TIER II TRAFFIC TECHNICAL REPORT

STATE ROUTE 11/
OTAY MESA EAST LAND PORT OF ENTRY

Appendix A – Caltrans Roadway Segment Capacity Analysis Methodology

Appendix B – San Diego County Roadway Segment Capacity Analysis Table

Appendix C – City of San Diego Roadway Segment Capacity Analysis Table

Appendix D – Existing (2009) Signalized Intersection Capacity Analysis

Appendix E – Opening Year (2015) Freeway Capacity Analysis

Prepared for:

Caltrans – District 11

Prepared by:

VRPA Technologies
9520 Padgett Street, Suite 213
San Diego, CA 92126

In association with:

AECOM

November 5, 2010

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Appendix A – Caltrans Roadway Segment Capacity Analysis Methodology

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LEVEL OF SERVICE (LOS) DEFINITIONS (generally used by Caltrans)

The concept of Level of Service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A Level of Service[s] definition generally describes these conditions in terms of such factors as speed, travel time, freedom to maneuver, comfort and convenience, and safety. Levels of Service definitions can generally be categorized as follows:

LOS	D/C*	Congestion/Delay	Traffic Description
		(Used for freeways, expressways and conventional highways[A])	
"A"	<0.41	None	Free flow.
"B"	0.42-0.62	None	Free to stable flow, light to moderate volumes.
"C"	0.63-0.79	None to minimal	Stable flow, moderate volumes, freedom to maneuver noticeably restricted.
"D"	0.80-0.92	Minimal to substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver.
"E"	0.93-1.00	Significant	Extremely unstable flow, maneuverability and psychological comfort extremely poor.
		(Used for conventional highways)	
"F"	>1.00	Considerable	Forced or breakdown. Delay measured in average flow, travel speed (MPH). Signalized segments experience delays >60.0 seconds/vehicle.
		(Used for freeways and expressways)	
"F0"	1.01-1.25	Considerable 0-1 hour delay	Forced flow, heavy congestion, long queues form behind breakdown points, stop and go.
"F1"	1.26-1.35	Severe 1-2 hour delay	Very heavy congestion, very long queues.
"F2"	1.36-1.45	Very severe 2-3 hour delay	Extremely heavy congestion, longer queues, more numerous breakdown points, longer stop periods.
"F3"	>1.46	Extremely severe 3+ hours of delay	Gridlock.

[s] Level of Service can generally be calculated using "Table 3.1. LOS Criteria for Basic Freeway Sections" from the latest Highway Capacity Manual. However, contact Caltrans for more specific information on determining existing "free-flow" freeway speeds.

* Demand/Capacity ratio used for forecasts (V/C ratio used for operational analysis, where V = volume)

[A] Arterial LOS is based upon average "free-flow" travel speeds, and should refer to definitions in Table 11.1 in the HCM.

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Appendix B – San Diego County Roadway Segment Capacity Analysis Table

Prepared for:

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In association with:

AECOM

November 5, 2010

TABLE 1

AVERAGE DAILY VEHICLE TRIPS

CIRCULATION ELEMENT ROADS		LEVEL OF SERVICE				
CLASS	X-SECTION	A	B	C	D	E
Expressway	126/148	<38,000	<54,000	<70,000	<88,000	<108,000
Prime Arterial	102/122	<22,200	<37,000	<44,600	<50,000	<57,000
Major Road	78/98	<14,800	<24,700	<29,600	<33,400	<37,000
Collector	64/84	<13,700	<22,800	<27,400	<30,800	<34,200
Town Collector	54/74	<3,000	<6,000	<9,500	<13,500	<19,000
Light Collector	40/60	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Collector	40/84	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Light Collector	40/60	<1,900	<4,100	<7,100	<10,900	<16,200
Recreational Parkway	40/100	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Mountain	40/100	<1,900	<4,100	<7,100	<10,900	<16,200

NON – CIRCULATION ELEMENT ROADS		LEVEL OF SERVICE				
CLASS	X-SECTION	A	B	C	D	E
Residential Collector	40/60	*	*	<4,500	*	*
Residential Road	38/56	*	*	<1,500	*	*
Residential Cul-de-sac or Loop Road	32/52	*	*	< 200	*	*

*Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

TIER II TRAFFIC TECHNICAL REPORT

STATE ROUTE 11/
OTAY MESA EAST LAND PORT OF ENTRY

Appendix C – City of San Diego Roadway Segment Capacity Analysis Table

Prepared for:

Caltrans – District 11

Prepared by:

VRPA Technologies
9520 Padgett Street, Suite 213
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In association with:

AECOM

November 5, 2010

TABLE 2
ROADWAY CLASSIFICATIONS, LEVELS OF SERVICE (LOS)
AND AVERAGE DAILY TRAFFIC (ADT)

STREET CLASSIFICATION	LANES	CROSS SECTIONS	LEVEL OF SERVICE A	B	C	D	E
Freeway	8 lanes		60,000	84,000	120,000	140,000	150,000
Freeway	6 lanes		45,000	63,000	90,000	110,000	120,000
Freeway	4 lanes		30,000	42,000	60,000	70,000	80,000
Expressway	6 lanes	102/122	30,000	42,000	60,000	70,000	80,000
Prime Arterial	6 lanes	102/122	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 lanes	102/122	20,000	28,000	40,000	45,000	50,000
Major Arterial	4 lanes	78/98	15,000	21,000	30,000	35,000	40,000
Collector	4 lanes	72/92	10,000	14,000	20,000	25,000	30,000
Collector (no center lane) (continuous left-turn lane)	4 lanes 2 lanes	64/84 50/70	5,000	7,000	10,000	13,000	15,000
Collector (no fronting property)	2 lanes	40/60	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 lanes	50/70	2,500	3,500	5,000	6,500	8,000
Collector (multi-family)	2 lanes	40/60	2,500	3,500	5,000	6,500	8,000
Sub-Collector (single-family)	2 lanes	36/56	—	—	2,200	—	—

LEGEND:

XXX/XXX = Curb to curb width (feet)/right of way width (feet): based on the City of San Diego Street Design Manual.

