buses	9		9		9	%
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	0.957		0.957		0.957	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp 8099 1499 3703 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3215 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8099	9000	No
$v_{FO} = v_F - v_R$	6600	9000	No
v_R	1499	3800	No
v_3 or v_{av34}	2442 pc/h	(Equation 25-15 or 25-16)	
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} = 3239		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3239	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 27.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.563

Space mean speed in ramp influence area, S_R = 47.7 mph

Space mean speed in outer lanes, S_O = 54.8 mph

Space mean speed for all vehicles, S = 51.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	03/11/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	SR 417 EB
Junction:	On Ramp from I-4 EB & WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Project

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1480	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	1990	vph
Length of first accel/decel lane	1100	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1170	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3106	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1480	1990	1170	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	411	553	325	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1644	2211	1300	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.292 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 480 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3855	9000	No
v_3 or v_{av34}	582 pc/h	(Equation 25-4 or 25-5)	
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} = 657		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	657	4400	No

!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.313	
Space mean speed in ramp influence area,	S_R = 50.9	mph
Space mean speed in outer lanes,	S_O = 55.0	mph
Space mean speed for all vehicles,	S = 51.9	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	12/28/2006
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (East of I-4) EB
Junction:	Off Ramp to I-4 NB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2270	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	990	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	1450	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1976	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2270		990		1450		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	617		269		394		v
Trucks and buses	9		10		9		%
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	0.957		0.952		0.957		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp	2578	1130	1647	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 37082.89 Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 6

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2578 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2578	6750	No
$v_{FO} = v_F - v_R$	1448	6750	No
v_R	1130	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
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} = 2578		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2578	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 19.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.530	
Space mean speed in ramp influence area,	S_R = 48.1	mph
Space mean speed in outer lanes,	S_O = 60.3	mph
Space mean speed for all vehicles,	S = 47.6	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	02/07/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	SR 417 WB
Junction:	On Ramp from I-4 NB & SB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2300	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	1270	vph
Length of first accel/decel lane	1325	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1200	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2076	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2300	1270	1200	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	639	353	333	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, E_T	1.5	1.5	1.5	
Recreational vehicle PCE, E_R	1.2	1.2	1.2	
Heavy vehicle adjustment, f_{HV}	1.000	1.000	1.000	
Driver population factor, f_P	1.00	1.00	1.00	
Flow rate, vp	2556	1411	1333	pcph

Estimation of V12 Merge Areas

L_{EQ} = 865.44 (Equation 25-2 or 25-3)

P_{FM} = 0.615 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1571 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
v_{FO}		3967	6750	No
$v_{3 \text{ or } av34}$	$v_{3 \text{ or } av34}$	985 pc/h	(Equation 25-4 or 25-5)	
Is	$v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is	$v_{3 \text{ or } av34}$ > 1.5 v_{12}/2		No	
If yes, v_{12A} =			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1571	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.305	
Space mean speed in ramp influence area,	S_R = 51.0	mph
Space mean speed in outer lanes,	S_O = 53.3	mph
Space mean speed for all vehicles,	S = 51.6	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (East of I-4) EB
Junction:	Off Ramp to SR 429 WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1560	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	280	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	990	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1478	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1560		280		990	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	424		76		269	v
Trucks and buses	9		9		9	%
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	0.957		0.957		0.957	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp 1772 318 1125 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1772 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1772	4500	No
$v_{FO} = v_F - v_R$	1454	4500	No
v_R	318	2000	No
$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12}/2		No	
If yes, v_{12A} = 1772		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1772	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 19.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.457

Space mean speed in ramp influence area, S_R = 49.1 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 49.1 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	3/11/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 WB
Junction:	On Ramp from SR 417
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2020	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	790	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	3260	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3490	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2020	790	3260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	561	219	906	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2244	878	3622	pcph

Estimation of V12 Merge Areas

L_{EQ} = 495.91 (Equation 25-2 or 25-3)

P_{FM} = 0.603 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1352 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3122	6750	No
v_3 or v_{av34}	892 pc/h	(Equation 25-4 or 25-5)	
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} =		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1352	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.294	
Space mean speed in ramp influence area,	S_R = 51.2	mph
Space mean speed in outer lanes,	S_O = 53.6	mph
Space mean speed for all vehicles,	S = 51.8	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	03/11/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	SR 417 WB
Junction:	Off Ramp to I-4 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5460	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1960	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1200	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	3765	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5460		1960		1200		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1517		544		333		v
Trucks and buses	0		0		0		%
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, E_T	1.5		1.5		1.5		
Recreational vehicle PCE, E_R	1.2		1.2		1.2		
Heavy vehicle adjustment, f_{HV}	1.000		1.000		1.000		
Driver population factor, f_P	1.00		1.00		1.00		
Flow rate, vp	6067		2178		1333		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3928 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
$v_{Fi} = v_F$		6067	6750	No
$v_{FO} = v - v_R$		3889	6750	No
v_R		2178	3800	No
v_3 or v_{av34}		2139 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?		No	
Is v_3 or v_{av34}	> 1.5 v_R /2		No	

If yes, v_{12A} = $v_{3 \text{ or } av34}$ (Equation 25-18) v_{12}

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3928	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.624	
Space mean speed in ramp influence area,	S_R = 46.9	mph
Space mean speed in outer lanes,	S_O = 55.9	mph
Space mean speed for all vehicles,	S = 49.7	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	Off Ramp to I-4 EB & WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3570	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	1270	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	890	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)	3570		1270		890		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	970		345		242		v
Trucks and buses	11		11		11		%
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	0.948		0.948		0.948		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 4094 1456 1021 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.591 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3014 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4094	6750	No
$v_{FO} = v_F - v_R$	2638	6750	No
v_R	1456	2000	No
v_3 or v_{av34}	1080 pc/h	(Equation 25-15 or 25-16)	
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} = 3014		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3014	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.559

Space mean speed in ramp influence area, S_R = 47.7 mph

Space mean speed in outer lanes, S_O = 60.0 mph

Space mean speed for all vehicles, S = 50.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	3/11/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from SR 417 WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3370	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	1450	vph
Length of first accel/decel lane	1278	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	810	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	4826	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3370	1450	810	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	936	403	225	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3744	1611	900	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.613 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2296 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
v_{FO}		5355	6750	No
$v_{3 \text{ or } av34}$	v_{av34}	1448 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	v_{av34} > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$	v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12}	2296	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.426	
Space mean speed in ramp influence area,	S_R = 49.5	mph
Space mean speed in outer lanes,	S_O = 51.6	mph
Space mean speed for all vehicles,	S = 50.0	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	12/28/2006
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (East of I-4) EB
Junction:	On Ramp from SR 417 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1280	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	990	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	280	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1478	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1280	990	280	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	356	275	78	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, E_T	1.5	1.5	1.5	
Recreational vehicle PCE, E_R	1.2	1.2	1.2	
Heavy vehicle adjustment, f_{HV}	1.000	1.000	1.000	
Driver population factor, f_P	1.00	1.00	1.00	
Flow rate, vp	1422	1100	311	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1422 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
v_{FO}		2522	4500	No
$v_{3 \text{ or } av34}$	$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	$v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$	$v_{3 \text{ or } av34}$ > 1.5 v_{12}/2		No	
If yes, v_{12A} =			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1422	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.274	
Space mean speed in ramp influence area,	S_R = 51.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.4	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (East of I-4) EB
Junction:	Off Ramp to SR 417 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2070	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	510	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	280	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1584	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2070		510		280		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	562		139		76		v
Trucks and buses	9		9		9		%
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	0.957		0.957		0.957		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 2351 579 318 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2351 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2351	4500	No
$v_{FO} = v_F - v_R$	1772	4500	No
v_R	579	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
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} = 2351		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2351	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 24.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.480

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 48.8 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	3/11/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (West of I-4) WB
Junction:	Off Ramp to SR 417 EB
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3650	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1480	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	990	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1531	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3650		1480		990		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1014		411		275		v
Trucks and buses	0		0		0		%
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	1.000		1.000		1.000		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	4056		1644		1100		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4056 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4056	4500	No
$v_{FO} = v_F - v_R$	2412	4500	No
v_R	1644	3800	No
v_3 or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
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} = (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4056	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 25.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.576	
Space mean speed in ramp influence area,	S_R = 47.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 47.5	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (West of I-4) WB
Junction:	Off Ramp to SR 417 WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4640	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	990	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1480	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1531	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4640		990		1480		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1261		269		402		v
Trucks and buses	9		9		9		%
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	0.957		0.957		0.957		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 5270 1125 1681 pcph

Estimation of V12 Diverge Areas

L_{EQ} = 2971.77 (Equation 25-8 or 25-9)

P_{FD} = 0.642 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3788 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5270	6750	No
$v_{FO} = v_F - v_R$	4145	6750	No
v_R	1125	2000	No
v_3 or v_{av34}	1482 pc/h	(Equation 25-15 or 25-16)	
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} = 3788		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3788	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 32.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.529

Space mean speed in ramp influence area, S_R = 48.1 mph

Space mean speed in outer lanes, S_O = 58.5 mph

Space mean speed for all vehicles, S = 50.6 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 EB
Junction:	Off Ramp to CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6470	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1840	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	2070	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1906	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6470		1840		2070		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1758		500		562		v
Trucks and buses	9		9		9		%
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	0.957		0.957		0.957		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 7349 2090 2351 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3457 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7349	9000	No
$v_{FO} = v_F - v_R$	5259	9000	No
v_R	2090	3800	No
v_3 or v_{av34}	1946 pc/h	(Equation 25-15 or 25-16)	
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} = 3457		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3457	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 20.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.616

Space mean speed in ramp influence area, S_R = 47.0 mph

Space mean speed in outer lanes, S_O = 56.6 mph

Space mean speed for all vehicles, S = 51.7 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (West of I-4) WB
Junction:	On Ramp from SR 46 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	860	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	520	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	3260	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1426	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	860	520	3260	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	234	141	886	v
Trucks and buses	9	9	9	%
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	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 977 591 3703 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 977 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1568	4500	No
v_3 or v_{av34}	0 pc/h	(Equation 25-4 or 25-5)	
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} = 977		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	977	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.291

Space mean speed in ramp influence area, S_R = 51.2 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 51.2 mph

Ramp 11B_I-4 EB On from CR 46A.txt

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2560	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	810	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	1450	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	4826	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2560	810	1450	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	696	220	394	v
Trucks and buses	9	9	9	%
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	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 2908 920 1647 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.597 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1736 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3828	6750	No
$v_{3 \text{ or } av34}$	1172 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12}/2		No	
If yes, v_{12A} = 1736		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1736	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.328	
Space mean speed in ramp influence area,	S_R = 50.7	mph
Space mean speed in outer lanes,	S_O = 52.6	mph
Space mean speed for all vehicles,	S = 51.3	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (West of I-4) WB
Junction:	Off Ramp to CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2170	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	900	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	1840	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1320	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2170		900		1840		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	590		245		500		v
Trucks and buses	9		9		9		%
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	0.957		0.957		0.957		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 2465 1022 2090 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2465 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2465	4500	No
$v_{FO} = v_F - v_R$	1443	4500	No
v_R	1022	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
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} = 2465		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2465	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 25.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.520

Space mean speed in ramp influence area, S_R = 48.2 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 48.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	12/28/2006
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 EB
Junction:	Off Ramp to SR 417 & SR 46
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4630	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2070	vph
Length of first accel/decel lane	406	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1840	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1906	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4630		2070		1840		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1286		575		511		v
Trucks and buses	0		0		0		%
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, E_T	1.5		1.5		1.5		
Recreational vehicle PCE, E_R	1.2		1.2		1.2		
Heavy vehicle adjustment, f_{HV}	1.000		1.000		1.000		
Driver population factor, f_P	1.00		1.00		1.00		
Flow rate, vp	5144		2300		2044		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3580 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
$v_{Fi} = v_F$		5144	6750	No
$v_{FO} = v - v_R$		2844	6750	No
v_R		2300	3800	No
v_3 or v_{av34}		1564 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?		No	
Is v_3 or v_{av34}	> 1.5 v_R /2		No	

If yes, v_{12A} = $v_{3 \text{ or } av34}$ + v_{12} (Equation 25-18)

Flow Entering Diverge Influence Area			
	Actual	Max Desirable	Violation?
v_{12}	3580	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 14.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.635	
Space mean speed in ramp influence area,	S_R = 46.7	mph
Space mean speed in outer lanes,	S_O = 58.1	mph
Space mean speed for all vehicles,	S = 49.7	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	3/11/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from SR 417 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4820	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	990	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1450	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1976	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4820	990	1450	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1339	275	403	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5356	1100	1611	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.240 Using Equation 4

$v_{12} = v_{F} (P_{FM})$ = 1283 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6456	9000	No
v_{3} or v_{av34}	2036 pc/h	(Equation 25-4 or 25-5)	
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} = 2142		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2142	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.386	
Space mean speed in ramp influence area,	S_R = 50.0	mph
Space mean speed in outer lanes,	S_O = 51.0	mph
Space mean speed for all vehicles,	S = 50.5	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	3/11/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (West of I-4) WB
Junction:	On Ramp from I-4 SB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1380	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	3260	vph
Length of first accel/decel lane	530	ft
Length of second accel/decel lane	530	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	520	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1426	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1380	3260	520	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	383	906	144	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1533	3622	578	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 320 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
v_{FO}		5155	9000	No
v_{3} or v_{av34}		606 pc/h	(Equation 25-4 or 25-5)	
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} = 613			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	613	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.499	
Space mean speed in ramp influence area,	S_R = 48.5	mph
Space mean speed in outer lanes,	S_O = 55.0	mph
Space mean speed for all vehicles,	S = 49.4	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date performed:	3/11/2007
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 WB
Junction:	Off Ramp to SR 417 & CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5280	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3260	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1320	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	6098	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5280		3260		1320		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1467		906		367		v
Trucks and buses	0		0		0		%
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	1.000		1.000		1.000		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5867		3622		1467		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4206 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5867	9000	No
$v_{FO} = v_F - v_R$	2245	9000	No
v_R	3622	3800	No
v_3 or v_{av34}	830 pc/h	(Equation 25-15 or 25-16)	
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} = (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?	
v_{12}	4206	4600	No	!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 26.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.754	
Space mean speed in ramp influence area,	S_R = 45.2	mph
Space mean speed in outer lanes,	S_O = 60.3	mph
Space mean speed for all vehicles,	S = 48.7	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 WB
Junction:	On Ramp from SR 46 & CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3360	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	3110	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane	900	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	730	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3654	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3360	3110	730	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	913	845	198	v
Trucks and buses	9	9	9	%
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	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 3817 3533 829 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2118 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7350	6750	Yes
$v_{3 \text{ or } av34}$	1699 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2181		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2181	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 31.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 1.314	
Space mean speed in ramp influence area,	S_R = 37.9	mph
Space mean speed in outer lanes,	S_O = 50.9	mph
Space mean speed for all vehicles,	S = 40.2	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	SR 417 WB
Junction:	Off Ramp to International Pkwy
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3500	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	1200	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	1960	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	3765	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3500		1200		1960		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	951		326		533		v
Trucks and buses	11		11		11		%
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	0.948		0.948		0.948		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 4014 1376 2248 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.596 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2949 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4014	6750	No
$v_{FO} = v_F - v_R$	2638	6750	No
v_R	1376	2000	No
v_3 or v_{av34}	1065 pc/h	(Equation 25-15 or 25-16)	
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} = 2949		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2949	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.552

Space mean speed in ramp influence area, S_R = 47.8 mph

Space mean speed in outer lanes, S_O = 60.1 mph

Space mean speed for all vehicles, S = 50.6 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	SR 417 EB
Junction:	On Ramp from International
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Project

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2300	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	1170	vph
Length of first accel/decel lane	1200	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1990	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3106	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2300	1170	1990	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	625	318	541	v
Trucks and buses	11	10	9	%
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	0.948	0.952	0.957	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 2638 1335 2260 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.611 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1612 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3973	6750	No
$v_{3 \text{ or } av34}$	1026 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		No	
If yes, v_{12A} = 1612		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1612	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.311

Space mean speed in ramp influence area, S_R = 51.0 mph

Space mean speed in outer lanes, S_O = 53.1 mph

Space mean speed for all vehicles, S = 51.5 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	SR 417 WB
Junction:	On Ramp from International Pwy
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3570	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	890	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	1270	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1325	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3570	890	1270	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	970	242	345	v
Trucks and buses	11	9	9	%
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	0.948	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 4094 1011 1443 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.091 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 374 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5105	9000	No
$v_{3 \text{ or } av34}$	1860 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?	No	
Is $v_{3 \text{ or } av34}$	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 1637		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1637	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 20.0+ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.313

Space mean speed in ramp influence area, S_R = 50.9 mph

Space mean speed in outer lanes, S_O = 52.4 mph

Space mean speed for all vehicles, S = 51.6 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	SR 417 EB
Junction:	Off Ramp to International Pkwy
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4460	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	890	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	1270	vph
Position of adjacent ramp	Downstream	
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)	4460		890		1270	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	1212		242		345	v
Trucks and buses	11		11		11	%
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	0.948		0.948		0.948	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp	5114	1021	1456	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 2390.65 (Equation 25-8 or 25-9)

P_{FD} = 0.654 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3698 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5114	6750	No
$v_{FO} = v_F - v_R$	4093	6750	No
v_R	1021	2000	No
v_3 or v_{av34}	1416 pc/h	(Equation 25-15 or 25-16)	
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} = 3698		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3698	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.520	
Space mean speed in ramp influence area,	S_R = 48.2	mph
Space mean speed in outer lanes,	S_O = 58.7	mph
Space mean speed for all vehicles,	S = 50.7	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (West of I-4) WB
Junction:	On Ramp from SR 46 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	860	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	520	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	3220	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1426	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	860	520	3220	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	234	141	875	v
Trucks and buses	9	9	9	%
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	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 977 591 3657 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 977 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1568	4500	No
$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?	No	
Is $v_{3 \text{ or } av34}$	> 1.5 v_{12} /2	No	
If yes, v_{12A} = 977		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	977	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.291

Space mean speed in ramp influence area, S_R = 51.2 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 51.2 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 WB
Junction:	Off Ramp to I-4 EB/WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5460	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1960	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1200	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	3765	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5460		1960		1200	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	1484		533		326	v
Trucks and buses	10		10		10	%
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	0.952		0.952		0.952	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp 6232 2237 1370 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3276 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6232	9000	No
$v_{FO} = v_F - v_R$	3995	9000	No
v_R	2237	3800	No
v_3 or v_{av34}	1478 pc/h	(Equation 25-15 or 25-16)	
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} = 3276		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3276	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 18.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.629

Space mean speed in ramp influence area, S_R = 46.8 mph

Space mean speed in outer lanes, S_O = 58.5 mph

Space mean speed for all vehicles, S = 51.7 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	Off Ramp to I-4 EB & WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3570	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	1270	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	1170	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1964	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3570		1270		1170		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	970		345		318		v
Trucks and buses	11		11		11		%
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	0.948		0.948		0.948		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, v_p 4094 1456 1342 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.591 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3014 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4094	6750	No
$v_{FO} = v_F - v_R$	2638	6750	No
v_R	1456	2000	No
v_3 or v_{av34}	1080 pc/h	(Equation 25-15 or 25-16)	
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} = 3014		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3014	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.559

