

BASIC FREEWAY SEGMENTS WORKSHEET					
<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Eastbound		
Agency or Company	AECOM		From/To Between Ints. 302 and 303		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	A.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	2689	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	10	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.862	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	1746	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			pc/h/ln		
S	66.5	mph	S		
D = v <sub>p</sub> / S	26.2	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	D		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

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Analyst	JRE		Highway/Direction of Travel I-80 Eastbound		
Agency or Company	AECOM		From/To Between Ints. 302 and 303		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	P.M. Peak Hour		Analysis Year		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	3390	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	12	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.840	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	2		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	2259	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			pc/h/ln		
S	57.0	mph	S		
D = v <sub>p</sub> / S	39.6	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	E		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

BASIC FREEWAY SEGMENTS WORKSHEET					
<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Eastbound		
Agency or Company	AECOM		From/To Between Ints. 303 and 304		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	A.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	2616	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	10	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.862	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	1133	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			pc/h/ln		
S	70.0	mph	S		
D = v <sub>p</sub> / S	16.2	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	B		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

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<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Eastbound		
Agency or Company	AECOM		From/To Between Ints. 303 and 304		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	P.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	3305	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	12	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.840	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	1468	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			x f <sub>p</sub> )		
S	69.2	mph	S		
D = v <sub>p</sub> / S	21.2	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	C		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

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<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Eastbound		
Agency or Company	AECOM		From/To Between Ints. 304 and 307		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	A.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	4204	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	10	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.862	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	4		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	1365	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			pc/h/ln		
S	69.7	mph	S		
D = v <sub>p</sub> / S	19.6	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	C		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

BASIC FREEWAY SEGMENTS WORKSHEET					
<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Eastbound		
Agency or Company	AECOM		From/To Between Ints. 304 and 307		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	P.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	4686	veh/h	Peak-Hour Factor, PHF	0.94	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	12	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.840	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	4		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	1561	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			x f <sub>p</sub> )		
S	68.5	mph	S		
D = v <sub>p</sub> / S	22.8	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	C		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

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Analyst	JRE		Highway/Direction of Travel I-80 Westbound		
Agency or Company	AECOM		From/To Between Ints. 303 and 304		
Date Performed	9/1//2014		Jurisdiction		
Analysis Time Period	A.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	2310	veh/h	Peak-Hour Factor, PHF	0.97	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	12	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.840	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	994	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			x f <sub>p</sub> )		
S	70.0	mph	S		
D = v <sub>p</sub> / S	14.2	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	B		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

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Analyst	JRE		Highway/Direction of Travel I-80 Westbound		
Agency or Company	AECOM		From/To Between Ints. 303 and 304		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	P.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	4682	veh/h	Peak-Hour Factor, PHF	0.97	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	13	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.830	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	2041	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			x f <sub>p</sub> )		
S	61.8	mph	S		
D = v <sub>p</sub> / S	33.0	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	D		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					



BASIC FREEWAY SEGMENTS WORKSHEET					
<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Westbound		
Agency or Company	AECOM		From/To Between 304 and 305 Merges		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	A.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	2100	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	12	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.840	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )	923	pc/h/ln	Design LOS		
x f <sub>p</sub> )			v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
S	70.0	mph	x f <sub>p</sub> )		
D = v <sub>p</sub> / S	13.2	pc/mi/ln	S		
LOS	B		D = v <sub>p</sub> / S		
			Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

BASIC FREEWAY SEGMENTS WORKSHEET					
<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Westbound		
Agency or Company	AECOM		From/To Between 304 and 305 Merges		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	P.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	4225	veh/h	Peak-Hour Factor, PHF	0.97	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	13	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.830	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> x f <sub>p</sub> )	1842	pc/h/ln	Design LOS		
S	65.2	mph	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> x f <sub>p</sub> )		
D = v <sub>p</sub> / S	28.2	pc/mi/ln	S		
LOS	D		D = v <sub>p</sub> / S		
			Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

BASIC FREEWAY SEGMENTS WORKSHEET					
<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Westbound		
Agency or Company	AECOM		From/To Between Ints. 304 and 305		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	A.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	1904	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	12	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.840	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	837	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			x f <sub>p</sub> )		
S	70.0	mph	S		
D = v <sub>p</sub> / S	12.0	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	B		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

BASIC FREEWAY SEGMENTS WORKSHEET					
<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Westbound		
Agency or Company	AECOM		From/To Between Ints. 304 and 305		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	P.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	4069	veh/h	Peak-Hour Factor, PHF	0.97	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	13	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.830	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	3		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.67	ramps/mi	TRD Adjustment	5.0	mph
FFS (measured)		mph	FFS	70.4	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	1774	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			x f <sub>p</sub> )		
S	66.2	mph	S		
D = v <sub>p</sub> / S	26.8	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	D		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

BASIC FREEWAY SEGMENTS WORKSHEET					
<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Westbound		
Agency or Company	AECOM		From/To Between Ints. 307 and 305		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	A.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	3206	veh/h	Peak-Hour Factor, PHF	0.91	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	12	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.840	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	4		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.83	ramps/mi	TRD Adjustment	5.3	mph
FFS (measured)		mph	FFS	70.1	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	1103	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			x f <sub>p</sub> )		
S	70.0	mph	S		
D = v <sub>p</sub> / S	15.8	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	B		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					

BASIC FREEWAY SEGMENTS WORKSHEET					
<b>General Information</b>			<b>Site Information</b>		
Analyst	JRE		Highway/Direction of Travel I-80 Westbound		
Agency or Company	AECOM		From/To Between Ints. 307 and 305		
Date Performed	9/11/2014		Jurisdiction		
Analysis Time Period	P.M. Peak Hour		Analysis Year Alt D1 Ph II 2045		
Project Description Interstate 80 Reconstruction					
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)		<input type="checkbox"/> Planning Data	
<b>Flow Inputs</b>					
Volume, V	6672	veh/h	Peak-Hour Factor, PHF	0.96	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	12	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	1	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
<b>Calculate Flow Adjustments</b>					
f <sub>p</sub>	0.95		E <sub>R</sub>	2.0	
E <sub>T</sub>	2.5		f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	0.840	
<b>Speed Inputs</b>			<b>Calc Speed Adj and FFS</b>		
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f <sub>LW</sub>	0.0	mph
Number of Lanes, N	4		f <sub>LC</sub>	0.0	mph
Total Ramp Density, TRD	1.83	ramps/mi	TRD Adjustment	5.3	mph
FFS (measured)		mph	FFS	70.1	mph
Base free-flow Speed, BFFS	75.4	mph			
<b>LOS and Performance Measures</b>			<b>Design (N)</b>		
<u>Operational (LOS)</u>			<u>Design (N)</u>		
v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )			Design LOS		
	2176	pc/h/ln	v <sub>p</sub> = (V or DDHV) / (PHF x N x f <sub>HV</sub> )		
x f <sub>p</sub> )			pc/h/ln		
S	59.0	mph	S		
D = v <sub>p</sub> / S	36.9	pc/mi/ln	D = v <sub>p</sub> / S		
LOS	E		Required Number of Lanes, N		
<b>Glossary</b>			<b>Factor Location</b>		
N - Number of lanes	S - Speed		E <sub>R</sub> - Exhibits 11-10, 11-12	f <sub>LW</sub> - Exhibit 11-8	
V - Hourly volume	D - Density		E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13	f <sub>LC</sub> - Exhibit 11-9	
v <sub>p</sub> - Flow rate	FFS - Free-flow speed		f <sub>p</sub> - Page 11-18	TRD - Page 11-11	
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2, 11-3		
DDHV - Directional design hour volume					