XX/XXX = Approximate recommended ADT based on the City of San Diego Street Design Manual.

NOTES:

1. The volumes and the average daily level of service listed above are only intended as a general planning guideline.

2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

TIER II TRAFFIC TECHNICAL REPORT

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Appendix D – Existing (2009) Signalized Intersection Capacity Analysis

Prepared for:

Caltrans – District 11

Prepared by:

VRPA Technologies
9520 Padgett Street, Suite 213
San Diego, CA 92126

In association with:

AECOM

November 5, 2010

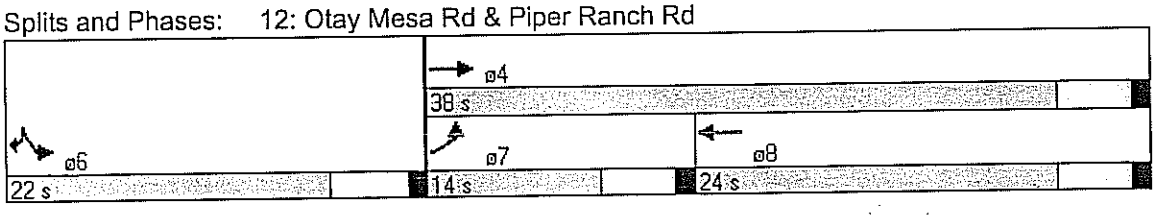
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	575			0	125	125
Storage Lanes	1			0	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	50
Trailing Detector (ft)	0	0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.91	0.91	0.97	0.91
Frt			0.985		0.924	0.850
Flt Protected	0.950				0.976	
Satd. Flow (prot)	1752	3505	4960	0	3227	1427
Flt Permitted	0.950				0.976	
Satd. Flow (perm)	1752	3505	4960	0	3227	1427
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			34		46	47
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		50	50		35	
Link Distance (ft)		1788	1108		1850	
Travel Time (s)		24.4	15.1		36.0	
Volume (vph)	125	1376	996	111	41	86
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	136	1496	1083	121	45	93
Lane Group Flow (vph)	136	1496	1204	0	91	47
Turn Type	Prot					Prot
Protected Phases	7	4	8		6	6
Permitted Phases						
Detector Phases	7	4	8		6	6
Minimum Initial (s)	8.0	10.0	10.0		8.0	8.0
Minimum Split (s)	13.0	21.0	21.0		21.0	21.0
Total Split (s)	14.0	38.0	24.0	0.0	22.0	22.0
Total Split (%)	23.3%	63.3%	40.0%	0.0%	36.7%	36.7%
Maximum Green (s)	9.0	33.0	19.0		17.0	17.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		C-Max	C-Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	9.7	32.2	21.1		19.8	19.8
Actuated g/C Ratio	0.16	0.54	0.35		0.33	0.33
v/c Ratio	0.48	0.80	0.68		0.08	0.09
Control Delay	29.2	14.8	14.6		9.2	6.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	29.2	14.8	14.6		9.2	6.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	C	B	B		A	A
Approach Delay		16.0	14.6		8.2	
Approach LOS		B	B		A	
Queue Length 50th (ft)	45	191	78		5	0
Queue Length 95th (ft)	92	267	97		19	21
Internal Link Dist (ft)		1708	1028		1770	
Turn Bay Length (ft)	575				125	125
Base Capacity (vph)	292	1986	1768		1097	503
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.47	0.75	0.68		0.08	0.09

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 40 (67%), Referenced to phase 2: and 6:SBL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 15.1 Intersection LOS: B
Intersection Capacity Utilization 51.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 12: Otay Mesa Rd & Piper Ranch Rd



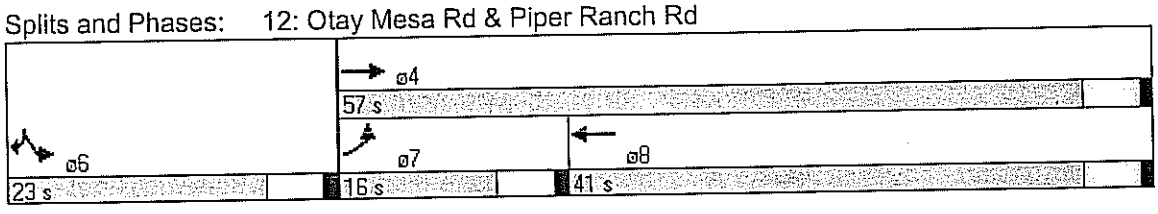
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	575			0	125	125
Storage Lanes	1			0	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	50
Trailing Detector (ft)	0	0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.91	0.91	0.97	0.91
Frt			0.989		0.944	0.850
Flt Protected	0.950				0.970	
Satd. Flow (prot)	1752	3505	4981	0	3277	1427
Flt Permitted	0.950				0.970	
Satd. Flow (perm)	1752	3505	4981	0	3277	1427
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			21		81	104
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		50	50		35	
Link Distance (ft)		1788	1108		1850	
Travel Time (s)		24.4	15.1		36.0	
Volume (vph)	111	1409	1575	126	125	170
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	121	1532	1712	137	136	185
Lane Group Flow (vph)	121	1532	1849	0	217	104
Turn Type	Prot					Prot
Protected Phases	7	4	8		6	6
Permitted Phases						
Detector Phases	7	4	8		6	6
Minimum Initial (s)	8.0	10.0	10.0		8.0	8.0
Minimum Split (s)	13.0	21.0	21.0		21.0	21.0
Total Split (s)	16.0	57.0	41.0	0.0	23.0	23.0
Total Split (%)	20.0%	71.3%	51.3%	0.0%	28.8%	28.8%
Maximum Green (s)	11.0	52.0	36.0		18.0	18.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		C-Max	C-Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	11.0	52.7	40.3		19.3	19.3
Actuated g/C Ratio	0.14	0.66	0.50		0.24	0.24
v/c Ratio	0.50	0.66	0.73		0.25	0.25
Control Delay	39.5	10.0	8.3		16.2	7.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	39.5	10.0	8.3		16.2	7.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	D	A	A		B	A
Approach Delay		12.2	8.3		13.3	
Approach LOS		B	A		B	
Queue Length 50th (ft)	56	208	66		27	0
Queue Length 95th (ft)	107	274	77		55	40
Internal Link Dist (ft)		1708	1028		1770	
Turn Bay Length (ft)	575				125	125
Base Capacity (vph)	263	2322	2521		853	423
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.46	0.66	0.73		0.25	0.25