Space mean speed in ramp influence area, S_R = 47.7 mph

Space mean speed in outer lanes, S_O = 60.0 mph

Space mean speed for all vehicles, S = 50.5 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (East of I-4) EB
Junction:	Off Ramp to SR 417 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2070	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	510	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	280	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1584	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2070		510		280	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	562		139		76	v
Trucks and buses	9		9		9	%
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	0.957		0.957		0.957	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp 2351 579 318 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2351 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2351	4500	No
$v_{FO} = v_F - v_R$	1772	4500	No
v_R	579	2000	No
$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34} > 2700$ pc/h?		No	
Is $v_{3 \text{ or } av34} > 1.5\, v_{12}/2$		No	
If yes, v_{12A} = 2351		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2351	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.480

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 48.8 mph

2032 Build I-4 EB On from US1792.txt

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	03/24/08
Analysis time period:	Build
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from US 1792
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5910	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	650	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	1220	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1948	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5910	650	1220	vph
Peak-hour factor, PHF	0.95	0.95	0.95	
Peak 15-min volume, v15	1555	171	321	v
Trucks and buses	9	9	9	%
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	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 6501 715 1342 pcph

Estimation of V12 Merge Areas

L_{EQ} = 1372.02 (Equation 25-2 or 25-3)

P_{FM} = 0.603 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3918 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7216	7200	Yes
v_3 or v_{av34}	2583 pc/h	(Equation 25-4 or 25-5)	
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} = 3918		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3918	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 35.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.659

Space mean speed in ramp influence area, S_R = 51.5 mph

Space mean speed in outer lanes, S_O = 61.8 mph

Space mean speed for all vehicles, S = 54.8 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	03/24/08
Analysis time period:	Build
Freeway/Dir of Travel:	I-4 WB
Junction:	Off Ramp to US 1792
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6560	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	650	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1220	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1948	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6560		650		1220		vph
Peak-hour factor, PHF	0.95		0.95		0.95		
Peak 15-min volume, v15	1726		171		321		v
Trucks and buses	9		9		9		%
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	0.957		0.957		0.957		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 7216 715 1342 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.547 Using Equation 5

$V_{12} = V_R + (V_F - V_R) P_{FD}$ = 4269 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{Fi} = V_F$	7216	7200	Yes
$V_{FO} = V_F - V_R$	6501	7200	No
V_R	715	2000	No
V_3 or V_{av34}	2947 pc/h	(Equation 25-15 or 25-16)	
Is V_3 or V_{av34}	> 2700 pc/h?	Yes	
Is V_3 or V_{av34}	> 1.5 V_{12}/2	No	
If yes, V_{12A} = 4516		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12A}	4516	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$ = 38.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.492

Space mean speed in ramp influence area, S_R = 56.2 mph

Space mean speed in outer lanes, S_O = 70.2 mph

Space mean speed for all vehicles, S = 60.7 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNm
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 WB
Junction:	Off RamptoSR 417&CR 46A-CD RD
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5810	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3260	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1320	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	6098	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5810		3260		1320		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1579		886		359		v
Trucks and buses	9		9		9		%
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	0.957		0.957		0.957		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 6599 3703 1499 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4456 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6599	9000	No
$v_{FO} = v_F - v_R$	2896	9000	No
v_R	3703	3800	No
v_3 or v_{av34}	1071 pc/h	(Equation 25-15 or 25-16)	
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} = 4456		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4456	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 29.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.761

Space mean speed in ramp influence area, S_R = 45.1 mph

Space mean speed in outer lanes, S_O = 60.1 mph

Space mean speed for all vehicles, S = 49.1 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	Frontage Rd (East of I-4) EB
Junction:	Off Ramp to SR 427 WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1560	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	280	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	510	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1584	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1560		280		510	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	424		76		139	v
Trucks and buses	9		9		9	%
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	0.957		0.957		0.957	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp 1772 318 579 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$V_{12} = V_R + (V_F - V_R) P_{FD}$ = 1772 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{Fi} = V_F$	1772	4500	No
$V_{FO} = V_F - V_R$	1454	4500	No
V_R	318	2000	No
$V_{3 \text{ or } av34}$	0 pc/h	(Equation 25-15 or 25-16)	
Is $V_{3 \text{ or } av34}$	> 2700 pc/h?	No	
Is $V_{3 \text{ or } av34}$	> 1.5 $v_{12}/2$	No	
If yes, V_{12A} = 1772		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
V_{12}	1772	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 19.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.457

Space mean speed in ramp influence area, S_R = 49.1 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 49.1 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	2/8/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. EB
Junction:	Off Ramp to EB CD
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3290	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	430	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	260	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3290		430		260		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	914		119		72		v
Trucks and buses	0		0		0		%
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, E_T	1.5		1.5		1.5		
Recreational vehicle PCE, E_R	1.2		1.2		1.2		
Heavy vehicle adjustment, f_{HV}	1.000		1.000		1.000		
Driver population factor, f_P	1.00		1.00		1.00		
Flow rate, vp	3656		478		289		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.647 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2533 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3656	6750	No
$v_{FO} = v_F - v_R$	3178	6750	No
v_R	478	2000	No
v_3 or v_{av34}	1123 pc/h	(Equation 25-15 or 25-16)	
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} = (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?	
v_{12}	2533	4600	No	!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 21.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.471	
Space mean speed in ramp influence area,	S_R = 48.9	mph
Space mean speed in outer lanes,	S_O = 59.9	mph
Space mean speed for all vehicles,	S = 51.8	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	1/2/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. EB CD
Junction:	On Ramp from Wekiva Pkwy. EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	20	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	430	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	260	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	20	430	260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	6	119	72	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	22	478	289	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 22 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
v_{FO}		500	4500	No
$v_{3 \text{ or } av34}$	$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	$v_{3 \text{ or } av34}$	> 2700 pc/h?	No	
Is $v_{3 \text{ or } av34}$	$v_{3 \text{ or } av34}$	> 1.5 v_{12} /2	No	
If yes, v_{12A}	=		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12}	22	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 6.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.292	
Space mean speed in ramp influence area,	S_R = 51.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.2	mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	2/8/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. EB
Junction:	On Ramp from EB CD
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2860	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	260	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	430	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2860	260	430	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	794	72	119	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3178	289	478	pcph

Estimation of V12 Merge Areas

L_{EQ} = 392.14 (Equation 25-2 or 25-3)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1880 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3467	6750	No
v_3 or v_{av34}	1298 pc/h	(Equation 25-4 or 25-5)	
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} =		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1880	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.320	
Space mean speed in ramp influence area,	S_R = 50.8	mph
Space mean speed in outer lanes,	S_O = 52.1	mph
Space mean speed for all vehicles,	S = 51.3	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	1/2/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. EB CD
Junction:	Off Ramp to Wekiva Pkwy. EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Pkwy. PD&E

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	530	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	430	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	530		260		430		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	147		72		119		v
Trucks and buses	0		0		0		%
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	1.000		1.000		1.000		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	589		289		478		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 589 pc/h

Capacity Checks

		Actual		Maximum	LOS F?
$v_{Fi} = v_F$		589		4500	No
$v_{FO} = v - v_R$		300		4500	No
v_R		289		2000	No
$v_{3 \text{ or } av34}$	$v_{3 \text{ or } av34}$	0	pc/h	(Equation 25-15 or 25-16)	
Is	$v_{3 \text{ or } av34}$ > 2700 pc/h?			No	
Is	$v_{3 \text{ or } av34}$ > 1.5 v_{12} /2			No	

If yes, v_{12A} = $v_{12} - v_{av34}$ (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	589	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 4.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.454	
Space mean speed in ramp influence area,	S_R = 49.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.1	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	1/2/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. EB CD
Junction:	On Ramp from Wekiva Pkwy. EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Pkwy. PD&E

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	330	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	650	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	330	650		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	92	181		v
Trucks and buses	0	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	1.000	1.000		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	367	722		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 367 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
v_{FO}		1089	4500	No
$v_{3 \text{ or } av34}$		0 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$	> 1.5 v_{12}/2		No	
If yes, v_{12A} =			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	367	4400	No

!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 4.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.228	
Space mean speed in ramp influence area,	S_R = 52.0	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 52.0	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	2/8/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. EB
Junction:	Off Ramp to SR 46
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3120	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	650	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	260	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	6684	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3120		650		260		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	867		181		72		v
Trucks and buses	0		0		0		%
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	1.000		1.000		1.000		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	3467		722		289		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1957 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
$v_{Fi} = v_F$		3467	6750	No
$v_{FO} = v - v_R$		2745	6750	No
v_R		722	3800	No
v_3 or v_{av34}		1510 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?		No	
Is v_3 or v_{av34}	> 1.5 v_R /2		Yes	

3 or v_{av34} = 12

If yes, v_{12A} = 1981 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1981	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 7.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.493	
Space mean speed in ramp influence area,	S_R = 48.6	mph
Space mean speed in outer lanes,	S_O = 58.4	mph
Space mean speed for all vehicles,	S = 52.4	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	2/8/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. WB
Junction:	On Ramp from SR 46
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4460	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	780	vph
Length of first accel/decel lane	800	ft
Length of second accel/decel lane	640	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	890	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4460	780	890	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1239	217	247	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, E_T	1.5	1.5	1.5	
Recreational vehicle PCE, E_R	1.2	1.2	1.2	
Heavy vehicle adjustment, f_{HV}	1.000	1.000	1.000	
Driver population factor, f_P	1.00	1.00	1.00	
Flow rate, vp	4956	867	989	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2751 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5823	6750	No
v_3 or v_{av34}	2205 pc/h	(Equation 25-4 or 25-5)	
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} = 2832		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2832	4400	No

!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.322	
Space mean speed in ramp influence area,	S_R = 50.8	mph
Space mean speed in outer lanes,	S_O = 49.2	mph
Space mean speed for all vehicles,	S = 50.2	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	1/2/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. WB CD
Junction:	Off Ramp to Wekiva Pkwy. WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1180	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	780	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	330	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	6684	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	1180		780		330		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	328		217		92		v
Trucks and buses	0		0		0		%
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	1.000		1.000		1.000		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	1311		867		367		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1311 pc/h

Capacity Checks

		Actual		Maximum	LOS F?
$v_{Fi} = v_F$		1311		4500	No
$v_{FO} = v - v_R$		444		4500	No
v_R		867		3800	No
v_3 or v_{av34}		0	pc/h	(Equation 25-15 or 25-16)	
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} = $v_{3\ or\ av34} - v_{12}$ (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1311	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 11.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.506	
Space mean speed in ramp influence area,	S_R = 48.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 48.4	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	1/2/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. WB CD
Junction:	On Ramp from Wekiva Pkwy. WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	310	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	330	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	780	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	6684	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	310	330	780	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	86	92	217	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, E_T	1.5	1.5	1.5	
Recreational vehicle PCE, E_R	1.2	1.2	1.2	
Heavy vehicle adjustment, f_{HV}	1.000	1.000	1.000	
Driver population factor, f_P	1.00	1.00	1.00	
Flow rate, v_p	344	367	867	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 344 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
v_{FO}		711	4500	No
$v_{3 \text{ or } av34}$		0 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$	> 1.5 $v_{12}/2$		No	
If yes, v_{12A} =			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12}	344	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 7.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.294	
Space mean speed in ramp influence area,	S_R = 51.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.2	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	2/8/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. WB
Junction:	Off Ramp to WB CD
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5240	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	330	vph
Length of first accel/decel lane	1340	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	780	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	6684	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5240		330		780		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1456		92		217		v
Trucks and buses	0		0		0		%
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, E_T	1.5		1.5		1.5		
Recreational vehicle PCE, E_R	1.2		1.2		1.2		
Heavy vehicle adjustment, f_{HV}	1.000		1.000		1.000		
Driver population factor, f_P	1.00		1.00		1.00		
Flow rate, vp	5822		367		867		pcph

Estimation of V12 Diverge Areas

L_{EQ} = 4897.92 (Equation 25-8 or 25-9)

P_{FD} = 0.598 Using Equation 5

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3627 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
$v_{Fi} = v_F$		5822	6750	No
$v_{FO} = v - v_R$		5455	6750	No
v_R		367	2000	No
v_3 or v_{av34}		2195 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?		No	
Is v_3 or v_{av34}	> 1.5 v_{FO} /2		No	

v_{12A} = $v_{3 \text{ or } av34}$ + v_{12} (Equation 25-18)

If yes,

Flow Entering Diverge Influence Area			
	Actual	Max Desirable	Violation?
v_{12}	3627	4600	No !

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.461	
Space mean speed in ramp influence area,	S_R = 49.0	mph
Space mean speed in outer lanes,	S_O = 55.7	mph
Space mean speed for all vehicles,	S = 51.3	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	2/8/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Pkwy. WB
Junction:	On Ramp from WB CD
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4910	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	520	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	330	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4910	520	330	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1364	144	92	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5456	578	367	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.305 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1663 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6034	9000	No
v_3 or v_{av34}	1896 pc/h	(Equation 25-4 or 25-5)	
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} = 2182		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2182	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 23.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.348	
Space mean speed in ramp influence area,	S_R = 50.5	mph
Space mean speed in outer lanes,	S_O = 50.9	mph
Space mean speed for all vehicles,	S = 50.7	mph

HCS+: Basic Freeway Segments Release 5.4

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	KNM
Agency or Company:	HNTB
Date Performed:	09/2010
Analysis Time Period:	Build
Freeway/Direction:	I-4 WB
From/To:	On Ramp from CR 46A & SR 46
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway PD&E

Flow Inputs and Adjustments

Volume, V	6450	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1753	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1832	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.90	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	66.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1832	pc/h/ln
Free-flow speed, FFS	66.5	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	4	
Density, D	28.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	KNM
Agency or Company:	HNTB
Date Performed:	09/2010
Analysis Time Period:	Build Service Road Concept
Freeway/Direction:	CD Road/WB
From/To:	I-4 WB On to SR 417 WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway PD&E

Flow Inputs and Adjustments

Volume, V	4640	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1261	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1757	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.54	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.2	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	66.8	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1757	pc/h/ln
Free-flow speed, FFS	66.8	mi/h
Average passenger-car speed, S	65.7	mi/h
Number of lanes, N	3	
Density, D	26.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	KNM
Agency or Company:	HNTB
Date Performed:	09/2010
Analysis Time Period:	Build Service Road Concept
Freeway/Direction:	CD Road/EB
From/To:	SR 417 EB On to Off to I-4 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway PD&E

Flow Inputs and Adjustments

Volume, V	2270	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	617	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	859	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.54	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.2	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	66.8	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	859	pc/h/ln
Free-flow speed, FFS	66.8	mi/h
Average passenger-car speed, S	66.8	mi/h
Number of lanes, N	3	
Density, D	12.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

2032 Build I-4 WB On from US1792.txt

HCS+: Basic Freeway Segments Release 5.4

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	KNM
Agency or Company:	HNTB
Date Performed:	
Analysis Time Period:	Build Service Road Concept
Freeway/Direction:	I-4 WB
From/To:	US 17/92 WB On to Off to SR 46
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway PD&E

Flow Inputs and Adjustments

Volume, V	7130	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1937	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2025	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.67	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.9	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	67.6	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2025	pc/h/ln
Free-flow speed, FFS	67.6	mi/h
Average passenger-car speed, S	62.8	mi/h
Number of lanes, N	4	
Density, D	32.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KNM
Agency or Company	HNTB
Date Performed	03/24/08
Analysis Time Period	Build

Site Information

Freeway/Dir of Travel	I-4 WB
Junction	Off Ramp to US 1792
Jurisdiction	Seminole County
Analysis Year	2032

Project Description: Wekiva Parkway Project Development & Environment Study

Inputs

Upstream Adj Ramp
- ☑ Yes ☑ On
- ☑ No ☐ Off
- L_{up} = ft
- V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 35.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
- ☑ Yes ☑ On
- ☑ No ☐ Off
- L_{down} = 1948 ft
- V_D = 1220 veh/

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6060	0.95	Level	9	0	0.957	1.00	6666
Ramp	650	0.95	Level	9	0	0.957	1.00	715
UpStream								
DownStream	1220	0.95	Level	9	0	0.957	1.00	1342

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.560 using Equation (Exhibit 25-12)

V_{12} = 4050 pc/h

V_3 or V_{av34} 2616 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6666	Exhibit 25-14	7200	No
$V_{FO} = V_F - V_R$	5951	Exhibit 25-14	7200	No
V_R	715	Exhibit 25-3	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4050	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 33.7 (pc/mi/ln)

LOS = D (Exhibit 25-4)

Speed Determination

D_s = 0.492 (Exhibit 25-19)

S_R = 56.2 mph (Exhibit 25-19)

70.5 mph (Exhibit 25-19)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KNM
Agency or Company	HNTB
Date Performed	03/24/08
Analysis Time Period	Build
Project Description	Wekiva Parkway Project Development & Environment Study

Site Information

Freeway/Dir of Travel	I-4 WB
Junction	On Ramp from US 1792
Jurisdiction	Seminole County
Analysis Year	2032

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☐ Off
L_{up} = 1948 ft
V_u = 650 veh/h

Terrain: Level
S_{FF} = 70.0 mph
S_{FR} = 35.0 mph
Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5410	0.95	Level	9	0	0.957	1.00	5951
Ramp	1220	0.95	Level	9	0	0.957	1.00	1342
UpStream	650	0.95	Level	9	0	0.957	1.00	715
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.209 using Equation (Exhibit 25-5)
V_{12} = 1246 pc/h
V_3 or V_{av34} 2352 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 2380 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7293	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3722	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 30.8 (pc/mi/ln)
LOS = D (Exhibit 25-4)

Speed Determination

M_S = 0.447 (Exibit 25-19)
S_R = 57.5 mph (Exhibit 25-19)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R = mph (Exhibit 25-19)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KNM
Agency or Company	HNTB
Date Performed	03/24/08
Analysis Time Period	Build

Site Information

Freeway/Dir of Travel	I-4 EB
Junction	Off Ramp to US 1792
Jurisdiction	Seminole County
Analysis Year	2032

Project Description: Wekiva Parkway Project Development & Environment Study

Inputs

Upstream Adj Ramp
☒ Yes ☐ On
☒ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 35.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☒ Yes ☒ On
☐ No ☐ Off
L_{down} = 1948 ft
V_D = 650 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	7130	0.95	Level	9	0	0.957	1.00	7843
Ramp	1220	0.95	Level	9	0	0.957	1.00	1342
UpStream								
DownStream	650	0.95	Level	9	0	0.957	1.00	715

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = using Equation (Exhibit 25-5)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☒ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☒ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

M_S = (Exibit 25-19)
S_R = mph (Exhibit 25-19)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = 0.436 using Equation (Exhibit 25-12)
V_{12} = 4176 pc/h
V_3 or V_{av34} 1833 pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☒ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☒ No
If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7843	Exhibit 25-14	9600	No
$V_{FO} = V_F - V_R$	6501	Exhibit 25-14	9600	No
V_R	1342	Exhibit 25-3	2000	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4176	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 30.8 (pc/mi/ln)
LOS = D (Exhibit 25-4)