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 62 (78%), Referenced to phase 2: and 6:SBL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 10.4 Intersection LOS: B
Intersection Capacity Utilization 56.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 12: Otay Mesa Rd & Piper Ranch Rd



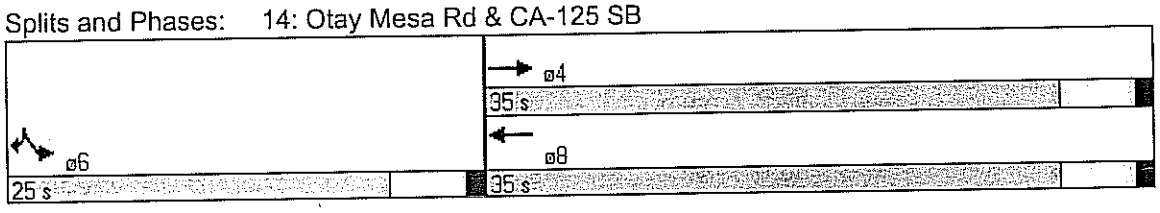
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	5036	5036	0	3400	1568
Flt Permitted					0.950	
Satd. Flow (perm)	0	5036	5036	0	3400	1568
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						79
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		50	50		65	
Link Distance (ft)		1108	332		3546	
Travel Time (s)		15.1	4.5		37.2	
Volume (vph)	0	1638	936	0	462	193
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	0	1780	1017	0	502	210
Lane Group Flow (vph)	0	1780	1017	0	502	210
Turn Type						Prot
Protected Phases		4	8		6	6
Permitted Phases						
Detector Phases		4	8		6	6
Minimum Initial (s)		10.0	10.0		8.0	8.0
Minimum Split (s)		21.0	21.0		21.0	21.0
Total Split (s)	0.0	35.0	35.0	0.0	25.0	25.0
Total Split (%)	0.0%	58.3%	58.3%	0.0%	41.7%	41.7%
Maximum Green (s)		30.0	30.0		20.0	20.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		31.0	31.0		21.0	21.0
Actuated g/C Ratio		0.52	0.52		0.35	0.35
v/c Ratio		0.68	0.39		0.42	0.35
Control Delay		6.4	7.7		16.2	10.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		6.4	7.7		16.2	10.9
LOS		A	A		B	B
Approach Delay		6.4	7.7		14.7	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A		B	
Queue Length 50th (ft)		60	77		69	33
Queue Length 95th (ft)		97	34		105	78
Internal Link Dist (ft)		1028	252		3466	
Turn Bay Length (ft)						
Base Capacity (vph)		2602	2602		1190	600
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.68	0.39		0.42	0.35

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 10 (17%), Referenced to phase 4:EBT and 8:WBT, Start of Green
Natural Cycle: 45
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 8.4 — Intersection LOS: A
Intersection Capacity Utilization 51.5% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 14: Otay Mesa Rd & CA-125 SB



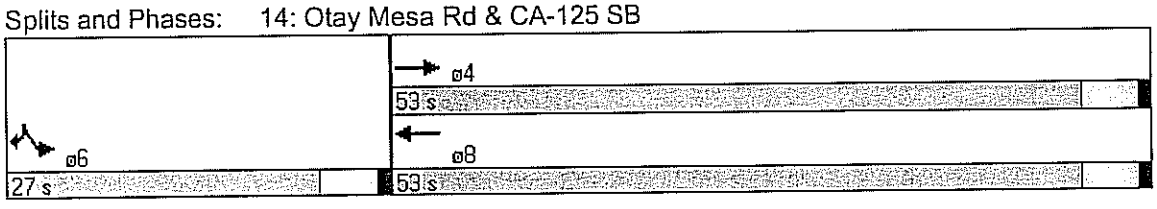
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	5036	5036	0	3400	1568
Flt Permitted					0.950	
Satd. Flow (perm)	0	5036	5036	0	3400	1568
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						6
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		50	50		65	
Link Distance (ft)		1108	332		3546	
Travel Time (s)		15.1	4.5		37.2	
Volume (vph)	0	1695	2103	0	146	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	0	1842	2286	0	159	22
Lane Group Flow (vph)	0	1842	2286	0	159	22
Turn Type						Prot
Protected Phases		4	8		6	6
Permitted Phases						
Detector Phases		4	8		6	6
Minimum Initial (s)		10.0	10.0		8.0	8.0
Minimum Split (s)		21.0	21.0		21.0	21.0
Total Split (s)	0.0	53.0	53.0	0.0	27.0	27.0
Total Split (%)	0.0%	66.3%	66.3%	0.0%	33.8%	33.8%
Maximum Green (s)		48.0	48.0		22.0	22.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		1.0	1.0		1.0	1.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max
Walk Time (s)		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		49.0	49.0		23.0	23.0
Actuated g/C Ratio		0.61	0.61		0.29	0.29
v/c Ratio		0.60	0.74		0.16	0.05
Control Delay		6.6	10.3		21.9	17.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		6.6	10.3		21.9	17.3
LOS		A	B		C	B
Approach Delay		6.6	10.3		21.3	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	B		C	
Queue Length 50th (ft)		97	235		30	6
Queue Length 95th (ft)		113	284		53	23
Internal Link Dist (ft)		1028	252		3466	
Turn Bay Length (ft)						
Base Capacity (vph)		3085	3085		978	455
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.60	0.74		0.16	0.05