Speed Determination

D_s = 0.549 (Exhibit 25-19)
S_R = 54.6 mph (Exhibit 25-19)
73.5 mph (Exhibit 25-19)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	KNM
Agency or Company	HNTB
Date Performed	03/24/08
Analysis Time Period	Build

Site Information

Freeway/Dir of Travel	I-4 EB
Junction	On Ramp from US 1792
Jurisdiction	Seminole County
Analysis Year	2032

Project Description: Wekiva Parkway Project Development & Environment Study

Inputs

Upstream Adj Ramp
☑ Yes ☑ On
☐ No ☑ Off
L_{up} = 1948 ft
V_u = 1220 veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 35.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☑ On
☑ No ☑ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5910	0.95	Level	9	0	0.957	1.00	6501
Ramp	650	0.95	Level	9	0	0.957	1.00	715
UpStream	1220	0.95	Level	9	0	0.957	1.00	1342
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1194.42 (Equation 25-2 or 25-3)
P_{FM} = 0.591 using Equation (Exhibit 25-5)
V_{12} = 3845 pc/h
V_3 or V_{av34} 2656 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7216	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4560	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 37.6 (pc/mi/ln)
LOS = F (Exhibit 25-4)

Speed Determination

M_S = 0.659 (Exibit 25-19)
S_R = 51.6 mph (Exhibit 25-19)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.0009\, L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R = mph (Exhibit 25-19)

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway EB
Junction:	On Ramp from Wekiva River Rd
Jurisdiction:	Lake County
Analysis Year:	2032 Build
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5220	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	210	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	80	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5220	210	80	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1418	57	22	v
Trucks and buses	11	2	2	%
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	0.948	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 5986 231 88 pcph

Estimation of V12 Merge Areas

L_{EQ} = 427.39 (Equation 25-2 or 25-3)

P_{FM} = 0.603 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3608 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6217	6750	No
$v_{3 \text{ or } av34}$	2378 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3608		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3608	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 29.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.439

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_O = 48.0 mph

Space mean speed for all vehicles, S = 48.8 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway EB
Junction:	Off Ramp to Wekiva River Rd.
Jurisdiction:	Lake County
Analysis Year:	2032 Build
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5300	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	80	vph
Length of first accel/decel lane	920	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	110	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5300		80		110		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1440		22		30		v
Trucks and buses	11		2		2		%
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	0.948		0.990		0.990		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 6078 88 121 pcph

Estimation of V12 Diverge Areas

L_{EQ} = 592.83 (Equation 25-8 or 25-9)

P_{FD} = 0.604 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3706 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6078	6750	No
$v_{FO} = v_F - v_R$	5990	6750	No
v_R	88	2000	No
v_3 or v_{av34}	2372 pc/h	(Equation 25-15 or 25-16)	
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} = 3706		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3706	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 27.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.436

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_O = 55.0 mph

Space mean speed for all vehicles, S = 51.4 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	7/13/07
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	Off Ramp to Wekiva River Rd.
Jurisdiction:	Lake County
Analysis Year:	2032 Build
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5430	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	210	vph
Length of first accel/decel lane	920	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5430		210			vph
Peak-hour factor, PHF	0.90		0.90			
Peak 15-min volume, v15	1508		58			v
Trucks and buses	0		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	1.000	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6033	233	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.598 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3704 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6033	6750	No
$v_{FO} = v_F - v_R$	5800	6750	No
v_R	233	2000	No
v_3 or v_{av34}	2329 pc/h	(Equation 25-15 or 25-16)	
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} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3704	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 27.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.449	
Space mean speed in ramp influence area,	S_R = 49.2	mph
Space mean speed in outer lanes,	S_O = 55.2	mph
Space mean speed for all vehicles,	S = 51.3	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	On Ramp from Wekiva River Rd
Jurisdiction:	Lake County
Analysis Year:	2032 Build
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5220	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	80	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	210	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5220	80	210	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1418	22	57	v
Trucks and buses	11	2	2	%
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	0.948	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 5986 88 231 pcph

Estimation of V12 Merge Areas

L_{EQ} = 1121.90 (Equation 25-2 or 25-3)

P_{FM} = 0.609 Using Equation 3

$v_{12} = v_F (P_{FM})$ = 3648 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6074	6750	No
$v_{3 \text{ or } av34}$	2338 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3648		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3648	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.422

Space mean speed in ramp influence area, S_R = 49.5 mph

Space mean speed in outer lanes, S_O = 48.2 mph

Space mean speed for all vehicles, S = 49.0 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	Off Ramp to CR46 (Old)
Jurisdiction:	Lake County
Analysis Year:	2032 Build
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5300	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	920	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	60	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5300		110		60		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1440		30		16		v
Trucks and buses	11		2		2		%
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	0.948		0.990		0.990		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp	6078	121	66	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 327.38 (Equation 25-8 or 25-9)

P_{FD} = 0.602 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3710 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6078	6750	No
$v_{FO} = v_F - v_R$	5957	6750	No
v_R	121	2000	No
v_3 or v_{av34}	2368 pc/h	(Equation 25-15 or 25-16)	
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} = 3710		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3710	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 27.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.439

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_O = 55.0 mph

Space mean speed for all vehicles, S = 51.4 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	On Ramp from CR 46A (Old)
Jurisdiction:	Lake County
Analysis Year:	2022 Build
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5190	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	60	vph
Length of first accel/decel lane	820	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	110	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5190	60	110	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1410	16	30	v
Trucks and buses	11	2	2	%
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	0.948	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp	5952	66	121	pcph

Estimation of V12 Merge Areas

L_{EQ} = 613.15 (Equation 25-2 or 25-3)

P_{FM} = 0.600 Using Equation 1

$V_{12} = V_F (P_{FM})$ = 3574 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	6018	6750	No
$V_{3 \text{ or } av34}$	2378 pc/h	(Equation 25-4 or 25-5)	
Is $V_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $V_{3 \text{ or } av34}$ > 1.5 v_{12} /2		No	
If yes, V_{12A} = 3574		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
V_{R12}	3574	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.412

Space mean speed in ramp influence area, S_R = 49.6 mph

Space mean speed in outer lanes, S_O = 48.0 mph

Space mean speed for all vehicles, S = 49.0 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway EB
Junction:	Off Ramp to CR46 (Old)
Jurisdiction:	Lake County
Analysis Year:	2032 Build
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5250	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	60	vph
Length of first accel/decel lane	920	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	110	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5250		60		110		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1427		16		30		v
Trucks and buses	11		2		2		%
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	0.948		0.990		0.990		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp	6020	66	121	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 591.85 (Equation 25-8 or 25-9)

P_{FD} = 0.606 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3677 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6020	6750	No
$v_{FO} = v_F - v_R$	5954	6750	No
v_R	66	2000	No
$v_{3 \text{ or } av34}$	2343 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3677		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3677	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 27.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.434

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_O = 55.1 mph

Space mean speed for all vehicles, S = 51.4 mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway EB
Junction:	On Ramp from CR 46A (Old)
Jurisdiction:	Lake County
Analysis Year:	2022 Build
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5300	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	110	vph
Length of first accel/decel lane	820	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	60	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5300	110	60	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1440	30	16	v
Trucks and buses	11	2	2	%
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	0.948	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 6078 121 66 pcph

Estimation of V12 Merge Areas

L_{EQ} = 334.45 (Equation 25-2 or 25-3)

P_{FM} = 0.600 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3650 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6199	6750	No
$v_{3 \text{ or } av34}$	2428 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3650		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3650	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 29.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.433	
Space mean speed in ramp influence area,	S_R = 49.4	mph
Space mean speed in outer lanes,	S_O = 47.7	mph
Space mean speed for all vehicles,	S = 48.7	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	On Ramp from SR 46 (Existing)
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3460	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	110	vph
Length of first accel/decel lane	1350	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1790	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3460	110	1790	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	940	30	486	v
Trucks and buses	11	11	11	%
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	0.948	0.948	0.948	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp	3968	126	2053	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3968 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4094	4500	No
v_3 or v_{av34}	0 pc/h	(Equation 25-4 or 25-5)	
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} = 3968		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3968	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_{R12} + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.460	
Space mean speed in ramp influence area,	S_R = 49.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.0	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	Off Ramp to SR 46 (Existing)
Jurisdiction:	Lake County
Analysis Year:	2032 Build

Description: Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5250	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1790	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	110	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5250		1790		110	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	1427		486		30	v
Trucks and buses	11		11		11	%
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	0.948		0.948		0.948	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp 6020 2053 126 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3838 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6020	6750	No
$v_{FO} = v_F - v_R$	3967	6750	No
v_R	2053	3800	No
v_3 or v_{av34}	2182 pc/h	(Equation 25-15 or 25-16)	
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} = 3838 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3838	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 23.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.613

Space mean speed in ramp influence area, S_R = 47.0 mph

Space mean speed in outer lanes, S_O = 55.7 mph

Space mean speed for all vehicles, S = 49.9 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway EB
Junction:	On Ramp from SR 46 (Existing)
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3460	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1790	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	110	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3460		1790		110	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	940		486		30	v
Trucks and buses	11		11		11	%
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	0.948		0.948		0.948	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp	3968	2053	126	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2202 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6021	6750	No
v_3 or v_{av34}	1766 pc/h	(Equation 25-4 or 25-5)	
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} = 2267		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2267	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.509	
Space mean speed in ramp influence area,	S_R = 48.4	mph
Space mean speed in outer lanes,	S_O = 50.7	mph
Space mean speed for all vehicles,	S = 49.0	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	Off Ramp to SR 46 Bypass
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3570	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1720	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1680	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3570		1720		1680		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	970		467		457		v
Trucks and buses	11		11		11		%
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	0.948		0.948		0.948		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 4094 1972 1927 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4094 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4094	4500	No
$v_{FO} = v_F - v_R$	2122	4500	No
v_R	1972	3800	No
v_3 or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
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} = 4094		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4094	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 26.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.605

Space mean speed in ramp influence area, S_R = 47.1 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 47.1 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	SR 429 NB
Junction:	Off Ramp to SR 46 Bypass
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3530	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	580	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3530		1680		580		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	959		457		158		v
Trucks and buses	11		11		11		%
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	0.948		0.948		0.948		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, v_p 4048 1927 665 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4048 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4048	4500	No
$v_{FO} = v_F - v_R$	2121	4500	No
v_R	1927	3800	No
v_3 or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
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} = 4048 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4048	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.601

Space mean speed in ramp influence area, S_R = 47.2 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 47.2 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	3/14/2007
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	On Ramp from SR 46 Bypass
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1850	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1720	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1850	1680	1720	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	514	467	478	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2056	1867	1911	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1141 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3923	6750	No
v_3 or v_{av34}	915 pc/h	(Equation 25-4 or 25-5)	
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}	= 1174	(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	1174	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.298	
Space mean speed in ramp influence area,	S_R = 51.1	mph
Space mean speed in outer lanes,	S_O = 53.6	mph
Space mean speed for all vehicles,	S = 51.7	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	SR 429 SB
Junction:	On Ramp from SR 46 Bypass
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3400	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	580	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3400		1680		580		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	924		457		158		v
Trucks and buses	11		11		11		%
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	0.948		0.948		0.948		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, v_p 3899 1927 665 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3899 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3899	4500	No
$v_{FO} = v_F - v_R$	1972	4500	No
v_R	1927	3800	No
$v_{3\ or\ av34}$	0 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3\ or\ av34}$ > 2700 pc/h?		No	
Is $v_{3\ or\ av34}$ > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3899		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3899	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 24.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.601

Space mean speed in ramp influence area, S_R = 47.2 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 47.2 mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	3/10/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	SB On Ramp from US 441
Jurisdiction:	Lake County
Analysis Year:	2032

Description: Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1480	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	2250	vph
Length of first accel/decel lane	530	ft
Length of second accel/decel lane	530	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	520	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1480	2250	520	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	411	625	144	v
Trucks and buses	0	0	0	%
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	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 1644 2500 578 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 912 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4144	6750	No
v_3 or v_{av34}	732 pc/h	(Equation 25-4 or 25-5)	
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} = 939		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	939	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.331

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_O = 54.3 mph

Space mean speed for all vehicles, S = 51.3 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	SB Off Ramp to US 441
Jurisdiction:	Orange County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3440	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	520	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	2250	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3440		520		2250		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	935		141		611		v
Trucks and buses	11		10		10		%
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	0.948		0.952		0.952		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 3945 593 2568 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3945 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3945	4500	No
$v_{FO} = v_F - v_R$	3352	4500	No
v_R	593	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
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} = 3945		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3945	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 v_{12} - 0.009 L_D$ = 33.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.481

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 48.7 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	NB On Ramp from US 441
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2920	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	520	vph
Length of first accel/decel lane	530	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2250	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2920	520	2250	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	793	141	611	v
Trucks and buses	11	10	10	%
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	0.948	0.952	0.952	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 3348 593 2568 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3348 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3941	4500	No
$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3348		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3348	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 32.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.485

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 48.7 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	3/10/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	NB Off Ramp to US 441
Jurisdiction:	Orange County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5170	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2250	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	520	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5170		2250		520		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1405		611		141		v
Trucks and buses	11		10		10		%
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	0.948		0.952		0.952		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 5929 2568 593 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4080 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5929	6750	No
$v_{FO} = v_F - v_R$	3361	6750	No
v_R	2568	3800	No
v_3 or v_{av34}	1849 pc/h	(Equation 25-15 or 25-16)	
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} = 4080		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4080	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 25.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.659

Space mean speed in ramp influence area, S_R = 46.4 mph

Space mean speed in outer lanes, S_O = 57.0 mph

Space mean speed for all vehicles, S = 49.3 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	SB On Ramp from Kelly Park Rd
Jurisdiction:	Lake County
Analysis Year:	2032

Description: Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2950	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	490	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	580	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2950	490	580	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	802	133	158	v
Trucks and buses	11	2	2	%
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	0.948	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 3383 538 637 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3383 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3921	4500	No
v_{3} or v_{av34}	0 pc/h	(Equation 25-4 or 25-5)	
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} = 3383		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3383	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.438	
Space mean speed in ramp influence area,	S_R = 49.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.3	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	NB Off Ramp to Kelly Park Rd
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3440	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	490	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	580	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3440		490		580		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	935		133		158		v
Trucks and buses	11		2		2		%
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	0.948		0.990		0.990		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 3945 538 637 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3945 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3945	4500	No
$v_{FO} = v_F - v_R$	3407	4500	No
v_R	538	2000	No
$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3945		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3945	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 33.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.476

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 48.8 mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	NB On Ramp from Kelly Park Rd
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2950	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	580	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	490	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2950	580	490	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	802	158	133	v
Trucks and buses	11	2	2	%
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	0.948	0.990	0.990	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 3383 637 538 pcph

Estimation of V12 Merge Areas

L_{EQ} = 794.64 (Equation 25-2 or 25-3)

P_{FM} = 0.609 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2062 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4020	6750	No
v_3 or v_{av34}	1321 pc/h	(Equation 25-4 or 25-5)	
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} = 2062		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2062	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.299

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_O = 52.0 mph

Space mean speed for all vehicles, S = 51.4 mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway WB
Junction:	SB Off Ramp to Kelly Park Rd
Jurisdiction:	Lake County
Analysis Year:	2032

Description: Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3530	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	580	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	490	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3530		580		490		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	959		158		133		v
Trucks and buses	11		2		2		%
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	0.948		0.990		0.990		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, vp 4048 637 538 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.629 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2784 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4048	6750	No
$v_{FO} = v_F - v_R$	3411	6750	No
v_R	637	2000	No
v_3 or v_{av34}	1264 pc/h	(Equation 25-15 or 25-16)	
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} = 2784		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2784	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 23.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.485

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_O = 59.3 mph

Space mean speed for all vehicles, S = 51.6 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	KNM
Agency/Co.:	HNTB
Date performed:	09/2010
Analysis time period:	Build I-4 Connection @ SR 417
Freeway/Dir of Travel:	Wekiva Parkway EB
Junction:	On Ramp from SR 429
Jurisdiction:	Lake County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development and Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1850	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1720	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	110	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1850	1720	110	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	503	467	30	v
Trucks and buses	11	11	11	%
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	0.948	0.948	0.948	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp	2121	1972	126	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2121 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4093	4500	No

$v_{3 \text{ or } av34}$ = 0 pc/h (Equation 25-4 or 25-5)

Is $v_{3 \text{ or } av34}$ > 2700 pc/h? No

Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2 No

If yes, v_{12A} = 2121 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2121	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.450	
Space mean speed in ramp influence area,	S_R = 49.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.2	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	Cristina Torres-Reyes
Agency/Co.:	HNTB
Date Performed:	3/11/2007
Analysis Time Period:	Build I-4 Connection @ SR417
Freeway/Dir of Travel:	I-4 SB
Weaving Location:	Off Ramp 16 w/Frontage Road
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	4	
Weaving segment length, L	2500	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	B	Multilane or C-D
Volume ratio, VR	0.51	
Weaving ratio, R	0.42	

Conversion to pc/h Under Base Conditions

	Non-Weaving V A-C	Non-Weaving V B-D	Weaving V A-D	Weaving V B-C	
Volume, V	2270	0	990	1380	veh/h
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	
Peak 15-min volume, v15	631	0	275	383	v
Trucks and buses	0	0	0	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2522	0	1100	1533	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.08	0.0020
b (Exhibit 24-6)	2.20	6.00
c (Exhibit 24-6)	0.70	1.00
d (Exhibit 24-6)	0.50	0.50
Weaving intensity factor, Wi	0.60	0.61
Weaving and non-weaving speeds, Si	49.45	49.10
Number of lanes required for unconstrained operation, Nw (Exhibit 24-7)		2.18
Maximum number of lanes, Nw (max) (Exhibit 24-7)		3.50
Type of operation is		Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	49.28	mph
Weaving segment density, D	26.15	pc/mi/ln
Level of service, LOS	C	
Capacity of base condition, cb	7625	pc/h
Capacity as a 15-minute flow rate, c	7625	pc/h
Capacity as a full-hour volume, ch	6862	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	2633	4000	a
Average flow rate (pcphpl)	1288	2350	b
Volume ratio, VR	0.51	0.80	c
Weaving ratio, R	0.42	N/A	d
Weaving length (ft)	2500	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.

c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

FREEWAY WEAVING WORKSHEET

General Information

Analyst	KNM
Agency/Company	HNTB
Date Performed	8/6/2007
Analysis Time Period	

Site Information

Freeway/Dir of Travel	Wekiva Parkway EB
Weaving Seg Location	SB Wekiva Parkway
Jurisdiction	Orange County
Analysis Year	2032 Build

Inputs

Freeway free-flow speed, S_{FF} (mi/h)	65	Weaving type	A
Weaving number of lanes, N	3	Volume ratio, VR	0.92
Weaving seg length, L (ft)	1500	Weaving ratio, R	0.21
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	0	0.90	11	0	1.5	1.2	0.948	1.00	0
V_{o2}	170	0.90	11	0	1.5	1.2	0.948	1.00	199
V_{w1}	410	0.90	11	0	1.5	1.2	0.948	1.00	480
V_{w2}	1510	0.90	11	0	1.5	1.2	0.948	1.00	1770
V_w				2250	V_{nw}				199
V									2449

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)			0.35	0.0020
b (Exhibit 24-6)			2.20	4.00
c (Exhibit 24-6)			0.97	1.30
d (Exhibit 24-6)			0.80	0.75
Weaving intensity factor, Wi			2.82	0.69
Weaving and non-weaving speeds, Si (mi/h)			29.40	47.62

Number of lanes required for unconstrained operation, Nw 2.33
Maximum number of lanes, Nw (max) 1.40

☐ If Nw < Nw(max) unconstrained operation ☑ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	30.34
Weaving segment density, D (pc/mi/ln)	26.91
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	4870
Capacity as a 15-minute flow rate, c (veh/h)	4616
Capacity as a full-hour volume, c_h (veh/h)	4154

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

FREEWAY WEAVING WORKSHEET

General Information

Analyst	KNM
Agency/Company	HNTB
Date Performed	8/6/2007
Analysis Time Period	

Site Information

Freeway/Dir of Travel	Wekiva Parkway WB
Weaving Seg Location	NB Wekiva Parkway
Jurisdiction	Orange County
Analysis Year	2032 Build

Inputs

Freeway free-flow speed, S_{FF} (mi/h)	65	Weaving type	A
Weaving number of lanes, N	3	Volume ratio, VR	0.05
Weaving seg length, L (ft)	1500	Weaving ratio, R	0.00
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	fp	v
V_{o1}	1850	0.90	11	0	1.5	1.2	0.948	1.00	2168
V_{o2}	1510	0.90	11	0	1.5	1.2	0.948	1.00	1770
V_{w1}	170	0.90	11	0	1.5	1.2	0.948	1.00	199
V_{w2}	0	0.90	11	0	1.5	1.2	0.948	1.00	0
V_w				199	V_{nw}				3938
V									4137

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)	0.15	0.0035		
b (Exhibit 24-6)	2.20	4.00		
c (Exhibit 24-6)	0.97	1.30		
d (Exhibit 24-6)	0.80	0.75		
Weaving intensity factor, Wi	0.53	0.21		
Weaving and non-weaving speeds, Si (mi/h)	50.91	60.40		

Number of lanes required for unconstrained operation, Nw 0.39
Maximum number of lanes, Nw (max) 1.40

☑ If Nw < Nw(max) unconstrained operation ☑ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	59.87
Weaving segment density, D (pc/mi/ln)	23.03
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	6620
Capacity as a 15-minute flow rate, c (veh/h)	6275
Capacity as a full-hour volume, c_h (veh/h)	5647

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

SHORT REPORT

General Information		Site Information	
Analyst	*KNM*	Intersection	*US 441 at CR 437*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*9/28/07*	Jurisdiction	*Orange County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032 Build*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*			*2*	*1*				*1*		*1*
Lane Group	*L*	*T*			*T*	*R*				*L*		*R*
Volume (vph)	*260*	*1280*			*1798*	*440*				*288*		*85*
% Heavy Vehicles	*11*	*11*			*11*	*11*				*2*		*2*
PHF	*0.95*	*0.95*			*0.95*	*0.95*				*0.95*		*0.95*
Pretimed/Actuated (P/A)	*A*	*A*			*A*	*A*				*A*		*A*
Startup Lost Time	*2.0*	*2.0*			*2.0*	*2.0*				*2.0*		*2.0*
Extension of Effective Green	*2.0*	*2.0*			*2.0*	*2.0*				*2.0*		*2.0*
Arrival Type	*3*	*3*			*3*	*3*				*3*		*3*
Unit Extension	*3.0*	*3.0*			*3.0*	*3.0*				*3.0*		*3.0*
Ped/Bike/RTOR Volume	*0*	*0*		*0*	*0*	*0*				*0*	*0*	*0*
Lane Width	*12.0*	*12.0*			*12.0*	*12.0*				*12.0*		*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*				*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*			*0*	*0*				*0*		*0*
Minimum Pedestrian Time		*3.2*			*3.2*						*3.2*	

Phasing	EB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = *16.0*	G = *76.0*	G =	G =	G = *16.0*	G =	G =	G =
	Y = *4*	Y = *4*	Y =	Y =	Y = *4*	Y =	Y =	Y =
Duration of Analysis (hrs) = *0.25*						Cycle Length C = *120.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*274*	*1347*			*1893*	*463*				*303*		*89*
Lane Group Capacity	*277*	*2607*			*2064*	*1164*				*236*		*1583*
v/c Ratio	*0.99*	*0.52*			*0.92*	*0.40*				*1.28*		*0.06*
Green Ratio	*0.80*	*0.80*			*0.63*	*0.80*				*0.13*		*1.00*
Uniform Delay d_1	*42.6*	*4.1*			*19.2*	*3.5*				*52.0*		*0.0*
Delay Factor k	*0.49*	*0.12*			*0.44*	*0.11*				*0.50*		*0.11*
Incremental Delay d_2	*50.9*	*0.2*			*7.1*	*0.2*				*156.0*		*0.0*
PF Factor	*1.000*	*1.000*			*1.000*	*1.000*				*1.000*		*0.950*
Control Delay	*93.6*	*4.3*			*26.3*	*3.7*				*208.0*		*0.0*
Lane Group LOS	*F*	*A*			*C*	*A*				*F*		*A*
Approach Delay	*19.4*			*21.9*						*160.8*		
Approach LOS	*B*			*C*						*F*		
Intersection Delay	*33.4*			Intersection LOS						*C*		

SHORT REPORT

General Information		Site Information	
Analyst	*Cristina Torres-Reyes*	Intersection	*CR 437 at Ponkan Road*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*2/23/2007*	Jurisdiction	*Orange County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*
Lane Group	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
Volume (vph)	*59*	*187*	*94*	*38*	*215*	*97*	*86*	*1041*	*33*	*61*	*354*	*35*
% Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Extension of Effective Green	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival Type	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Unit Extension	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Ped/Bike/RTOR Volume	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*			*3.2*	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = *10.6*	G =	G =	G =	G = *28.5*	G =	G =	G =
	Y = *5.6*	Y =	Y =	Y =	Y = *5.3*	Y =	Y =	Y =
Duration of Analysis (hrs) = *0.25*						Cycle Length C = *50.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*62*	*197*	*99*	*40*	*226*	*102*	*91*	*1096*	*35*	*64*	*373*	*37*
Lane Group Capacity	*243*	*395*	*336*	*250*	*395*	*336*	*567*	*2022*	*902*	*230*	*1062*	*902*
v/c Ratio	*0.26*	*0.50*	*0.29*	*0.16*	*0.57*	*0.30*	*0.16*	*0.54*	*0.04*	*0.28*	*0.35*	*0.04*
Green Ratio	*0.21*	*0.21*	*0.21*	*0.21*	*0.21*	*0.21*	*0.57*	*0.57*	*0.57*	*0.57*	*0.57*	*0.57*
Uniform Delay d_1	*16.4*	*17.4*	*16.6*	*16.1*	*17.7*	*16.6*	*5.1*	*6.7*	*4.7*	*5.5*	*5.8*	*4.7*
Delay Factor k	*0.11*	*0.11*	*0.11*	*0.11*	*0.17*	*0.11*	*0.11*	*0.14*	*0.11*	*0.11*	*0.11*	*0.11*
Incremental Delay d_2	*0.6*	*1.0*	*0.5*	*0.3*	*2.0*	*0.5*	*0.1*	*0.3*	*0.0*	*0.7*	*0.2*	*0.0*
PF Factor	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Control Delay	*17.0*	*18.4*	*17.0*	*16.4*	*19.7*	*17.1*	*5.2*	*7.0*	*4.7*	*6.2*	*6.0*	*4.8*
Lane Group LOS	*B*	*B*	*B*	*B*	*B*	*B*	*A*	*A*	*A*	*A*	*A*	*A*
Approach Delay	*17.8*			*18.6*			*6.8*			*5.9*		
Approach LOS	*B*			*B*			*A*			*A*		
Intersection Delay	*10.0*			Intersection LOS						*B*		

SHORT REPORT

General Information		Site Information	
Analyst	*Cristina Torres-Reyes*	Intersection	*CR 437 at Kelly Park Road*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*2/23/2007*	Jurisdiction	*Orange County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Lane Group	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
Volume (vph)	*304*	*197*	*188*	*60*	*317*	*83*	*168*	*468*	*74*	*57*	*186*	*377*
% Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Extension of Effective Green	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival Type	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Unit Extension	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Ped/Bike/RTOR Volume	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*			*3.2*	

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = *23.2*	G =	G =	G =	G = *24.5*	G =	G =	G =
	Y = *7*	Y =	Y =	Y =	Y = *5.3*	Y =	Y =	Y =
Duration of Analysis (hrs) = *0.25*						Cycle Length C = *60.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*320*	*207*	*198*	*63*	*334*	*87*	*177*	*493*	*78*	*60*	*196*	*397*
Lane Group Capacity	*397*	*1372*	*612*	*448*	*1372*	*612*	*483*	*761*	*646*	*246*	*761*	*646*
v/c Ratio	*0.81*	*0.15*	*0.32*	*0.14*	*0.24*	*0.14*	*0.37*	*0.65*	*0.12*	*0.24*	*0.26*	*0.61*
Green Ratio	*0.39*	*0.39*	*0.39*	*0.39*	*0.39*	*0.39*	*0.41*	*0.41*	*0.41*	*0.41*	*0.41*	*0.41*
Uniform Delay d_1	*16.4*	*12.0*	*12.9*	*11.9*	*12.5*	*11.9*	*12.4*	*14.3*	*11.0*	*11.7*	*11.7*	*14.0*
Delay Factor k	*0.35*	*0.11*	*0.11*	*0.11*	*0.11*	*0.11*	*0.11*	*0.23*	*0.11*	*0.11*	*0.11*	*0.20*
Incremental Delay d_2	*11.6*	*0.1*	*0.3*	*0.1*	*0.1*	*0.1*	*0.5*	*1.9*	*0.1*	*0.5*	*0.2*	*1.8*
PF Factor	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Control Delay	*28.0*	*12.0*	*13.2*	*12.1*	*12.6*	*12.0*	*12.8*	*16.2*	*11.1*	*12.2*	*11.9*	*15.8*
Lane Group LOS	*C*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*
Approach Delay	*19.4*			*12.4*			*14.9*			*14.3*		
Approach LOS	*B*			*B*			*B*			*B*		
Intersection Delay	*15.5*			Intersection LOS			*B*					

SHORT REPORT

General Information		Site Information	
Analyst	*KNM*	Intersection	*US 441 at Wekiva Parkway*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*9/14/07*	Jurisdiction	*Orange County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032 Build*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*	*2*	*2*	*2*	*1*	*2*		*1*	*1*		*1*
Lane Group	*L*	*T*	*R*	*L*	*T*	*R*	*L*		*R*	*L*		*R*
Volume (vph)	*260*	*131*	*1645*	*605*	*109*	*260*	*1462*		*788*	*130*		*390*
% Heavy Vehicles	*0*	*2*	*2*	*2*	*2*	*0*	*0*		*0*	*2*		*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*		*0.95*	*0.95*		*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*		*A*	*A*		*A*
Startup Lost Time	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*
Extension of Effective Green	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*
Arrival Type	*3*	*3*	*3*	*3*	*3*	*3*	*3*		*3*	*3*		*3*
Unit Extension	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*		*3.0*
Ped/Bike/RTOR Volume	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*		*12.0*	*12.0*		*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*		*0*
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*			*3.2*	

Phasing	Excl. Left	Thru & RT	03	04	NS Perm	06	07	08
Timing	G = *25.0*	G = *20.0*	G =	G =	G = *60.0*	G =	G =	G =
	Y = *5*	Y = *5*	Y =	Y =	Y = *5*	Y =	Y =	Y =
Duration of Analysis (hrs) = *0.25*						Cycle Length C = *120.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*274*	*138*	*1732*	*637*	*115*	*274*	*1539*		*829*	*137*		*411*
Lane Group Capacity	*376*	*591*	*1985*	*716*	*591*	*1144*	*1753*		*1211*	*885*		*1187*
v/c Ratio	*0.73*	*0.23*	*0.87*	*0.89*	*0.19*	*0.24*	*0.88*		*0.68*	*0.15*		*0.35*
Green Ratio	*0.21*	*0.17*	*0.71*	*0.21*	*0.17*	*0.71*	*0.50*		*0.75*	*0.50*		*0.75*
Uniform Delay d_1	*44.3*	*43.4*	*13.4*	*46.2*	*43.1*	*6.1*	*26.7*		*7.7*	*16.3*		*5.1*
Delay Factor k	*0.29*	*0.11*	*0.40*	*0.41*	*0.11*	*0.11*	*0.40*		*0.25*	*0.11*		*0.11*
Incremental Delay d_2	*7.0*	*0.2*	*4.6*	*13.2*	*0.2*	*0.1*	*5.4*		*1.6*	*0.1*		*0.2*
PF Factor	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*		*1.000*
Control Delay	*51.3*	*43.6*	*18.0*	*59.4*	*43.2*	*6.3*	*32.2*		*9.3*	*16.3*		*5.2*
Lane Group LOS	*D*	*D*	*B*	*E*	*D*	*A*	*C*		*A*	*B*		*A*
Approach Delay	*23.9*			*43.4*			*24.2*			*8.0*		
Approach LOS	*C*			*D*			*C*			*A*		
Intersection Delay	*25.9*			Intersection LOS						*C*		

SHORT REPORT

General Information		Site Information	
Analyst	*KNM*	Intersection	*US 441 West of WP Interchange*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*09/28/07*	Jurisdiction	*Orange County*
Time Period	*Build I-4 Connection @ SR417*	Analysis Year	*2032 Build*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes		*2*			*2*	*1*				*1*		*2*
Lane Group		*T*			*T*	*R*				*L*		*R*
Volume (vph)		*1397*			*1605*	*293*				*466*		*1505*
% Heavy Vehicles		*2*			*0*	*2*				*0*		*0*
PHF		*0.95*			*0.90*	*0.95*				*0.90*		*0.90*
Pretimed/Actuated (P/A)		*A*			*A*	*A*				*A*		*A*
Startup Lost Time		*2.0*			*2.0*	*2.0*				*2.0*		*2.0*
Extension of Effective Green		*2.0*			*2.0*	*2.0*				*2.0*		*2.0*
Arrival Type		*3*			*3*	*3*				*3*		*3*
Unit Extension		*3.0*			*3.0*	*3.0*				*3.0*		*3.0*
Ped/Bike/RTOR Volume	*0*	*0*		*0*	*0*	*0*				*0*	*0*	*0*
Lane Width		*12.0*			*12.0*	*12.0*				*12.0*		*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*				*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour		*0*			*0*	*0*				*0*		*0*
Minimum Pedestrian Time		*3.2*			*3.2*						*3.2*	

Phasing	Thru & RT	02	03	04	SB Only	06	07	08
Timing	G = *35.0*	G =	G =	G =	G = *25.0*	G =	G =	G =
	Y = *5*	Y =	Y =	Y =	Y = *5*	Y =	Y =	Y =
Duration of Analysis (hrs) = *0.25*					Cycle Length C = *70.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate		*1471*			*1783*	*308*				*518*		*1672*
Lane Group Capacity		*1774*			*1809*	*1583*				*645*		*2859*
v/c Ratio		*0.83*			*0.99*	*0.19*				*0.80*		*0.58*
Green Ratio		*0.50*			*0.50*	*1.00*				*0.36*		*1.00*
Uniform Delay d_1		*14.9*			*17.3*	*0.0*				*20.3*		*0.0*
Delay Factor k		*0.37*			*0.49*	*0.11*				*0.35*		*0.18*
Incremental Delay d_2		*3.5*			*17.8*	*0.1*				*7.3*		*0.3*
PF Factor		*1.000*			*1.000*	*0.950*				*1.000*		*0.950*
Control Delay		*18.4*			*35.0*	*0.1*				*27.6*		*0.3*
Lane Group LOS		*B*			*D*	*A*				*C*		*A*
Approach Delay	*18.4*			*29.9*						*6.8*		
Approach LOS	*B*			*C*						*A*		
Intersection Delay	*18.1*			Intersection LOS						*B*		

SHORT REPORT

General Information		Site Information	
Analyst	*CTR*	Intersection	*CR 437 East of WP Interchange*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*09/28/07*	Jurisdiction	*Orange County*
Time Period	*Build I-4 Connection @ SR417*	Analysis Year	*2032 Build*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*2*		*1*				*1*	*1*			*1*	*1*
Lane Group	*L*		*R*				*L*	*T*			*T*	*R*
Volume (vph)	*957*		*92*				*298*	*494*			*294*	*686*
% Heavy Vehicles	*2*		*2*				*2*	*2*			*2*	*2*
PHF	*0.95*		*0.95*				*0.95*	*0.95*			*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*		*A*				*A*	*A*			*A*	*A*
Startup Lost Time	*2.0*		*2.0*				*2.0*	*2.0*			*2.0*	*2.0*
Extension of Effective Green	*2.0*		*2.0*				*2.0*	*2.0*			*2.0*	*2.0*
Arrival Type	*3*		*3*				*3*	*3*			*3*	*3*
Unit Extension	*3.0*		*3.0*				*3.0*	*3.0*			*3.0*	*3.0*
Ped/Bike/RTOR Volume	*0*	*0*	*0*				*0*	*0*		*0*	*0*	*0*
Lane Width	*12.0*		*12.0*				*12.0*	*12.0*			*12.0*	*12.0*
Parking/Grade/Parking	*N*	*0*	*N*				*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*		*0*				*0*	*0*			*0*	*0*
Minimum Pedestrian Time		*3.2*						*3.2*			*3.2*	

Phasing	EB Only	02	03	04	NS Perm	06	07	08
Timing	G = *20.0*	G =	G =	G =	G = *30.0*	G =	G =	G =
	Y = *5*	Y =	Y =	Y =	Y = *5*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *60.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*1007*		*97*				*314*	*520*			*309*	*722*
Lane Group Capacity	*1146*		*1583*				*512*	*932*			*932*	*1583*
v/c Ratio	*0.88*		*0.06*				*0.61*	*0.56*			*0.33*	*0.46*
Green Ratio	*0.33*		*1.00*				*0.50*	*0.50*			*0.50*	*1.00*
Uniform Delay d_1	*18.9*		*0.0*				*10.8*	*10.4*			*9.0*	*0.0*
Delay Factor k	*0.41*		*0.11*				*0.20*	*0.16*			*0.11*	*0.11*
Incremental Delay d_2	*8.0*		*0.0*				*2.2*	*0.8*			*0.2*	*0.2*
PF Factor	*1.000*		*0.950*				*1.000*	*1.000*			*1.000*	*0.950*
Control Delay	*26.9*		*0.0*				*13.0*	*11.2*			*9.2*	*0.2*
Lane Group LOS	*C*		*A*				*B*	*B*			*A*	*A*
Approach Delay	*24.5*						*11.9*			*2.9*		
Approach LOS	*C*						*B*			*A*		
Intersection Delay	*13.5*			Intersection LOS						*B*		