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 8 (10%), Referenced to phase 4:EBT and 8:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 9.2 Intersection LOS: A
Intersection Capacity Utilization 54.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 14: Otay Mesa Rd & CA-125 SB



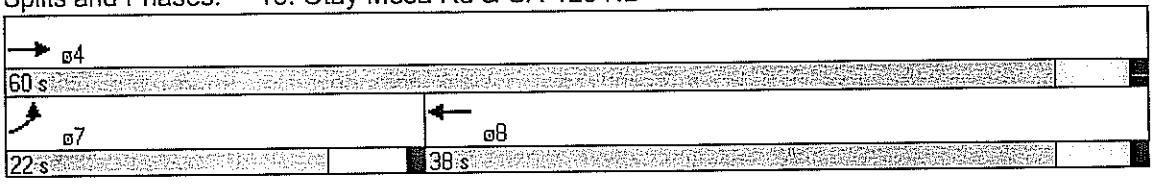
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			100	0	0
Storage Lanes	2			2	0	0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50		
Trailing Detector (ft)	0	0	0	0		
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	0.97	0.95	0.95	0.88	1.00	1.00
Frt				0.850		
Flt Protected	0.950					
Satd. Flow (prot)	3400	3505	3505	2760	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	3400	3505	3505	2760	0	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				83		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		50	50		65	
Link Distance (ft)		336	353		3819	
Travel Time (s)		4.6	4.8		40.1	
Volume (vph)	30	781	1017	76	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	33	849	1105	83	0	0
Lane Group Flow (vph)	33	849	1105	83	0	0
Turn Type	Prot			Perm		
Protected Phases	7	4	8			
Permitted Phases				8		
Detector Phases	7	4	8	8		
Minimum Initial (s)	8.0	10.0	10.0	10.0		
Minimum Split (s)	13.0	21.0	21.0	21.0		
Total Split (s)	22.0	60.0	38.0	38.0	0.0	0.0
Total Split (%)	36.7%	100.0%	63.3%	63.3%	0.0%	0.0%
Maximum Green (s)	17.0	55.0	33.0	33.0		
Yellow Time (s)	4.0	4.0	4.0	4.0		
All-Red Time (s)	1.0	1.0	1.0	1.0		
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Recall Mode	None	C-Max	C-Max	C-Max		
Walk Time (s)		5.0	5.0	5.0		
Flash Dont Walk (s)		11.0	11.0	11.0		
Pedestrian Calls (#/hr)		0	0	0		
Act Effct Green (s)	9.0	60.0	56.6	56.6		
Actuated g/C Ratio	0.15	1.00	0.94	0.94		
v/c Ratio	0.06	0.24	0.33	0.03		
Control Delay	16.8	0.1	0.4	0.0		
Queue Delay	0.0	0.0	0.0	0.0		
Total Delay	16.8	0.1	0.5	0.0		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	B	A	A	A		
Approach Delay		0.8	0.4			
Approach LOS		A	A			
Queue Length 50th (ft)	4	0	0	0		
Queue Length 95th (ft)	m8	0	15	0		
Internal Link Dist (ft)		256	273		3739	
Turn Bay Length (ft)	100			100		
Base Capacity (vph)	1020	3505	3306	2608		
Starvation Cap Reductn	0	0	202	0		
Spillback Cap Reductn	0	0	0	0		
Storage Cap Reductn	0	0	0	0		
Reduced v/c Ratio	0.03	0.24	0.36	0.03		

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.33
Intersection Signal Delay: 0.6 Intersection LOS: A
Intersection Capacity Utilization 48.4% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Otay Mesa Rd & CA-125 NB