SHORT REPORT

General Information		Site Information	
Analyst	*CTR/KNM*	Intersection	*Kelly Park Rd at Wekiva Pkwy*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*2/22/2007*	Jurisdiction	*Orange County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes		*2*	*1*	*1*	*2*					*1*		*1*
Lane Group		*T*	*R*	*L*	*T*					*L*		*R*
Volume (vph)		*319*	*145*	*345*	*180*					*423*		*157*
% Heavy Vehicles		*2*	*2*	*2*	*2*					*2*		*2*
PHF		*0.95*	*0.95*	*0.95*	*0.95*					*0.95*		*0.95*
Pretimed/Actuated (P/A)		*A*	*A*	*A*	*A*					*A*		*A*
Startup Lost Time		*2.0*	*2.0*	*2.0*	*2.0*					*2.0*		*2.0*
Extension of Effective Green		*2.0*	*2.0*	*2.0*	*2.0*					*2.0*		*2.0*
Arrival Type		*3*	*3*	*3*	*3*					*3*		*3*
Unit Extension		*3.0*	*3.0*	*3.0*	*3.0*					*3.0*		*3.0*
Ped/Bike/RTOR Volume	*0*	*0*	*0*	*0*	*0*					*0*	*0*	*0*
Lane Width		*12.0*	*12.0*	*12.0*	*12.0*					*12.0*		*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*				*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour		*0*	*0*	*0*	*0*					*0*		*0*
Minimum Pedestrian Time		*3.2*			*3.2*						*3.2*	

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = *15.0*	G = *15.0*	G =	G =	G = *31.0*	G =	G =	G =
	Y = *7*	Y = *7*	Y =	Y =	Y = *5*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *80.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate		*336*	*153*	*363*	*189*					*445*		*165*
Lane Group Capacity		*665*	*1049*	*523*	*1640*					*686*		*1583*
v/c Ratio		*0.51*	*0.15*	*0.69*	*0.12*					*0.65*		*0.10*
Green Ratio		*0.19*	*0.66*	*0.46*	*0.46*					*0.39*		*1.00*
Uniform Delay d_1		*29.2*	*5.0*	*15.0*	*12.2*					*20.0*		*0.0*
Delay Factor k		*0.11*	*0.11*	*0.26*	*0.11*					*0.23*		*0.11*
Incremental Delay d_2		*0.6*	*0.1*	*4.0*	*0.0*					*2.2*		*0.0*
PF Factor		*1.000*	*1.000*	*1.000*	*1.000*					*1.000*		*0.950*
Control Delay		*29.8*	*5.1*	*19.0*	*12.2*					*22.2*		*0.0*
Lane Group LOS		*C*	*A*	*B*	*B*					*C*		*A*
Approach Delay		*22.1*			*16.7*					*16.2*		
Approach LOS		*C*			*B*					*B*		
Intersection Delay		*18.1*			Intersection LOS					*B*		

SHORT REPORT

General Information		Site Information	
Analyst	*CTR/KNM*	Intersection	*Kelly Park Rd at Wekiva Pkwy*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*2/22/2007*	Jurisdiction	*Orange County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*			*2*	*1*	*1*		*1*			
Lane Group	*L*	*T*			*T*	*R*	*L*		*R*			
Volume (vph)	*140*	*602*			*422*	*440*	*103*		*387*			
% Heavy Vehicles	*2*	*2*			*2*	*2*	*2*		*2*			
PHF	*0.95*	*0.95*			*0.95*	*0.95*	*0.95*		*0.95*			
Pretimed/Actuated (P/A)	*A*	*A*			*A*	*A*	*A*		*A*			
Startup Lost Time	*2.0*	*2.0*			*2.0*	*2.0*	*2.0*		*2.0*			
Extension of Effective Green	*2.0*	*2.0*			*2.0*	*2.0*	*2.0*		*2.0*			
Arrival Type	*3*	*3*			*3*	*3*	*3*		*3*			
Unit Extension	*3.0*	*3.0*			*3.0*	*3.0*	*3.0*		*3.0*			
Ped/Bike/RTOR Volume	*0*	*0*		*0*	*0*	*0*	*0*	*0*	*0*			
Lane Width	*12.0*	*12.0*			*12.0*	*12.0*	*12.0*		*12.0*			
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*			
Parking/Hour												
Bus Stops/Hour	*0*	*0*			*0*	*0*	*0*		*0*			
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*				

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = *15.0*	G = *30.0*	G =	G =	G = *16.0*	G =	G =	G =
	Y = *7*	Y = *7*	Y =	Y =	Y = *5*	Y =	Y =	Y =
Duration of Analysis (hrs) = *0.25*						Cycle Length C = *80.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*147*	*634*			*444*	*463*	*108*		*407*			
Lane Group Capacity	*673*	*2306*			*1330*	*1049*	*354*		*1583*			
v/c Ratio	*0.22*	*0.27*			*0.33*	*0.44*	*0.31*		*0.26*			
Green Ratio	*0.65*	*0.65*			*0.38*	*0.66*	*0.20*		*1.00*			
Uniform Delay d_1	*5.8*	*6.0*			*17.9*	*6.4*	*27.3*		*0.0*			
Delay Factor k	*0.11*	*0.11*			*0.11*	*0.11*	*0.11*		*0.11*			
Incremental Delay d_2	*0.2*	*0.1*			*0.1*	*0.3*	*0.5*		*0.1*			
PF Factor	*1.000*	*1.000*			*1.000*	*1.000*	*1.000*		*0.950*			
Control Delay	*5.9*	*6.0*			*18.0*	*6.7*	*27.8*		*0.1*			
Lane Group LOS	*A*	*A*			*B*	*A*	*C*		*A*			
Approach Delay	*6.0*			*12.3*			*5.9*					
Approach LOS	*A*			*B*			*A*					
Intersection Delay	*8.6*			Intersection LOS						*A*		

SHORT REPORT

General Information		Site Information	
Analyst	*CTR*	Intersection	*SR 46 and US 441*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*2/15/2007*	Jurisdiction	*Lake County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*	*1*	*2*	*2*	*1*	*1*	*3*	*1*	*1*	*3*	*1*
Lane Group	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
Volume (vph)	*80*	*529*	*61*	*267*	*546*	*7*	*242*	*1340*	*498*	*7*	*782*	*71*
% Heavy Vehicles	*11*	*11*	*11*	*11*	*11*	*11*	*10*	*10*	*10*	*10*	*10*	*10*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Extension of Effective Green	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival Type	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Unit Extension	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Ped/Bike/RTOR Volume	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*			*3.2*	

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	Thru & RT	07	08
Timing	G = *10.0*	G = *20.0*	G =	G =	G = *15.0*	G = *25.0*	G =	G =
	Y = *4*	Y = *4*	Y =	Y =	Y = *4*	Y = *4*	Y =	Y =

Duration of Analysis (hrs) = *0.25* — Cycle Length C = *86.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*84*	*557*	*64*	*281*	*575*	*7*	*255*	*1411*	*524*	*7*	*823*	*75*
Lane Group Capacity	*189*	*758*	*660*	*378*	*796*	*660*	*286*	*1506*	*1075*	*286*	*1506*	*1075*
v/c Ratio	*0.44*	*0.73*	*0.10*	*0.74*	*0.72*	*0.01*	*0.89*	*0.94*	*0.49*	*0.02*	*0.55*	*0.07*
Green Ratio	*0.12*	*0.23*	*0.45*	*0.12*	*0.23*	*0.45*	*0.17*	*0.29*	*0.73*	*0.17*	*0.29*	*0.73*
Uniform Delay d_1	*35.4*	*30.5*	*13.4*	*36.8*	*30.4*	*12.9*	*34.7*	*29.7*	*4.8*	*29.4*	*25.7*	*3.2*
Delay Factor k	*0.11*	*0.29*	*0.11*	*0.30*	*0.28*	*0.11*	*0.42*	*0.45*	*0.11*	*0.11*	*0.15*	*0.11*
Incremental Delay d_2	*1.7*	*3.7*	*0.1*	*7.8*	*3.3*	*0.0*	*27.5*	*11.4*	*0.3*	*0.0*	*0.4*	*0.0*
PF Factor	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Control Delay	*37.1*	*34.3*	*13.5*	*44.5*	*33.7*	*12.9*	*62.2*	*41.1*	*5.1*	*29.5*	*26.1*	*3.3*
Lane Group LOS	*D*	*C*	*B*	*D*	*C*	*B*	*E*	*D*	*A*	*C*	*C*	*A*
Approach Delay	*32.7*			*37.0*			*35.0*			*24.3*		
Approach LOS	*C*			*D*			*C*			*C*		
Intersection Delay	*32.9*			Intersection LOS						*C*		

SHORT REPORT

General Information		Site Information	
Analyst	*KNM*	Intersection	*SR 46 at Round Lake Road*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*2/7/2007*	Jurisdiction	*Lake County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032 Build*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*3*	*1*	*1*	*3*	*1*	*1*	*2*	*1*	*1*	*2*	*1*
Lane Group	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
Volume (vph)	*93*	*1976*	*191*	*87*	*2575*	*803*	*65*	*81*	*114*	*191*	*466*	*203*
% Heavy Vehicles	*11*	*11*	*11*	*11*	*11*	*11*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Extension of Effective Green	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival Type	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Unit Extension	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Ped/Bike/RTOR Volume	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*			*3.2*	

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	NS Perm	07	08
Timing	G = *10.0*	G = *76.0*	G =	G =	G = *10.0*	G = *20.0*	G =	G =
	Y = *4*	Y = *4*	Y =	Y =	Y = *4*	Y = *4*	Y =	Y =

Duration of Analysis (hrs) = *0.25* — Cycle Length C = *132.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*98*	*2080*	*201*	*92*	*2711*	*845*	*68*	*85*	*120*	*201*	*491*	*214*
Lane Group Capacity	*123*	*2685*	*1257*	*123*	*2685*	*1257*	*190*	*537*	*1367*	*343*	*537*	*1367*
v/c Ratio	*0.80*	*0.77*	*0.16*	*0.75*	*1.01*	*0.67*	*0.36*	*0.16*	*0.09*	*0.59*	*0.91*	*0.16*
Green Ratio	*0.08*	*0.58*	*0.86*	*0.08*	*0.58*	*0.86*	*0.26*	*0.15*	*0.86*	*0.26*	*0.15*	*0.86*
Uniform Delay d_1	*60.0*	*21.4*	*1.4*	*59.8*	*28.0*	*2.9*	*39.2*	*48.7*	*1.3*	*43.0*	*55.2*	*1.4*
Delay Factor k	*0.34*	*0.32*	*0.11*	*0.30*	*0.50*	*0.24*	*0.11*	*0.11*	*0.11*	*0.18*	*0.43*	*0.11*
Incremental Delay d_2	*29.6*	*1.5*	*0.1*	*22.1*	*19.8*	*1.4*	*1.2*	*0.1*	*0.0*	*2.6*	*20.3*	*0.1*
PF Factor	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Control Delay	*89.6*	*22.9*	*1.5*	*81.8*	*47.8*	*4.3*	*40.4*	*48.8*	*1.4*	*45.6*	*75.5*	*1.5*
Lane Group LOS	*F*	*C*	*A*	*F*	*D*	*A*	*D*	*D*	*A*	*D*	*E*	*A*
Approach Delay	*23.9*			*38.6*			*25.9*			*51.4*		
Approach LOS	*C*			*D*			*C*			*D*		
Intersection Delay	*34.8*			Intersection LOS			*C*					

SHORT REPORT

General Information		Site Information	
Analyst	*Kacia Monts*	Intersection	*SR 46 Bypass at SR 46 West*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*1/25/2007*	Jurisdiction	*Lake County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032 Build*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes		*2*		*1*	*1*			*3*	*1*			
Lane Group		*T*		*L*	*T*			*T*	*R*			
Volume (vph)		*455*		*70*	*570*			*2890*	*510*			
% Heavy Vehicles		*2*		*2*	*2*			*2*	*2*			
PHF		*0.95*		*0.95*	*0.95*			*0.95*	*0.95*			
Pretimed/Actuated (P/A)		*A*		*A*	*A*			*A*	*A*			
Startup Lost Time		*2.0*		*2.0*	*2.0*			*2.0*	*2.0*			
Extension of Effective Green		*2.0*		*2.0*	*2.0*			*2.0*	*2.0*			
Arrival Type		*3*		*3*	*3*			*3*	*3*			
Unit Extension		*3.0*		*3.0*	*3.0*			*3.0*	*3.0*			
Ped/Bike/RTOR Volume	*0*	*0*		*0*	*0*		*0*	*0*	*0*			
Lane Width		*12.0*		*12.0*	*12.0*			*12.0*	*12.0*			
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*			
Parking/Hour												
Bus Stops/Hour		*0*		*0*	*0*			*0*	*0*			
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*				

Phasing	EW Perm	02	03	04	NB Only	06	07	08
Timing	G = *35.0*	G =	G =	G =	G = *75.0*	G =	G =	G =
	Y = *4*	Y =	Y =	Y =	Y = *4*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *118.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate		*479*		*74*	*600*			*3042*	*537*			
Lane Group Capacity		*1052*		*193*	*553*			*3225*	*1583*			
v/c Ratio		*0.46*		*0.38*	*1.08*			*0.94*	*0.34*			
Green Ratio		*0.30*		*0.30*	*0.30*			*0.64*	*1.00*			
Uniform Delay d_1		*33.7*		*32.9*	*41.5*			*19.6*	*0.0*			
Delay Factor k		*0.11*		*0.11*	*0.50*			*0.46*	*0.11*			
Incremental Delay d_2		*0.2*		*1.3*	*63.3*			*6.7*	*0.1*			
PF Factor		*1.000*		*1.000*	*1.000*			*1.000*	*0.950*			
Control Delay		*33.9*		*34.2*	*104.8*			*26.3*	*0.1*			
Lane Group LOS		*C*		*C*	*F*			*C*	*A*			
Approach Delay		*33.9*			*97.1*			*22.3*				
Approach LOS		*C*			*F*			*C*				
Intersection Delay		*34.2*			Intersection LOS						*C*	

SHORT REPORT

General Information		Site Information	
Analyst	*Cristina Torres-Reyes*	Intersection	*SR 46 at CR 437*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*1/25/2007*	Jurisdiction	*Lake County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Lane Group	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*
Volume (vph)	*154*	*280*	*96*	*123*	*270*	*267*	*174*	*141*	*255*	*273*	*49*	*108*
% Heavy Vehicles	*11*	*11*	*11*	*11*	*11*	*11*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Extension of Effective Green	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival Type	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Unit Extension	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Ped/Bike/RTOR Volume	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*			*3.2*	

Phasing	Excl. Left	Thru & RT	03	04	NS Perm	06	07	08
Timing	G = *15.0*	G = *20.0*	G =	G =	G = *20.0*	G =	G =	G =
	Y = *5*	Y = *5*	Y =	Y =	Y = *5*	Y =	Y =	Y =
Duration of Analysis (hrs) = *0.25*					Cycle Length C = *70.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*162*	*295*	*101*	*129*	*284*	*281*	*183*	*148*	*268*	*287*	*52*	*114*
Lane Group Capacity	*348*	*489*	*416*	*348*	*489*	*416*	*385*	*532*	*905*	*353*	*532*	*905*
v/c Ratio	*0.47*	*0.60*	*0.24*	*0.37*	*0.58*	*0.68*	*0.48*	*0.28*	*0.30*	*0.81*	*0.10*	*0.13*
Green Ratio	*0.21*	*0.29*	*0.29*	*0.21*	*0.29*	*0.29*	*0.29*	*0.29*	*0.57*	*0.29*	*0.29*	*0.57*
Uniform Delay d_1	*24.0*	*21.6*	*19.2*	*23.5*	*21.4*	*22.1*	*20.7*	*19.4*	*7.7*	*23.3*	*18.4*	*6.9*
Delay Factor k	*0.11*	*0.19*	*0.11*	*0.11*	*0.17*	*0.25*	*0.11*	*0.11*	*0.11*	*0.35*	*0.11*	*0.11*
Incremental Delay d_2	*1.0*	*2.1*	*0.3*	*0.7*	*1.7*	*4.3*	*0.9*	*0.3*	*0.2*	*13.5*	*0.1*	*0.1*
PF Factor	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Control Delay	*25.0*	*23.7*	*19.5*	*24.1*	*23.2*	*26.4*	*21.6*	*19.7*	*7.9*	*36.8*	*18.5*	*7.0*
Lane Group LOS	*C*	*C*	*B*	*C*	*C*	*C*	*C*	*B*	*A*	*D*	*B*	*A*
Approach Delay	*23.3*			*24.7*			*15.0*			*27.2*		
Approach LOS	*C*			*C*			*B*			*C*		
Intersection Delay	*22.3*			Intersection LOS						*C*		

SHORT REPORT

General Information		Site Information	
Analyst	*Cristina Torres-Reyes*	Intersection	*SR 46 at CR 435*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*1/25/2007*	Jurisdiction	*Lake County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*0*
Lane Group	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*T*	*R*	*L*	*TR*	
Volume (vph)	*2*	*401*	*147*	*476*	*899*	*25*	*345*	*18*	*257*	*10*	*18*	*6*
% Heavy Vehicles	*11*	*11*	*11*	*11*	*11*	*11*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of Effective Green	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival Type	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	
Unit Extension	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Ped/Bike/RTOR Volume	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*			*3.2*	

Phasing	WB Only	EW Perm	03	04	NS Perm	06	07	08
Timing	G = *15.0*	G = *50.0*	G =	G =	G = *25.0*	G =	G =	G =
	Y = *5.5*	Y = *5.5*	Y =	Y =	Y = *5.5*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *106.5*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*2*	*422*	*155*	*501*	*946*	*26*	*363*	*19*	*271*	*11*	*25*	
Lane Group Capacity	*184*	*804*	*683*	*546*	*1133*	*963*	*324*	*437*	*676*	*326*	*422*	
v/c Ratio	*0.01*	*0.52*	*0.23*	*0.92*	*0.83*	*0.03*	*1.12*	*0.04*	*0.40*	*0.03*	*0.06*	
Green Ratio	*0.47*	*0.47*	*0.47*	*0.66*	*0.66*	*0.66*	*0.23*	*0.23*	*0.43*	*0.23*	*0.23*	
Uniform Delay d_1	*15.1*	*19.9*	*16.8*	*23.1*	*13.6*	*6.2*	*40.8*	*31.5*	*21.1*	*31.4*	*31.6*	
Delay Factor k	*0.11*	*0.13*	*0.11*	*0.44*	*0.37*	*0.11*	*0.50*	*0.11*	*0.11*	*0.11*	*0.11*	
Incremental Delay d_2	*0.0*	*0.6*	*0.2*	*20.6*	*5.6*	*0.0*	*86.5*	*0.0*	*0.4*	*0.0*	*0.1*	
PF Factor	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Control Delay	*15.1*	*20.5*	*16.9*	*43.7*	*19.2*	*6.2*	*127.3*	*31.5*	*21.5*	*31.5*	*31.7*	
Lane Group LOS	*B*	*C*	*B*	*D*	*B*	*A*	*F*	*C*	*C*	*C*	*C*	
Approach Delay	*19.5*			*27.3*			*80.6*			*31.6*		
Approach LOS	*B*			*C*			*F*			*C*		
Intersection Delay	*38.4*			Intersection LOS						*D*		

SHORT REPORT

General Information		Site Information	
Analyst	*Cristina Torres-Reyes*	Intersection	*SR 46 at CR 46A*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*12/15/2006*	Jurisdiction	*Lake County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*1*			*2*	*1*				*2*		*1*
Lane Group	*L*	*T*			*T*	*R*				*L*		*R*
Volume (vph)	*7*	*1153*			*963*	*677*				*749*		*31*
% Heavy Vehicles	*11*	*11*			*11*	*11*				*2*		*2*
PHF	*0.95*	*0.95*			*0.95*	*0.95*				*0.95*		*0.95*
Pretimed/Actuated (P/A)	*A*	*A*			*A*	*A*				*A*		*A*
Startup Lost Time	*2.0*	*2.0*			*2.0*	*2.0*				*2.0*		*2.0*
Extension of Effective Green	*2.0*	*2.0*			*2.0*	*2.0*				*2.0*		*2.0*
Arrival Type	*3*	*3*			*3*	*3*				*3*		*3*
Unit Extension	*3.0*	*3.0*			*3.0*	*3.0*				*3.0*		*3.0*
Ped/Bike/RTOR Volume	*0*	*0*		*0*	*0*	*0*				*0*	*0*	*0*
Lane Width	*12.0*	*12.0*			*12.0*	*12.0*				*12.0*		*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*				*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*			*0*	*0*				*0*		*0*
Minimum Pedestrian Time		*3.2*			*3.2*						*3.2*	

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = *80.1*	G =	G =	G =	G = *27.9*	G =	G =	G =
	Y = *7*	Y =	Y =	Y =	Y = *5*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *120.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*7*	*1214*			*1014*	*713*				*788*		*33*
Lane Group Capacity	*284*	*1143*			*2175*	*1455*				*799*		*368*
v/c Ratio	*0.02*	*1.06*			*0.47*	*0.49*				*0.99*		*0.09*
Green Ratio	*0.67*	*0.67*			*0.67*	*1.00*				*0.23*		*0.23*
Uniform Delay d_1	*6.7*	*20.0*			*9.6*	*0.0*				*45.9*		*36.1*
Delay Factor k	*0.11*	*0.50*			*0.11*	*0.11*				*0.49*		*0.11*
Incremental Delay d_2	*0.0*	*44.8*			*0.2*	*0.3*				*28.3*		*0.1*
PF Factor	*1.000*	*1.000*			*1.000*	*0.950*				*1.000*		*1.000*
Control Delay	*6.8*	*64.7*			*9.8*	*0.3*				*74.2*		*36.2*
Lane Group LOS	*A*	*E*			*A*	*A*				*E*		*D*
Approach Delay	*64.4*			*5.9*						*72.7*		
Approach LOS	*E*			*A*						*E*		
Intersection Delay	*39.4*			Intersection LOS						*D*		

SHORT REPORT

General Information		Site Information	
Analyst	*CTR/KNM*	Intersection	*SR 46 Existing at Wekiva Pkwy*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*2/21/2007*	Jurisdiction	*Lake County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes						*2*		*2*			*2*	*1*
Lane Group						*R*		*T*			*T*	*R*
Volume (vph)						*1790*		*110*			*1790*	*110*
% Heavy Vehicles						*2*		*2*			*2*	*2*
PHF						*0.95*		*0.95*			*0.95*	*0.95*
Pretimed/Actuated (P/A)						*A*		*A*			*A*	*A*
Startup Lost Time						*2.0*		*2.0*			*2.0*	*2.0*
Extension of Effective Green						*2.0*		*2.0*			*2.0*	*2.0*
Arrival Type						*3*		*3*			*3*	*3*
Unit Extension						*3.0*		*3.0*			*3.0*	*3.0*
Ped/Bike/RTOR Volume				*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*
Lane Width						*12.0*		*12.0*			*12.0*	*12.0*
Parking/Grade/Parking				*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour						*0*		*0*			*0*	*0*
Minimum Pedestrian Time					*3.2*			*3.2*			*3.2*	

Phasing	WB Only	02	03	04	Thru & RT	06	07	08
Timing	G = *10.0*	G =	G =	G =	G = *60.0*	G =	G =	G =
	Y = *5*	Y =	Y =	Y =	Y = *5*	Y =	Y =	Y =
Duration of Analysis (hrs) = *0.25*					Cycle Length C = *80.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate						*1884*		*116*			*1884*	*116*
Lane Group Capacity						*2803*		*2660*			*2660*	*1583*
v/c Ratio						*0.67*		*0.04*			*0.71*	*0.07*
Green Ratio						*1.00*		*0.75*			*0.75*	*1.00*
Uniform Delay d_1						*0.0*		*2.6*			*5.3*	*0.0*
Delay Factor k						*0.24*		*0.11*			*0.27*	*0.11*
Incremental Delay d_2						*0.6*		*0.0*			*0.9*	*0.0*
PF Factor						*0.950*		*1.000*			*1.000*	*0.950*
Control Delay						*0.6*		*2.6*			*6.2*	*0.0*
Lane Group LOS						*A*		*A*			*A*	*A*
Approach Delay				*0.6*			*2.6*			*5.9*		
Approach LOS				*A*			*A*			*A*		
Intersection Delay	*3.3*			Intersection LOS						*A*		

SHORT REPORT

General Information		Site Information	
Analyst	*CTR/KNM*	Intersection	*SR 46 Existing at Wekiva Pkwy*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*2/21/2007*	Jurisdiction	*Lake County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*									*2*		
Lane Group	*L*									*L*		
Volume (vph)	*110*									*1790*		
% Heavy Vehicles	*2*									*2*		
PHF	*0.95*									*0.95*		
Pretimed/Actuated (P/A)	*A*									*A*		
Startup Lost Time	*2.0*									*2.0*		
Extension of Effective Green	*2.0*									*2.0*		
Arrival Type	*3*									*3*		
Unit Extension	*3.0*									*3.0*		
Ped/Bike/RTOR Volume	*0*	*0*								*0*	*0*	
Lane Width	*12.0*									*12.0*		
Parking/Grade/Parking	*N*	*0*	*N*							*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*									*0*		
Minimum Pedestrian Time		*3.2*									*3.2*	

Phasing	EB Only	02	03	04	SB Only	06	07	08
Timing	G = *10.0*	G =	G =	G =	G = *60.0*	G =	G =	G =
	Y = *5*	Y =	Y =	Y =	Y = *5*	Y =	Y =	Y =
Duration of Analysis (hrs) = *0.25*					Cycle Length C = *80.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*116*									*1884*		
Lane Group Capacity	*221*									*2578*		
v/c Ratio	*0.52*									*0.73*		
Green Ratio	*0.13*									*0.75*		
Uniform Delay d_1	*32.8*									*5.5*		
Delay Factor k	*0.13*									*0.29*		
Incremental Delay d_2	*2.3*									*1.1*		
PF Factor	*1.000*									*1.000*		
Control Delay	*35.1*									*6.6*		
Lane Group LOS	*D*									*A*		
Approach Delay	*35.1*									*6.6*		
Approach LOS	*D*									*A*		
Intersection Delay	*8.3*			Intersection LOS						*A*		

SHORT REPORT

General Information		Site Information	
Analyst	*KNM*	Intersection	*SR 46 Existing at Wekiva Pkwy*
Agency or Co.	*HNTB*	Area Type	*All other areas*
Date Performed	*7/17/07*	Jurisdiction	*Lake County*
Time Period	*Build I-4 Connection @ SR 417*	Analysis Year	*2032 Build*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes				*1*		*1*	*1*	*1*			*1*	*1*
Lane Group				*L*		*R*	*L*	*T*			*T*	*R*
Volume (vph)				*11*		*99*	*10*	*103*			*120*	*50*
% Heavy Vehicles				*0*		*2*	*0*	*2*			*2*	*2*
PHF				*0.95*		*0.95*	*0.95*	*0.95*			*0.95*	*0.95*
Pretimed/Actuated (P/A)				*A*		*A*	*A*	*A*			*A*	*A*
Startup Lost Time				*2.0*		*2.0*	*2.0*	*2.0*			*2.0*	*2.0*
Extension of Effective Green				*2.0*		*2.0*	*2.0*	*2.0*			*2.0*	*2.0*
Arrival Type				*3*		*3*	*3*	*3*			*3*	*3*
Unit Extension				*3.0*		*3.0*	*3.0*	*3.0*			*3.0*	*3.0*
Ped/Bike/RTOR Volume				*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*
Lane Width				*12.0*		*12.0*	*12.0*	*12.0*			*12.0*	*12.0*
Parking/Grade/Parking				*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour				*0*		*0*	*0*	*0*			*0*	*0*
Minimum Pedestrian Time					*3.2*			*3.2*			*3.2*	

Phasing	WB Only	02	03	04	NS Perm	06	07	08
Timing	G = *10.0*	G =	G =	G =	G = *60.0*	G =	G =	G =
	Y = *5*	Y =	Y =	Y =	Y = *5*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *80.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate				*12*		*104*	*11*	*108*			*126*	*53*
Lane Group Capacity				*226*		*1583*	*964*	*1397*			*1397*	*1583*
v/c Ratio				*0.05*		*0.07*	*0.01*	*0.08*			*0.09*	*0.03*
Green Ratio				*0.13*		*1.00*	*0.75*	*0.75*			*0.75*	*1.00*
Uniform Delay d_1				*30.8*		*0.0*	*2.5*	*2.7*			*2.7*	*0.0*
Delay Factor k				*0.11*		*0.11*	*0.11*	*0.11*			*0.11*	*0.11*
Incremental Delay d_2				*0.1*		*0.0*	*0.0*	*0.0*			*0.0*	*0.0*
PF Factor				*1.000*		*0.950*	*1.000*	*1.000*			*1.000*	*0.950*
Control Delay				*30.9*		*0.0*	*2.5*	*2.7*			*2.7*	*0.0*
Lane Group LOS				*C*		*A*	*A*	*A*			*A*	*A*
Approach Delay				*3.2*			*2.7*			*1.9*		
Approach LOS				*A*			*A*			*A*		
Intersection Delay	*2.5*			Intersection LOS						*A*		

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	SR 46 Existing at Wekiva Pkwy
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	7/17/07	Jurisdiction	Lake County
Time Period	Build I-4 Connection @ SR 417	Analysis Year	2032 Build

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	1		1					1	1	1	1	
Lane Group	L		R					T	R	L	T	
Volume (vph)	40		20					73	97	13	118	
% Heavy Vehicles	2		0					0	0	2	0	
PHF	0.95		0.95					0.95	0.95	0.95	0.95	
Pretimed/Actuated (P/A)	A		A					A	A	A	A	
Startup Lost Time	2.0		2.0					2.0	2.0	2.0	2.0	
Extension of Effective Green	2.0		2.0					2.0	2.0	2.0	2.0	
Arrival Type	3		3					3	3	3	3	
Unit Extension	3.0		3.0					3.0	3.0	3.0	3.0	
Ped/Bike/RTOR Volume	0	0	0				0	0	0	0	0	
Lane Width	12.0		12.0					12.0	12.0	12.0	12.0	
Parking/Grade/Parking	N	0	N				N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour	0		0					0	0	0	0	
Minimum Pedestrian Time		3.2						3.2			3.2	

Phasing	EB Only	02	03	04	NS Perm	06	07	08
Timing	G = 10.0	G =	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25 | Cycle Length C = 80.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	42		21					77	102	14	124	
Lane Group Capacity	221		202					1425	1211	988	1425	
v/c Ratio	0.19		0.10					0.05	0.08	0.01	0.09	
Green Ratio	0.13		0.13					0.75	0.75	0.75	0.75	
Uniform Delay d_1	31.4		31.0					2.6	2.7	2.5	2.7	
Delay Factor k	0.11		0.11					0.11	0.11	0.11	0.11	
Incremental Delay d_2	0.4		0.2					0.0	0.0	0.0	0.0	
PF Factor	1.000		1.000					1.000	1.000	1.000	1.000	
Control Delay	31.8		31.3					2.6	2.7	2.5	2.7	
Lane Group LOS	C		C					A	A	A	A	
Approach Delay	31.6						2.7			2.7		
Approach LOS	C						A			A		
Intersection Delay	7.5			Intersection LOS						A		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*KNM*
Agency/Co.	*HNTB*
Date Performed	*7/17/07*
Analysis Time Period	*Build I-4 Connection @ SR 417*

Site Information

Intersection	*Wekiva River Rd at Wekiva Pkwy*
Jurisdiction	*Lake County*
Analysis Year	

Project Description *Wekiva Parkway Project Development and Environment Study*

East/West Street: *Wekiva Parkway WB Ramps* | North/South Street: *Wekiva River Rd*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*36*	*163*			*247*	*44*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*37*	*171*	*0*	*0*	*260*	*46*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*1*
Configuration	*L*	*T*			*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*126*		*84*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*132*	*0*	*88*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*		*L*		*R*			
v (veh/h)	*37*		*132*		*88*			
C (m) (veh/h)	*1255*		*496*		*873*			
v/c	*0.03*		*0.27*		*0.10*			
95% queue length	*0.09*		*1.06*		*0.34*			
Control Delay (s/veh)	*8.0*		*14.9*		*9.6*			
LOS	*A*		*B*		*A*			
Approach Delay (s/veh)	--	--	*12.8*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	KNM
Agency/Co.	HNTB
Date Performed	7/17/07
Analysis Time Period	Build I-4 Connection @ SR 417

Site Information

Intersection	Wekiva River Rd at Wekiva Pkwy
Jurisdiction	Lake County
Analysis Year	2032 Build

Project Description: Wekiva Parkway Project Development and Environment Study

East/West Street: Wekiva Parkway EB Ramps | North/South Street: Wekiva River Rd

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		158	132	78	294	
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	0	166	138	82	309	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	1	1	0
Configuration		T	R	L	T	
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	41		39			
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	43	0	41	0	0	0
Percent Heavy Vehicles	11	0	11	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L				L		R
v (veh/h)		82				43		41
C (m) (veh/h)		1257				363		710
v/c		0.07				0.12		0.06
95% queue length		0.21				0.40		0.18
Control Delay (s/veh)		8.1				16.2		10.4
LOS		A				C		B
Approach Delay (s/veh)	--	--				13.4		
Approach LOS	--	--				B		

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	US 17/92 and I-4 WBW Ramps
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	3/24/08	Jurisdiction	Seminole County
Time Period	Build I-4 Connection @ SR 417	Analysis Year	2032 Build

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	1		2				1	2			2	1
Lane Group	L		R				L	T			T	R
Volume (vph)	33		617				471	2254			741	749
% Heavy Vehicles	9		9				11	11			11	11
PHF	0.95		0.95				0.95	0.95			0.95	0.95
Pretimed/Actuated (P/A)	A		A				A	A			A	A
Startup Lost Time	2.0		2.0				2.0	2.0			2.0	2.0
Extension of Effective Green	2.0		2.0				2.0	2.0			2.0	2.0
Arrival Type	3		3				3	3			3	3
Unit Extension	3.0		3.0				3.0	3.0			3.0	3.0
Ped/Bike/RTOR Volume	0	0	40				0	0		0	0	0
Lane Width	12.0		12.0				12.0	12.0			12.0	12.0
Parking/Grade/Parking	N	0	N				N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour	0		0				0	0			0	0
Minimum Pedestrian Time		3.2						3.2			3.2	

Phasing	EB Only	02	03	04	NS Perm	06	07	08
Timing	G = 15.0	G =	G =	G =	G = 95.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	35		607				496	2373			780	788
Lane Group Capacity	207		2623				472	2580			2580	1455
v/c Ratio	0.17		0.23				1.05	0.92			0.30	0.54
Green Ratio	0.13		1.00				0.79	0.79			0.79	1.00
Uniform Delay d_1	46.9		0.0				12.5	9.6			3.4	0.0
Delay Factor k	0.11		0.11				0.50	0.44			0.11	0.14
Incremental Delay d_2	0.4		0.0				55.4	6.0			0.1	0.4
PF Factor	1.000		0.950				1.000	1.000			1.000	0.950
Control Delay	47.3		0.0				67.9	15.6			3.5	0.4
Lane Group LOS	D		A				E	B			A	A
Approach Delay	2.6						24.6			1.9		
Approach LOS	A						C			A		
Intersection Delay	14.8			Intersection LOS						B		

SHORT REPORT

General Information

Analyst	*KNM*
Agency or Co.	*HNTB*
Date Performed	*3/24/08*
Time Period	*Build I-4 Connection @ SR 417*

Site Information

Intersection	*US 17/92 and I-4 EB Ramps*
Area Type	*All other areas*
Jurisdiction	*Seminole County*
Analysis Year	*2032 Build*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*2*			*1*	*1*	*1*	*1*	*2*			*2*	*1*
Lane Group	*L*			*L*	*T*	*R*	*L*	*T*			*T*	*R*
Volume (vph)	*976*			*85*	*61*	*107*	*285*	*675*			*701*	*657*
% Heavy Vehicles	*2*			*9*	*9*	*9*	*11*	*11*			*11*	*11*
PHF	*0.95*			*0.95*	*0.95*	*0.95*	*0.95*	*0.95*			*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*			*A*	*A*	*A*	*A*	*A*			*A*	*A*
Startup Lost Time	*2.0*			*2.0*	*2.0*	*2.0*	*2.0*	*2.0*			*2.0*	*2.0*
Extension of Effective Green	*2.0*			*2.0*	*2.0*	*2.0*	*2.0*	*2.0*			*2.0*	*2.0*
Arrival Type	*3*			*3*	*3*	*3*	*3*	*3*			*3*	*3*
Unit Extension	*3.0*			*3.0*	*3.0*	*3.0*	*3.0*	*3.0*			*3.0*	*3.0*
Ped/Bike/RTOR Volume	*0*	*0*		*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*
Lane Width	*12.0*			*12.0*	*12.0*	*12.0*	*12.0*	*12.0*			*12.0*	*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*			*0*	*0*	*0*	*0*	*0*			*0*	*0*
Minimum Pedestrian Time		*3.2*			*3.2*			*3.2*			*3.2*	