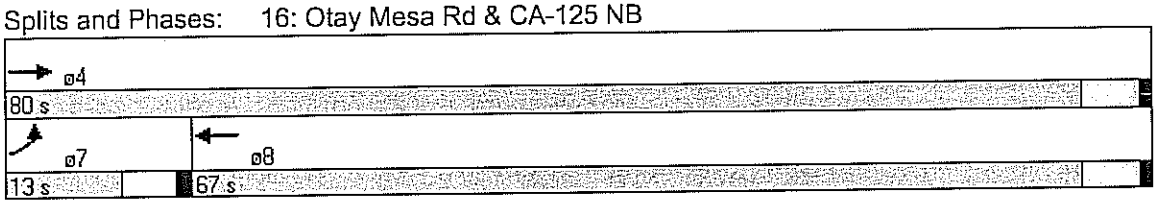
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			100	0	0
Storage Lanes	2			2	0	0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50		
Trailing Detector (ft)	0	0	0	0		
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	0.97	0.95	0.95	0.88	1.00	1.00
Frt				0.850		
Flt Protected	0.950					
Satd. Flow (prot)	3400	3505	3505	2760	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	3400	3505	3505	2760	0	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				174		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		50	50		65	
Link Distance (ft)		336	353		3819	
Travel Time (s)		4.6	4.8		40.1	
Volume (vph)	188	190	2099	622	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	204	207	2282	676	0	0
Lane Group Flow (vph)	204	207	2282	676	0	0
Turn Type	Prot			Perm		
Protected Phases	7	4	8			
Permitted Phases				8		
Detector Phases	7	4	8	8		
Minimum Initial (s)	8.0	10.0	10.0	10.0		
Minimum Split (s)	13.0	21.0	21.0	21.0		
Total Split (s)	13.0	80.0	67.0	67.0	0.0	0.0
Total Split (%)	16.3%	100.0%	83.8%	83.8%	0.0%	0.0%
Maximum Green (s)	8.0	75.0	62.0	62.0		
Yellow Time (s)	4.0	4.0	4.0	4.0		
All-Red Time (s)	1.0	1.0	1.0	1.0		
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Recall Mode	None	C-Max	C-Max	C-Max		
Walk Time (s)		5.0	5.0	5.0		
Flash Dont Walk (s)		11.0	11.0	11.0		
Pedestrian Calls (#/hr)		0	0	0		
Act Effct Green (s)	9.0	80.0	63.0	63.0		
Actuated g/C Ratio	0.11	1.00	0.79	0.79		
v/c Ratio	0.53	0.06	0.83	0.31		
Control Delay	30.0	0.0	5.3	1.5		
Queue Delay	0.0	0.0	6.7	0.3		
Total Delay	30.0	0.0	11.9	1.9		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
LOS	C	A	B	A		
Approach Delay		14.9	9.6			
Approach LOS		B	A			
Queue Length 50th (ft)	50	0	227	24		
Queue Length 95th (ft)	78	0	m193	m19		
Internal Link Dist (ft)		256	273		3739	
Turn Bay Length (ft)	100			100		
Base Capacity (vph)	383	3505	2760	2210		
Starvation Cap Reductn	0	0	447	898		
Spillback Cap Reductn	0	0	0	0		
Storage Cap Reductn	0	0	0	0		
Reduced v/c Ratio	0.53	0.06	0.99	0.52		

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 64 (80%), Referenced to phase 4:EBT and 8:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 10.3 Intersection LOS: B
Intersection Capacity Utilization 71.4% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Otay Mesa Rd & CA-125 NB



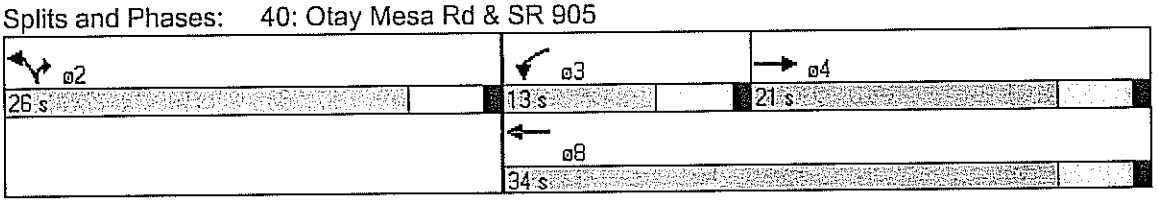
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	100		0	100
Storage Lanes		1	1		2	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)		9	15		15	9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1845	1568	1752	3505	3400	1568
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1845	1568	1752	3505	3400	1568
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		14				15
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	50			50	55	
Link Distance (ft)	353			498	966	
Travel Time (s)	4.8			6.8	12.0	
Volume (vph)	90	13	19	281	831	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	98	14	21	305	903	15
Lane Group Flow (vph)	98	14	21	305	903	15
Turn Type		Perm	Prot			Prot
Protected Phases	4		3	8	2	2
Permitted Phases		4				
Detector Phases	4	4	3	8	2	2
Minimum Initial (s)	10.0	10.0	8.0	10.0	8.0	8.0
Minimum Split (s)	21.0	21.0	13.0	21.0	21.0	21.0
Total Split (s)	21.0	21.0	13.0	34.0	26.0	26.0
Total Split (%)	35.0%	35.0%	21.7%	56.7%	43.3%	43.3%
Maximum Green (s)	16.0	16.0	8.0	29.0	21.0	21.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	11.2	11.2	9.0	13.8	38.2	38.2
Actuated g/C Ratio	0.19	0.19	0.15	0.23	0.64	0.64
v/c Ratio	0.28	0.05	0.08	0.38	0.42	0.01
Control Delay	24.7	11.6	22.9	20.0	7.2	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	11.6	22.9	20.0	7.2	4.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
LOS	C	B	C	C	A	A
Approach Delay	23.1			20.2	7.2	
Approach LOS	C			C	A	
Queue Length 50th (ft)	31	1	7	52	57	0
Queue Length 95th (ft)	59	6	23	59	165	8
Internal Link Dist (ft)	273			418	886	
Turn Bay Length (ft)			100			100
Base Capacity (vph)	523	454	263	1753	2164	1004
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.03	0.08	0.17	0.42	0.01

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 56 (93%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 11.6 Intersection LOS: B
Intersection Capacity Utilization 38.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 40: Otay Mesa Rd & SR 905



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	100		0	100
Storage Lanes		1	1		2	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)		9	15		15	9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1845	1568	1752	3505	3400	1568
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1845	1568	1752	3505	3400	1568
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		16				4
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	50			50	55	
Link Distance (ft)	353			498	966	
Travel Time (s)	4.8			6.8	12.0	
Volume (vph)	198	15	28	951	1673	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	215	16	30	1034	1818	8
Lane Group Flow (vph)	215	16	30	1034	1818	8
Turn Type		Perm	Prot			Prot
Protected Phases	4		3	8	2	2
Permitted Phases		4				
Detector Phases	4	4	3	8	2	2
Minimum Initial (s)	10.0	10.0	8.0	10.0	8.0	8.0
Minimum Split (s)	21.0	21.0	13.0	21.0	21.0	21.0
Total Split (s)	21.0	21.0	13.0	34.0	46.0	46.0
Total Split (%)	26.3%	26.3%	16.3%	42.5%	57.5%	57.5%
Maximum Green (s)	16.0	16.0	8.0	29.0	41.0	41.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max
Walk Time (s)	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	22.8	22.8	9.0	28.0	44.0	44.0
Actuated g/C Ratio	0.28	0.28	0.11	0.35	0.55	0.55
v/c Ratio	0.41	0.03	0.15	0.84	0.97	0.01
Control Delay	22.2	9.6	34.2	31.2	34.7	7.3
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	22.2	9.6	34.2	31.5	34.7	7.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
LOS	C	A	C	C	C	A
Approach Delay	21.3			31.6	34.6	
Approach LOS	C			C	C	
Queue Length 50th (ft)	70	1	14	235	~465	1
Queue Length 95th (ft)	175	15	38	312	#635	7
Internal Link Dist (ft)	273			418	886	
Turn Bay Length (ft)			100			100
Base Capacity (vph)	525	458	197	1314	1872	865
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	38	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.03	0.15	0.81	0.97	0.01

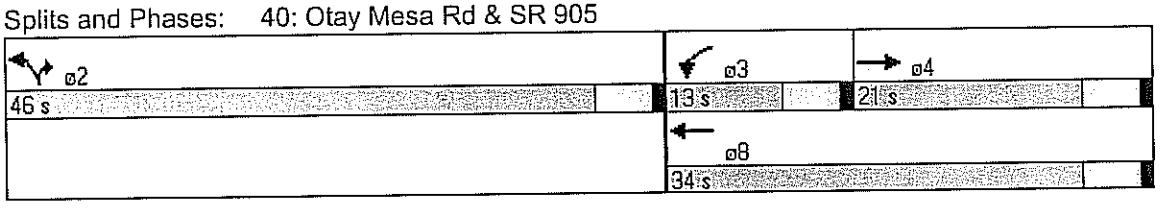
Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 32.5 Intersection LOS: C
Intersection Capacity Utilization 80.7% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 40: Otay Mesa Rd & SR 905



Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	200	
Storage Lanes	0	2		0	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	0.88	0.91	0.91	0.97	0.91
Frt		0.850	0.975			
Flt Protected					0.950	
Satd. Flow (prot)	0	2760	4910	0	3400	5036
Flt Permitted					0.950	
Satd. Flow (perm)	0	2760	4910	0	3400	5036
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		998	62			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	65		35			35
Link Distance (ft)	1014		472			210
Travel Time (s)	10.6		9.2			4.1
Volume (vph)	0	629	284	57	49	724
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	0	684	309	62	53	787
Lane Group Flow (vph)	0	684	371	0	53	787
Turn Type		custom			Prot	
Protected Phases			4		3	8
Permitted Phases		2				
Detector Phases		2	4		3	8
Minimum Initial (s)		4.0	10.0		8.0	10.0
Minimum Split (s)		20.0	21.0		13.0	21.0
Total Split (s)	0.0	20.0	22.0	0.0	13.0	35.0
Total Split (%)	0.0%	36.4%	40.0%	0.0%	23.6%	63.6%
Maximum Green (s)		16.0	17.0		8.0	30.0
Yellow Time (s)		3.5	4.0		4.0	4.0
All-Red Time (s)		0.5	1.0		1.0	1.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		None	C-Max		None	C-Max
Walk Time (s)		5.0	5.0			5.0
Flash Dont Walk (s)		11.0	11.0			11.0
Pedestrian Calls (#/hr)		0	0			0
Act Effct Green (s)		5.9	35.9		9.0	41.1
Actuated g/C Ratio		0.11	0.65		0.16	0.75
v/c Ratio		0.58	0.12		0.10	0.21
Control Delay		2.0	2.1		17.6	1.6
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		2.0	2.1		17.6	1.6

Lane Group	NWL	NWR	NET	NER	SWL	SWT
LOS		A	A		B	A
Approach Delay			2.1			2.6
Approach LOS			A			A
Queue Length 50th (ft)		0	3		6	10
Queue Length 95th (ft)		0	21		m15	14
Internal Link Dist (ft)	934		392			130
Turn Bay Length (ft)					200	
Base Capacity (vph)		1511	3226		556	3763
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.45	0.12		0.10	0.21

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 14 (25%), Referenced to phase 4:NET and 8:SWT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 2.3 Intersection LOS: A
Intersection Capacity Utilization 37.0% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: SR 905 SB & Siempre Viva