Phasing	Excl. Left	WB Only	03	04	NB Only	NS Perm	07	08
Timing	G = *40.0*	G = *15.0*	G =	G =	G = *15.0*	G = *35.0*	G =	G =
	Y = *5*	Y = *5*	Y =	Y =	Y = *0*	Y = *5*	Y =	Y =
Duration of Analysis (hrs) = *0.25*						Cycle Length C = *120.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*1027*			*89*	*64*	*113*	*300*	*711*			*738*	*692*
Lane Group Capacity	*1146*			*828*	*218*	*864*	*291*	*1358*			*951*	*1212*
v/c Ratio	*0.90*			*0.11*	*0.29*	*0.13*	*1.03*	*0.52*			*0.78*	*0.57*
Green Ratio	*0.33*			*0.50*	*0.13*	*0.58*	*0.46*	*0.42*			*0.29*	*0.83*
Uniform Delay d_1	*38.0*			*15.9*	*47.7*	*11.3*	*27.9*	*26.1*			*38.9*	*3.2*
Delay Factor k	*0.42*			*0.11*	*0.11*	*0.11*	*0.50*	*0.13*			*0.33*	*0.17*
Incremental Delay d_2	*9.4*			*0.1*	*0.8*	*0.1*	*61.0*	*0.4*			*4.1*	*0.7*
PF Factor	*1.000*			*1.000*	*1.000*	*1.000*	*1.000*	*1.000*			*1.000*	*1.000*
Control Delay	*47.5*			*15.9*	*48.4*	*11.3*	*88.9*	*26.5*			*43.0*	*3.8*
Lane Group LOS	*D*			*B*	*D*	*B*	*F*	*C*			*D*	*A*
Approach Delay	*47.5*			*21.8*			*45.0*			*24.1*		
Approach LOS	*D*			*C*			*D*			*C*		
Intersection Delay	*36.0*			Intersection LOS						*D*		

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	CR 15 @ Orange Blvd
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	3/24/08	Jurisdiction	Seminole County
Time Period	Build I-4 Connection @ SR 417	Analysis Year	2032 Build

Volume and Timing Input

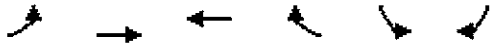
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	1		1				1	1			1	1
Lane Group	L		R				L	T			T	R
Volume (vph)	474		86				88	1022			539	214
% Heavy Vehicles	2		2				2	2			2	2
PHF	0.95		0.95				0.95	0.95			0.95	0.95
Pretimed/Actuated (P/A)	A		A				A	A			A	A
Startup Lost Time	2.0		2.0				2.0	2.0			2.0	2.0
Extension of Effective Green	2.0		2.0				2.0	2.0			2.0	2.0
Arrival Type	3		3				3	3			3	3
Unit Extension	3.0		3.0				3.0	3.0			3.0	3.0
Ped/Bike/RTOR Volume	0	0	40				0	0		0	0	0
Lane Width	12.0		12.0				12.0	12.0			12.0	12.0
Parking/Grade/Parking	N	0	N				N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour	0		0				0	0			0	0
Minimum Pedestrian Time		3.2						3.2			3.2	

Phasing	EB Only	02	03	04	NS Perm	06	07	08
Timing	G = 30.0	G =	G =	G =	G = 60.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25 — Cycle Length C = 100.0

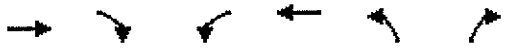
Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	499		48				93	1076			567	225
Lane Group Capacity	531		1583				392	1118			1118	950
v/c Ratio	0.94		0.03				0.24	0.96			0.51	0.24
Green Ratio	0.30		1.00				0.60	0.60			0.60	0.60
Uniform Delay d_1	34.1		0.0				9.3	18.9			11.5	9.3
Delay Factor k	0.45		0.11				0.11	0.47			0.12	0.11
Incremental Delay d_2	24.9		0.0				0.3	18.5			0.4	0.1
PF Factor	1.000		0.950				1.000	1.000			1.000	1.000
Control Delay	59.1		0.0				9.6	37.5			11.9	9.5
Lane Group LOS	E		A				A	D			B	A
Approach Delay	53.9						35.2			11.2		
Approach LOS	D						D			B		
Intersection Delay	31.7			Intersection LOS						C		



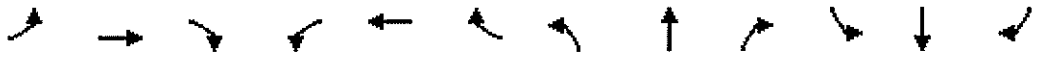
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations			↑	↱		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0			264	0	0
Storage Lanes	0			1	0	1
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.865
Flt Protected						
Satd. Flow (prot)	0	0	1863	1583	0	1611
Flt Permitted						
Satd. Flow (perm)	0	0	1863	1583	0	1611
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1207	2029		2084	
Travel Time (s)		27.4	46.1		47.4	
Volume (vph)	0	0	0	20	0	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	22	0	11
Lane Group Flow (vph)	0	0	0	22	0	11
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 6.7%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	0
Storage Lanes		0	1		1	0
Turning Speed (mph)		9	15		15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected			0.950		0.950	
Satd. Flow (prot)	0	0	1770	1863	1770	0
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	0	0	1770	1863	1770	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	1311			3299	287	
Travel Time (s)	29.8			75.0	6.5	
Volume (vph)	0	0	210	420	120	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	228	457	130	0
Lane Group Flow (vph)	0	0	228	457	130	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		422	0		0	0		264	0		0
Storage Lanes	1		1	0		0	0		1	1		0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	1863	1583	0	0	0	0	1863	1583	1770	1863	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1770	1863	1583	0	0	0	0	1863	1583	1770	1863	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1310			3279			7917			287	
Travel Time (s)		29.8			74.5			179.9			6.5	
Volume (vph)	4	300	146	0	0	0	0	116	64	126	84	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	326	159	0	0	0	0	126	70	137	91	0
Lane Group Flow (vph)	4	326	159	0	0	0	0	126	70	137	91	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 43.2%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	475		0	0
Storage Lanes		0	1		1	0
Turning Speed (mph)		9	15		15	9
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt						
Flt Protected			0.950		0.950	
Satd. Flow (prot)	0	0	1770	3539	1770	0
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	0	0	1770	3539	1770	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	1735			3514	371	
Travel Time (s)	39.4			79.9	8.4	
Volume (vph)	0	0	160	190	120	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	174	207	130	0
Lane Group Flow (vph)	0	0	174	207	130	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	264		264	0		0	0		475	0		0
Storage Lanes	1		1	0		0	0		1	1		0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1770	3539	1583	0	0	0	0	1863	1583	1770	1863	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1770	3539	1583	0	0	0	0	1863	1583	1770	1863	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1516			3539			1303			371	
Travel Time (s)		34.5			80.4			29.6			8.4	
Volume (vph)	18	140	92	0	0	0	0	102	83	22	138	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	152	100	0	0	0	0	111	90	24	150	0
Lane Group Flow (vph)	20	152	100	0	0	0	0	111	90	24	150	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 22.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.57	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1055	1863	1583	1208	1863	1583
Volume (vph)	89	860	31	107	1322	171	295	158	97	133	77	100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	935	34	116	1437	186	321	172	105	145	84	109
RTOR Reduction (vph)	0	0	22	0	0	115	0	0	77	0	0	90
Lane Group Flow (vph)	97	935	12	116	1437	71	321	172	28	145	84	19
Turn Type	Prot		Perm	Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	9.9	36.2	36.2	11.5	37.8	37.8	41.3	26.5	26.5	24.8	16.5	16.5
Effective Green, g (s)	12.4	40.2	40.2	14.0	41.8	41.8	43.8	29.0	29.0	29.8	19.0	19.0
Actuated g/C Ratio	0.11	0.37	0.37	0.13	0.38	0.38	0.40	0.26	0.26	0.27	0.17	0.17
Clearance Time (s)	6.5	8.0	8.0	6.5	8.0	8.0	6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	200	1858	579	225	1932	602	555	491	417	382	322	273
v/s Ratio Prot	0.05	0.18		c0.07	c0.28		c0.11	0.09		0.04	0.05	
v/s Ratio Perm			0.01			0.04	c0.12		0.02	0.07		0.01
v/c Ratio	0.48	0.50	0.02	0.52	0.74	0.12	0.58	0.35	0.07	0.38	0.26	0.07
Uniform Delay, d1	45.8	27.1	22.3	44.8	29.5	22.1	24.5	32.9	30.4	31.8	39.4	38.1
Progression Factor	1.00	1.00	1.00	1.62	0.21	0.04	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	1.0	0.1	1.7	2.2	0.3	1.5	2.0	0.3	0.6	2.0	0.5
Delay (s)	47.7	28.1	22.4	74.2	8.4	1.2	25.9	34.8	30.7	32.5	41.4	38.6
Level of Service	D	C	C	E	A	A	C	C	C	C	D	D
Approach Delay (s)		29.7			12.0			29.3			36.7	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.09	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	159	5085	5085	1583	1770	1583
Volume (vph)	35	1285	1601	319	288	62
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	1397	1740	347	313	67
RTOR Reduction (vph)	0	0	0	142	0	13
Lane Group Flow (vph)	38	1397	1740	205	313	54
Turn Type	Perm			Perm		Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	61.5	61.5	61.5	61.5	34.5	34.5
Effective Green, g (s)	65.0	65.0	65.0	65.0	37.0	37.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.34	0.34
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	94	3005	3005	935	595	532
v/s Ratio Prot		0.27	c0.34		c0.18	
v/s Ratio Perm	0.24			0.13		0.03
v/c Ratio	0.40	0.46	0.58	0.22	0.53	0.10
Uniform Delay, d1	12.1	12.7	14.0	10.6	29.4	25.1
Progression Factor	1.34	0.84	1.08	3.65	1.00	1.00
Incremental Delay, d2	11.7	0.5	0.7	0.5	3.3	0.4
Delay (s)	27.9	11.1	15.9	39.1	32.7	25.5
Level of Service	C	B	B	D	C	C
Approach Delay (s)		11.6	19.7		31.5	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↱	↰↰	↑↑↑	↰↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	0.97	0.91	0.97	0.88
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	5085	3433	2787
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	3433	2787
Volume (vph)	1433	157	156	1604	437	383
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1558	171	170	1743	475	416
RTOR Reduction (vph)	0	79	0	0	0	321
Lane Group Flow (vph)	1558	92	170	1743	475	95
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	56.5	56.5	10.9	73.9	22.1	22.1
Effective Green, g (s)	59.5	59.5	13.4	76.9	25.1	25.1
Actuated g/C Ratio	0.54	0.54	0.12	0.70	0.23	0.23
Clearance Time (s)	7.0	7.0	6.5	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2751	856	418	3555	783	636
v/s Ratio Prot	c0.31		0.05	c0.34	c0.14	
v/s Ratio Perm		0.06				0.03
v/c Ratio	0.57	0.11	0.41	0.49	0.61	0.15
Uniform Delay, d1	16.7	12.3	44.6	7.6	38.0	33.9
Progression Factor	0.73	0.79	1.41	0.21	0.84	0.42
Incremental Delay, d2	0.8	0.2	0.4	0.3	1.2	0.1
Delay (s)	13.0	10.0	63.4	1.9	33.1	14.4
Level of Service	B	B	E	A	C	B
Approach Delay (s)	12.7			7.4	24.4	
Approach LOS	B			A	C	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	5083		1770	5085	1583	1770	1863	1583	1681	1693	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.62	1.00	1.00	0.50	0.49	1.00
Satd. Flow (perm)	1770	5083		1770	5085	1583	1156	1863	1583	890	869	1583
Volume (vph)	94	1352	4	54	1756	260	22	93	201	357	18	55
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	1470	4	59	1909	283	24	101	218	388	20	60
RTOR Reduction (vph)	0	0	0	0	0	148	0	0	127	0	0	46
Lane Group Flow (vph)	102	1474	0	59	1909	135	24	101	91	199	209	14
Turn Type	Prot			Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6	8		8	4		4
Actuated Green, G (s)	9.8	51.8		6.3	48.3	48.3	16.0	13.9	13.9	30.9	30.9	22.3
Effective Green, g (s)	12.3	55.8		8.8	52.3	52.3	21.0	16.4	16.4	33.4	33.4	24.8
Actuated g/C Ratio	0.11	0.51		0.08	0.48	0.48	0.19	0.15	0.15	0.30	0.30	0.23
Clearance Time (s)	6.5	8.0		6.5	8.0	8.0	6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	198	2578		142	2418	753	246	278	236	364	361	357
v/s Ratio Prot	c0.06	c0.29		0.03	c0.38		0.00	0.05		0.06	c0.07	
v/s Ratio Perm						0.08	0.01		0.06	0.10	c0.11	0.01
v/c Ratio	0.52	0.57		0.42	0.79	0.18	0.10	0.36	0.39	0.55	0.58	0.04
Uniform Delay, d1	46.0	18.8		48.2	24.2	16.5	36.5	42.1	42.3	30.4	32.4	33.3
Progression Factor	0.96	0.72		1.22	0.48	0.06	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.8		1.0	1.4	0.3	0.2	0.8	1.1	1.7	2.2	0.0
Delay (s)	46.3	14.3		59.9	13.1	1.3	36.7	42.9	43.3	32.1	34.6	33.3
Level of Service	D	B		E	B	A	D	D	D	C	C	C
Approach Delay (s)		16.3			12.8			42.7			33.4	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR
Lane Configurations		↑↑↑	↱		↑↑↑		↰↰		↱		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0		4.0		
Lane Util. Factor		0.91	1.00		0.91		0.97		1.00		
Frt		1.00	0.85		1.00		1.00		0.85		
Flt Protected		1.00	1.00		1.00		0.95		1.00		
Satd. Flow (prot)		5085	1583		5085		3433		1583		
Flt Permitted		1.00	1.00		1.00		0.95		1.00		
Satd. Flow (perm)		5085	1583		5085		3433		1583		
Volume (vph)	0	1190	520	0	2054	0	842	0	478	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1293	565	0	2233	0	915	0	520	0	0
RTOR Reduction (vph)	0	0	277	0	0	0	0	0	1	0	0
Lane Group Flow (vph)	0	1293	288	0	2233	0	915	0	519	0	0
Turn Type			Perm				Prot		custom		
Protected Phases		2			6		4				
Permitted Phases			2						4		
Actuated Green, G (s)		53.5	53.5		53.5		43.5		43.5		
Effective Green, g (s)		56.0	56.0		56.0		46.0		46.0		
Actuated g/C Ratio		0.51	0.51		0.51		0.42		0.42		
Clearance Time (s)		6.5	6.5		6.5		6.5		6.5		
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0		
Lane Grp Cap (vph)		2589	806		2589		1436		662		
v/s Ratio Prot		0.25			c0.44		0.27				
v/s Ratio Perm			0.18						c0.33		
v/c Ratio		0.50	0.36		0.86		0.64		0.78		
Uniform Delay, d1		17.8	16.2		23.6		25.4		27.7		
Progression Factor		0.52	0.57		0.49		1.00		1.00		
Incremental Delay, d2		0.6	1.1		1.6		2.2		9.0		
Delay (s)		9.8	10.3		13.1		27.6		36.7		
Level of Service		A	B		B		C		D		
Approach Delay (s)		9.9			13.1			30.9		0.0	
Approach LOS		A			B			C		A	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.91			0.91	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	5085			5085	1583	3433		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3433	5085			5085	1583	3433		2787			
Volume (vph)	395	1637	0	0	2345	925	569	0	711	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	1779	0	0	2549	1005	618	0	773	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	359	0	0	43	0	0	0
Lane Group Flow (vph)	429	1779	0	0	2549	646	618	0	730	0	0	0
Turn Type	Prot					Perm	Prot		custom			
Protected Phases	5	2			6		8					
Permitted Phases						6			8			
Actuated Green, G (s)	11.6	72.5			54.4	54.4	24.5		24.5			
Effective Green, g (s)	14.1	75.0			56.9	56.9	27.0		27.0			
Actuated g/C Ratio	0.13	0.68			0.52	0.52	0.25		0.25			
Clearance Time (s)	6.5	6.5			6.5	6.5	6.5		6.5			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	440	3467			2630	819	843		684			
v/s Ratio Prot	c0.12	0.35			c0.50		0.18					
v/s Ratio Perm						0.41			c0.26			
v/c Ratio	0.98	0.51			0.97	0.79	0.73		1.07			
Uniform Delay, d1	47.8	8.6			25.7	21.6	38.2		41.5			
Progression Factor	1.07	0.87			0.48	1.69	1.00		1.00			
Incremental Delay, d2	32.6	0.5			5.4	2.8	5.6		53.8			
Delay (s)	83.6	7.9			17.6	39.4	43.8		95.3			
Level of Service	F	A			B	D	D		F			
Approach Delay (s)		22.6			23.8			72.4			0.0	
Approach LOS		C			C			E			A	