ø2	ø3	ø4
20 s	13 s	22 s
	ø8	
	35 s	

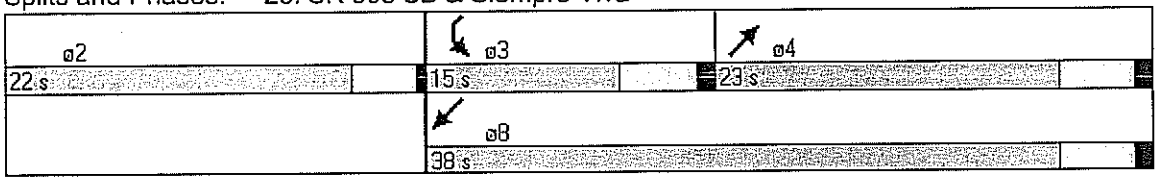
Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	200	
Storage Lanes	0	2		0	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50		50	50
Trailing Detector (ft)		0	0		0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	0.88	0.91	0.91	0.97	0.91
Frt		0.850	0.963			
Flt Protected					0.950	
Satd. Flow (prot)	0	2760	4850	0	3400	5036
Flt Permitted					0.950	
Satd. Flow (perm)	0	2760	4850	0	3400	5036
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		774	146			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	65		35			35
Link Distance (ft)	1014		472			210
Travel Time (s)	10.6		9.2			4.1
Volume (vph)	0	258	578	191	264	385
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	0	280	628	208	287	418
Lane Group Flow (vph)	0	280	836	0	287	418
Turn Type		custom			Prot	
Protected Phases			4		3	8
Permitted Phases		2				
Detector Phases		2	4		3	8
Minimum Initial (s)		4.0	10.0		8.0	10.0
Minimum Split (s)		20.0	21.0		13.0	21.0
Total Split (s)	0.0	22.0	23.0	0.0	15.0	38.0
Total Split (%)	0.0%	36.7%	38.3%	0.0%	25.0%	63.3%
Maximum Green (s)		18.0	18.0		10.0	33.0
Yellow Time (s)		3.5	4.0		4.0	4.0
All-Red Time (s)		0.5	1.0		1.0	1.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		None	C-Max		None	C-Max
Walk Time (s)		5.0	5.0			5.0
Flash Dont Walk (s)		11.0	11.0			11.0
Pedestrian Calls (#/hr)		0	0			0
Act Effct Green (s)		5.5	30.3		12.2	46.5
Actuated g/C Ratio		0.09	0.50		0.20	0.78
v/c Ratio		0.29	0.33		0.42	0.11
Control Delay		0.8	8.1		16.1	1.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		0.8	8.1		16.1	1.0

Lane Group	NWL	NWR	NET	NER	SWL	SWT
LOS		A	A		B	A
Approach Delay			8.1			7.1
Approach LOS			A			A
Queue Length 50th (ft)		0	47		31	4
Queue Length 95th (ft)		0	83		m43	6
Internal Link Dist (ft)	934		392			130
Turn Bay Length (ft)					200	
Base Capacity (vph)		1370	2522		733	3903
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.20	0.33		0.39	0.11

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 16 (27%), Referenced to phase 4:NET and 8:SWT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 6.6 Intersection LOS: A
Intersection Capacity Utilization 31.1% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: SR 905 SB & Siempre Viva



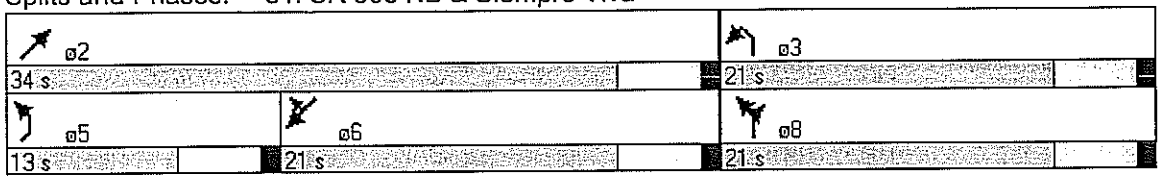
Lane Group	NBL2	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%		0%			0%			15%	
Storage Length (ft)		0	0	0	0	250		0	0		250
Storage Lanes		0	2	0	0	2		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50			50	50			50	50
Trailing Detector (ft)	0	0	0			0	0			0	0
Turning Speed (mph)	15	15	9	15	9	15		9	15		9
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	0.97	0.91	1.00	1.00	0.86	0.86
Frt			0.850							0.952	0.850
Flt Protected		0.950				0.950					
Satd. Flow (prot)	0	1752	2760	0	0	3400	5036	0	0	4191	1247
Flt Permitted		0.950				0.950					
Satd. Flow (perm)	0	1752	2760	0	0	3400	5036	0	0	4191	1247
Right Turn on Red			Yes					Yes			Yes
Satd. Flow (RTOR)			205							147	156
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.11	1.11	1.11
Link Speed (mph)		65		65			35			35	
Link Distance (ft)		1140		893			494			1118	
Travel Time (s)		12.0		9.4			9.6			21.8	
Volume (vph)	118	1	189	0	0	104	793	0	0	290	279
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
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	128	1	205	0	0	113	862	0	0	315	303
Lane Group Flow (vph)	0	129	205	0	0	113	862	0	0	462	156
Turn Type	Prot		Prot			Prot					Prot
Protected Phases	3	8	8			5	2			6	6
Permitted Phases											
Detector Phases	3	8	8			5	2			6	6
Minimum Initial (s)	8.0	8.0	8.0			8.0	10.0			10.0	10.0
Minimum Split (s)	13.0	21.0	21.0			13.0	21.0			21.0	21.0
Total Split (s)	21.0	21.0	21.0	0.0	0.0	13.0	34.0	0.0	0.0	21.0	21.0
Total Split (%)	38.2%	38.2%	38.2%	0.0%	0.0%	23.6%	61.8%	0.0%	0.0%	38.2%	38.2%
Maximum Green (s)	16.0	16.0	16.0			8.0	29.0			16.0	16.0
Yellow Time (s)	4.0	4.0	4.0			4.0	4.0			4.0	4.0
All-Red Time (s)	1.0	1.0	1.0			1.0	1.0			1.0	1.0
Lead/Lag						Lead				Lag	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0			3.0	3.0			3.0	3.0
Recall Mode	None	C-Max	C-Max			None	None			None	None
Walk Time (s)		5.0	5.0				5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0				11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0				0			0	0
Act Effct Green (s)		24.2	24.2			9.0	22.8			12.4	12.4
Actuated g/C Ratio		0.44	0.44			0.16	0.41			0.23	0.23
v/c Ratio		0.17	0.15			0.20	0.41			0.44	0.39
Control Delay		12.0	2.7			22.2	9.9			13.5	6.8
Queue Delay		0.0	0.0			0.0	0.0			0.0	0.0