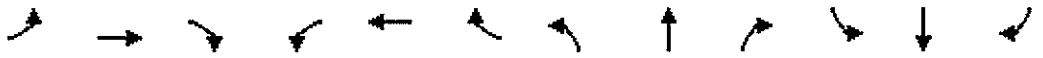
Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.86	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	6408	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	6408	1583	3433	1863	1583	1770	1863	1583
Volume (vph)	297	1570	843	335	2239	146	718	66	289	144	62	199
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	323	1707	916	364	2434	159	780	72	314	157	67	216
RTOR Reduction (vph)	0	0	336	0	0	97	0	0	183	0	0	172
Lane Group Flow (vph)	323	1707	580	364	2434	62	780	72	131	157	67	44
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	17.6	47.8	47.8	10.2	40.4	40.4	22.5	15.3	15.3	10.7	3.5	3.5
Effective Green, g (s)	20.1	50.3	50.3	12.7	42.9	42.9	25.0	17.8	17.8	13.2	6.0	6.0
Actuated g/C Ratio	0.18	0.46	0.46	0.12	0.39	0.39	0.23	0.16	0.16	0.12	0.05	0.05
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	323	2325	724	396	2499	617	780	301	256	212	102	86
v/s Ratio Prot	c0.18	0.34		0.11	c0.38		c0.23	0.04		0.09	0.04	
v/s Ratio Perm			0.37			0.04			c0.08			0.03
v/c Ratio	1.00	0.73	0.80	0.92	0.97	0.10	1.00	0.24	0.51	0.74	0.66	0.51
Uniform Delay, d1	45.0	24.4	25.6	48.1	33.0	21.3	42.5	40.2	42.1	46.7	51.0	50.6
Progression Factor	1.07	0.69	0.62	0.89	1.05	2.31	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	45.1	1.7	7.5	17.3	8.9	0.2	32.2	0.4	1.7	13.0	14.2	5.0
Delay (s)	93.3	18.5	23.4	60.0	43.5	49.3	74.7	40.6	43.9	59.7	65.2	55.6
Level of Service	F	B	C	E	D	D	E	D	D	E	E	E
Approach Delay (s)		28.2			45.9			64.3			58.6	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM Average Control Delay	42.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	1790	398	555	1982	13	762	71	527	41	37	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	3433	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	1946	433	603	2154	14	828	77	573	45	40	158
RTOR Reduction (vph)	0	0	187	0	0	7	0	0	189	0	0	65
Lane Group Flow (vph)	67	1946	246	603	2154	7	828	77	384	45	40	93
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	3.4	39.1	39.1	16.9	52.6	52.6	23.5	23.5	23.5	4.5	4.5	4.5
Effective Green, g (s)	5.9	41.6	41.6	19.4	55.1	55.1	26.0	26.0	26.0	7.0	7.0	7.0
Actuated g/C Ratio	0.05	0.38	0.38	0.18	0.50	0.50	0.24	0.24	0.24	0.06	0.06	0.06
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	95	1923	599	605	2547	793	811	440	374	113	119	101
v/s Ratio Prot	0.04	c0.38		c0.18	0.42		0.24	0.04		0.03	0.02	
v/s Ratio Perm			0.16			0.00			c0.24			c0.06
v/c Ratio	0.71	1.01	0.41	1.00	0.85	0.01	1.02	0.17	1.03	0.40	0.34	0.92
Uniform Delay, d1	51.2	34.2	25.2	45.3	23.8	13.8	42.0	33.5	42.0	49.5	49.3	51.2
Progression Factor	1.09	0.59	0.23	1.00	1.00	1.00	0.71	0.69	0.48	1.00	1.00	1.00
Incremental Delay, d2	16.4	20.8	1.6	35.5	3.7	0.0	32.9	0.7	47.8	2.3	1.7	65.2
Delay (s)	72.1	40.9	7.4	80.8	27.4	13.8	62.6	23.8	68.2	51.8	51.0	116.5
Level of Service	E	D	A	F	C	B	E	C	E	D	D	F
Approach Delay (s)		35.8			39.0			62.8			93.7	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM Average Control Delay	44.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	213	609	60	315	672	393	195	1214	1170	457	880	193
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	662	65	342	730	427	212	1320	1272	497	957	210
RTOR Reduction (vph)	0	0	52	0	0	21	0	0	3	0	0	118
Lane Group Flow (vph)	232	662	13	342	730	406	212	1320	1269	497	957	92
Turn Type	Prot		Perm	Prot		pt+ov	Prot		pt+ov	Prot		Perm
Protected Phases	5	2		1	6	6 7	3	8	8 1	7	4	
Permitted Phases			2									4
Actuated Green, G (s)	13.5	27.1	27.1	11.9	25.5	47.5	21.9	69.5	87.9	15.5	63.1	63.1
Effective Green, g (s)	16.0	29.6	29.6	14.4	28.0	50.0	24.4	72.0	90.4	18.0	65.6	65.6
Actuated g/C Ratio	0.11	0.20	0.20	0.10	0.19	0.33	0.16	0.48	0.60	0.12	0.44	0.44
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5		6.5	6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	189	698	312	330	661	528	288	1699	954	412	1548	692
v/s Ratio Prot	0.13	0.19		0.10	c0.21	0.26	0.12	0.37	c0.80	c0.14	0.27	
v/s Ratio Perm			0.01									0.06
v/c Ratio	1.23	0.95	0.04	1.04	1.10	0.77	0.74	0.78	1.33	1.21	0.62	0.13
Uniform Delay, d1	67.0	59.4	48.7	67.8	61.0	44.8	59.7	32.3	29.8	66.0	32.5	25.2
Progression Factor	1.00	1.00	1.00	1.02	0.71	0.57	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	140.0	23.5	0.2	48.1	60.4	4.1	9.4	3.6	155.8	113.7	1.9	0.4
Delay (s)	207.0	83.0	49.0	117.2	103.8	29.8	69.1	35.9	185.6	179.7	34.4	25.6
Level of Service	F	F	D	F	F	C	E	D	F	F	C	C
Approach Delay (s)		110.7			85.8			106.3			76.7	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	95.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	0.88	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1681	1721	2787	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1681	1721	2787	1770	1863	1583
Volume (vph)	30	1613	697	771	1448	67	227	64	609	295	372	34
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	1753	758	838	1574	73	247	70	662	321	404	37
RTOR Reduction (vph)	0	0	164	0	0	32	0	0	43	0	0	30
Lane Group Flow (vph)	33	1753	594	838	1574	41	154	163	619	321	404	7
Turn Type	Prot		Perm	Prot		Perm	Split		pt+ov	Split		Perm
Protected Phases	5	2		1	6		8	8	8 1	4	4	
Permitted Phases			2			6						4
Actuated Green, G (s)	4.4	57.5	57.5	28.5	81.6	81.6	14.5	14.5	48.5	26.5	26.5	26.5
Effective Green, g (s)	5.9	60.0	60.0	30.0	84.1	84.1	16.0	16.0	50.0	28.0	28.0	28.0
Actuated g/C Ratio	0.04	0.40	0.40	0.20	0.56	0.56	0.11	0.11	0.33	0.19	0.19	0.19
Clearance Time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	70	1416	633	687	1984	888	179	184	929	330	348	295
v/s Ratio Prot	0.02	c0.50		c0.24	0.44		0.09	c0.09	0.22	0.18	c0.22	
v/s Ratio Perm			0.38			0.03						0.00
v/c Ratio	0.47	1.24	0.94	1.22	0.79	0.05	0.86	0.89	0.67	0.97	1.16	0.02
Uniform Delay, d1	70.5	45.0	43.2	60.0	26.1	14.9	65.9	66.1	42.8	60.6	61.0	49.8
Progression Factor	0.92	1.12	1.22	1.19	0.37	0.11	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	107.7	3.5	102.3	0.8	0.0	38.4	41.8	1.8	41.9	99.6	0.0
Delay (s)	65.2	158.2	56.1	174.0	10.5	1.7	104.3	107.9	44.7	102.6	160.6	49.9
Level of Service	E	F	E	F	B	A	F	F	D	F	F	D
Approach Delay (s)		126.6			65.4			64.6			130.7	
Approach LOS		F			E			E			F	

Intersection Summary			
HCM Average Control Delay	95.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	107.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	3539			3539	1583	3433		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3433	3539			3539	1583	3433		2787			
Volume (vph)	365	2152	0	0	1652	445	634	0	1206	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	397	2339	0	0	1796	484	689	0	1311	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	135	0	0	4	0	0	0
Lane Group Flow (vph)	397	2339	0	0	1796	349	689	0	1307	0	0	0
Turn Type	Prot					Perm	Prot		custom			
Protected Phases	5	2			6		8					
Permitted Phases						6			8			
Actuated Green, G (s)	13.5	81.0			62.0	62.0	56.5		56.5			
Effective Green, g (s)	15.0	84.0			65.0	65.0	58.0		58.0			
Actuated g/C Ratio	0.10	0.56			0.43	0.43	0.39		0.39			
Clearance Time (s)	5.5	7.0			7.0	7.0	5.5		5.5			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	343	1982			1534	686	1327		1078			
v/s Ratio Prot	0.12	c0.66			0.51		0.20					
v/s Ratio Perm						0.22			c0.47			
v/c Ratio	1.16	1.18			1.17	0.51	0.52		1.21			
Uniform Delay, d1	67.5	33.0			42.5	30.9	35.3		46.0			
Progression Factor	0.82	1.01			0.35	0.08	1.00		1.00			
Incremental Delay, d2	74.2	81.6			77.6	0.2	0.3		104.5			
Delay (s)	129.6	114.8			92.5	2.8	35.6		150.5			
Level of Service	F	F			F	A	D		F			
Approach Delay (s)		116.9			73.4			110.9			0.0	
Approach LOS		F			E			F			A	

Intersection Summary			
HCM Average Control Delay	101.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	108.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	3539	1583
Volume (vph)	1086	1521	750	317	661	122	1018	993	499	113	659	418
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1180	1653	815	345	718	133	1107	1079	542	123	716	454
RTOR Reduction (vph)	0	0	319	0	0	106	0	0	129	0	0	328
Lane Group Flow (vph)	1180	1653	496	345	718	27	1107	1079	413	123	716	126
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	38.5	54.5	54.5	11.5	27.5	27.5	36.5	50.1	50.1	9.9	23.5	23.5
Effective Green, g (s)	40.0	57.0	57.0	13.0	30.0	30.0	38.0	52.6	52.6	11.4	26.0	26.0
Actuated g/C Ratio	0.27	0.38	0.38	0.09	0.20	0.20	0.25	0.35	0.35	0.08	0.17	0.17
Clearance Time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.5	6.5	6.5	5.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	915	1345	602	298	708	317	870	1241	555	135	613	274
v/s Ratio Prot	c0.34	c0.47		0.10	0.20		c0.32	0.30		0.07	c0.20	
v/s Ratio Perm			0.31			0.02			0.26			0.08
v/c Ratio	1.29	1.23	0.82	1.16	1.01	0.08	1.27	0.87	0.74	0.91	1.17	0.46
Uniform Delay, d1	55.0	46.5	42.0	68.5	60.0	48.8	56.0	45.5	42.8	68.8	62.0	55.7
Progression Factor	0.99	1.05	1.28	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	131.1	103.7	1.2	101.9	37.4	0.5	131.6	6.7	5.4	51.3	92.3	1.2
Delay (s)	185.8	152.3	55.2	170.4	97.4	49.3	187.6	52.2	48.2	120.1	154.3	56.9
Level of Service	F	F	E	F	F	D	F	D	D	F	F	E
Approach Delay (s)		141.4			113.1			106.4			116.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	123.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	1863	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.64	1.00	1.00	0.42	1.00	1.00	0.34	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	1196	3539	1583	791	1863	1583	1227	3539	1583	399	3539	1583
Volume (vph)	86	188	190	270	168	201	311	1128	121	143	558	99
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	204	207	293	183	218	338	1226	132	155	607	108
RTOR Reduction (vph)	0	0	179	0	0	103	0	0	69	0	0	58
Lane Group Flow (vph)	93	204	28	293	183	115	338	1226	63	155	607	50
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	16.2	12.4	12.4	36.1	26.8	26.8	57.0	50.2	50.2	53.8	48.6	48.6
Effective Green, g (s)	20.2	14.9	14.9	38.6	29.3	29.3	61.0	52.7	52.7	57.8	51.1	51.1
Actuated g/C Ratio	0.18	0.14	0.14	0.35	0.27	0.27	0.55	0.48	0.48	0.53	0.46	0.46
Clearance Time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.5	6.5	6.5	5.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	247	479	214	453	496	422	847	1696	758	394	1644	735
v/s Ratio Prot	0.02	0.06		c0.12	0.10		c0.03	c0.35		0.02	0.17	
v/s Ratio Perm	0.05		0.02	c0.11		0.07	0.19		0.04	0.18		0.03
v/c Ratio	0.38	0.43	0.13	0.65	0.37	0.27	0.40	0.72	0.08	0.39	0.37	0.07
Uniform Delay, d1	38.7	43.6	41.9	28.0	32.8	31.9	12.7	22.8	15.5	16.9	19.0	16.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.82	0.88	0.84	1.68	0.63	0.25
Incremental Delay, d2	1.0	0.6	0.3	3.2	0.5	0.4	0.2	1.6	0.1	0.4	0.4	0.1
Delay (s)	39.7	44.2	42.1	31.2	33.3	32.3	10.6	21.8	13.2	28.8	12.4	4.2
Level of Service	D	D	D	C	C	C	B	C	B	C	B	A
Approach Delay (s)		42.5			32.1			18.9			14.3	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	21	137	338	42	970	126	829	288	351	725	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1526	1504	3433	3539	1583	3433	3539	1583
Flt Permitted	0.16	1.00	1.00	0.64	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	292	1863	1583	1195	1526	1504	3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	23	149	367	46	1054	137	901	313	382	788	46
RTOR Reduction (vph)	0	0	114	0	132	132	0	0	215	0	0	29
Lane Group Flow (vph)	58	23	35	367	420	416	137	901	98	382	788	17
Turn Type	pm+pt		Perm	pm+pt		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	24.8	22.0	22.0	44.0	33.7	33.7	5.8	30.8	30.8	12.7	37.7	37.7
Effective Green, g (s)	31.8	25.5	25.5	47.5	37.2	37.2	9.3	34.3	34.3	16.2	41.2	41.2
Actuated g/C Ratio	0.29	0.23	0.23	0.43	0.34	0.34	0.08	0.31	0.31	0.15	0.37	0.37
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	169	432	367	610	516	509	290	1104	494	506	1326	593
v/s Ratio Prot	0.02	0.01		c0.10	0.28		0.04	c0.25		c0.11	0.22	
v/s Ratio Perm	0.08		0.02	0.16		c0.28			0.06			0.01
v/c Ratio	0.34	0.05	0.09	0.60	0.81	0.82	0.47	0.82	0.20	0.75	0.59	0.03
Uniform Delay, d1	30.5	32.9	33.2	22.5	33.2	33.3	48.0	34.9	27.8	45.0	27.7	21.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.07	0.70	1.73	1.01	0.81	0.79
Incremental Delay, d2	1.2	0.1	0.1	1.7	9.6	9.9	0.9	4.9	0.6	5.9	1.8	0.1
Delay (s)	31.7	32.9	33.3	24.2	42.8	43.2	52.3	29.4	48.6	51.2	24.3	17.2
Level of Service	C	C	C	C	D	D	D	C	D	D	C	B
Approach Delay (s)		32.8			38.3			36.2			32.5	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	35.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	205	455	788	777	573	627
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	495	857	845	623	682
RTOR Reduction (vph)	0	423	0	232	0	0
Lane Group Flow (vph)	223	72	857	613	623	682
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	13.5	13.5	38.8	38.8	38.2	83.5
Effective Green, g (s)	16.0	16.0	41.3	41.3	40.7	86.0
Actuated g/C Ratio	0.15	0.15	0.38	0.38	0.37	0.78
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	257	230	1329	594	655	2767
v/s Ratio Prot	c0.13		0.24		c0.35	0.19
v/s Ratio Perm		0.05		c0.39		
v/c Ratio	0.87	0.31	0.64	1.03	0.95	0.25
Uniform Delay, d1	46.0	42.1	28.3	34.4	33.7	3.2
Progression Factor	1.00	1.00	0.51	0.30	0.87	0.33
Incremental Delay, d2	25.1	0.8	1.9	40.9	21.1	0.2
Delay (s)	71.0	42.9	16.4	51.1	50.4	1.2
Level of Service	E	D	B	D	D	A
Approach Delay (s)	51.6		33.6			24.7
Approach LOS	D		C			C

Intersection Summary			
HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	3433	3503		1770	3525			1792	1583		1795	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.76	1.00		0.77	1.00
Satd. Flow (perm)	3433	3503		1770	3525			1422	1583		1432	1583
Volume (vph)	426	1205	89	41	856	23	51	14	24	64	21	453
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	463	1310	97	45	930	25	55	15	26	70	23	492
RTOR Reduction (vph)	0	5	0	0	2	0	0	0	17	0	0	218
Lane Group Flow (vph)	463	1402	0	45	953	0	0	70	9	0	93	274
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	18.6	50.5		4.4	36.3			36.6	36.6		36.6	36.6
Effective Green, g (s)	20.1	53.0		5.9	38.8			39.1	39.1		39.1	39.1
Actuated g/C Ratio	0.18	0.48		0.05	0.35			0.36	0.36		0.36	0.36
Clearance Time (s)	5.5	6.5		5.5	6.5			6.5	6.5		6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	627	1688		95	1243			505	563		509	563
v/s Ratio Prot	c0.13	c0.40		0.03	0.27							
v/s Ratio Perm								0.05	0.01		0.06	c0.17
v/c Ratio	0.74	0.83		0.47	0.77			0.14	0.02		0.18	0.49
Uniform Delay, d1	42.5	24.6		50.5	31.6			24.0	23.0		24.4	27.6
Progression Factor	1.00	1.00		0.91	1.01			1.00	1.00		1.00	1.00
Incremental Delay, d2	4.5	3.6		3.5	2.7			0.6	0.1		0.8	3.0
Delay (s)	47.0	28.2		49.3	34.6			24.6	23.0		25.2	30.6
Level of Service	D	C		D	C			C	C		C	C
Approach Delay (s)		32.9			35.3			24.2			29.8	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBR	SEL	SER
Lane Configurations											
Volume (vph)	826	354	0	0	451	64	647	0	553	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0		
Lane Util. Factor	0.97	0.95			0.95	1.00	0.97		1.00		
Frt	1.00	1.00			1.00	0.85	1.00		0.85		
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00		
Satd. Flow (prot)	3433	3539			3539	1583	3433		1583		
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00		
Satd. Flow (perm)	3433	3539			3539	1583	3433		1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	898	385	0	0	490	70	703	0	601	0	0
RTOR Reduction (vph)	0	0	0	0	0	54	0	0	313	0	0
Lane Group Flow (vph)	898	385	0	0	490	16	703	0	288	0	0
Turn Type	Prot					Perm	Prot		custom		
Protected Phases	5	2			6		4				
Permitted Phases						6			4		
Actuated Green, G (s)	33.4	62.5			22.6	22.6	34.5		34.5		
Effective Green, g (s)	35.9	65.0			25.1	25.1	37.0		37.0		
Actuated g/C Ratio	0.33	0.59			0.23	0.23	0.34		0.34		
Clearance Time (s)	6.5	6.5			6.5	6.5	6.5		6.5		
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0		
Lane Grp Cap (vph)	1120	2091			808	361	1155		532		
v/s Ratio Prot	c0.26	0.11			c0.14		c0.20				
v/s Ratio Perm						0.01			0.18		
v/c Ratio	0.80	0.18			0.61	0.04	0.61		0.54		
Uniform Delay, d1	33.8	10.3			38.0	33.1	30.5		29.6		
Progression Factor	0.79	0.43			0.78	0.47	1.00		1.00		
Incremental Delay, d2	3.5	0.2			3.4	0.2	2.4		3.9		
Delay (s)	30.1	4.6			32.9	15.9	32.8		33.6		
Level of Service	C	A			C	B	C		C		
Approach Delay (s)		22.5			30.7			33.2		0.0	
Approach LOS		C			C			C		A	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	250	0	640	0	0	0	0	930	878	292	806	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00		0.88					0.95	1.00	0.97	0.95	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		2787					3539	1583	3433	3539	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		2787					3539	1583	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	0	696	0	0	0	0	1011	954	317	876	0
RTOR Reduction (vph)	0	0	291	0	0	0	0	0	362	0	0	0
Lane Group Flow (vph)	272	0	405	0	0	0	0	1011	592	317	876	0
Turn Type	Prot		custom						Perm	Prot		
Protected Phases	8							2		1	6	
Permitted Phases			8						2			
Actuated Green, G (s)	22.4		22.4					53.5	53.5	17.1	77.1	
Effective Green, g (s)	22.4		22.4					56.0	56.0	19.6	79.6	
Actuated g/C Ratio	0.20		0.20					0.51	0.51	0.18	0.72	
Clearance Time (s)	4.0		4.0					6.5	6.5	6.5	6.5	
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	360		568					1802	806	612	2561	
v/s Ratio Prot	c0.15							0.29		c0.09	0.25	
v/s Ratio Perm			0.15						c0.37			
v/c Ratio	0.76		0.71					0.56	0.73	0.52	0.34	
Uniform Delay, d1	41.2		40.8					18.6	21.2	40.9	5.6	
Progression Factor	1.00		1.00					1.00	1.00	1.09	0.03	
Incremental Delay, d2	8.7		4.2					1.3	5.9	2.5	0.3	
Delay (s)	50.0		45.0					19.8	27.0	47.1	0.5	
Level of Service	D		D					B	C	D	A	
Approach Delay (s)		46.4			0.0			23.3			12.9	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			