Lane Group	NBL2	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Total Delay		12.0	2.7			22.2	9.9			13.5	6.8
LOS		B	A			C	A			B	A
Approach Delay		6.3					11.3			11.8	
Approach LOS		A					B			B	
Queue Length 50th (ft)		25	0			18	58			34	0
Queue Length 95th (ft)		61	18			28	46			55	41
Internal Link Dist (ft)		1060		813			414			1038	
Turn Bay Length (ft)						250					250
Base Capacity (vph)		770	1327			556	2747			1397	493
Starvation Cap Reductn		0	0			0	0			0	0
Spillback Cap Reductn		0	0			0	0			0	0
Storage Cap Reductn		0	0			0	0			0	0
Reduced v/c Ratio		0.17	0.15			0.20	0.31			0.33	0.32

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 54 (98%), Referenced to phase 4: and 8:NBL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 10.6 Intersection LOS: B
Intersection Capacity Utilization 36.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 31: SR 905 NB & Siempre Viva



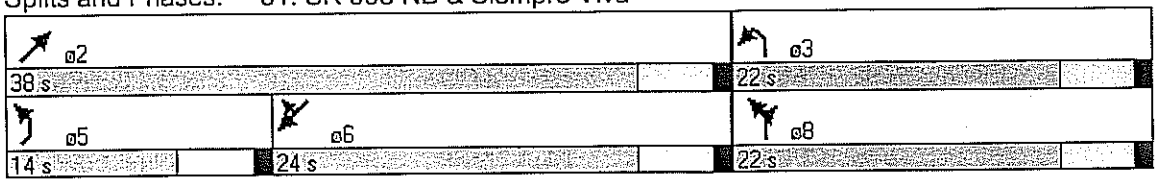
Lane Group	NBL2	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%		0%			0%			15%	
Storage Length (ft)		0	0	0	0	250		0	0		250
Storage Lanes		0	2	0	0	2		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50			50	50			50	50
Trailing Detector (ft)	0	0	0			0	0			0	0
Turning Speed (mph)	15	15	9	15	9	15		9	15		9
Lane Util. Factor	1.00	1.00	0.88	[illegible]	[illegible]	0.97	0.91	1.00	1.00	0.86	0.86
Frt			0.850							0.964	0.850
Flt Protected		0.950				0.950					
Satd. Flow (prot)	0	1752	2780	0	0	3400	5036	0	0	4244	1247
Flt Permitted		0.950				0.950					
Satd. Flow (perm)	0	1752	2780	0	0	3400	5036	0	0	4244	1247
Right Turn on Red			Yes					Yes			Yes
Satd. Flow (RTOR)			139							144	356
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.11	1.11	1.11
Link Speed (mph)		65		65			35			35	
Link Distance (ft)		1140		893			494			1118	
Travel Time (s)		12.0		9.4			9.6			21.8	
Volume (vph)	55	2	128	0	0	356	480	0	0	594	517
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
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	60	2	139	0	0	387	522	0	0	646	562
Lane Group Flow (vph)	0	62	139	0	0	387	522	0	0	852	356
Turn Type	Prot		Prot			Prot					Prot
Protected Phases	3	8	8			5	2			6	6
Permitted Phases											
Detector Phases	3	8	8			5	2			6	6
Minimum Initial (s)	8.0	8.0	8.0			8.0	10.0			10.0	10.0
Minimum Split (s)	13.0	21.0	21.0			13.0	21.0			21.0	21.0
Total Split (s)	22.0	22.0	22.0	0.0	0.0	14.0	38.0	0.0	0.0	24.0	24.0
Total Split (%)	36.7%	36.7%	36.7%	0.0%	0.0%	23.3%	63.3%	0.0%	0.0%	40.0%	40.0%
Maximum Green (s)	17.0	17.0	17.0			9.0	33.0			19.0	19.0
Yellow Time (s)	4.0	4.0	4.0			4.0	4.0			4.0	4.0
All-Red Time (s)	1.0	1.0	1.0			1.0	1.0			1.0	1.0
Lead/Lag						Lead				Lag	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0			3.0	3.0			3.0	3.0
Recall Mode	None	C-Max	C-Max			None	None			None	None
Walk Time (s)		5.0	5.0				5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0				11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0				0			0	0
Act Effct Green (s)		20.6	20.6			9.9	31.4			17.5	17.5
Actuated g/C Ratio		0.34	0.34			0.16	0.52			0.29	0.29
v/c Ratio		0.10	0.13			0.69	0.20			0.64	0.58
Control Delay		15.5	3.9			25.7	4.3			17.2	6.3
Queue Delay		0.0	0.0			0.0	0.0			0.0	0.0

Lane Group	NBL2	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Total Delay		15.5	3.9			25.7	4.3			17.2	6.3
LOS		B	A			C	A			B	A
Approach Delay		7.5					13.4			14.0	
Approach LOS		A					B			B	
Queue Length 50th (ft)		15	0			59	14			81	0
Queue Length 95th (ft)		40	18			#66	17			115	58
Internal Link Dist (ft)		1060		813			414			1038	
Turn Bay Length (ft)						250					250
Base Capacity (vph)		601	1038			567	2854			1511	653
Starvation Cap Reductn		0	0			0	0			0	0
Spillback Cap Reductn		0	0			0	0			0	0
Storage Cap Reductn		0	0			0	0			0	0
Reduced v/c Ratio		0.10	0.13			0.68	0.18			0.56	0.55

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 4: and 8:NBL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 13.2 Intersection LOS: B
Intersection Capacity Utilization 48.2% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 31: SR 905 NB & Siempre Viva



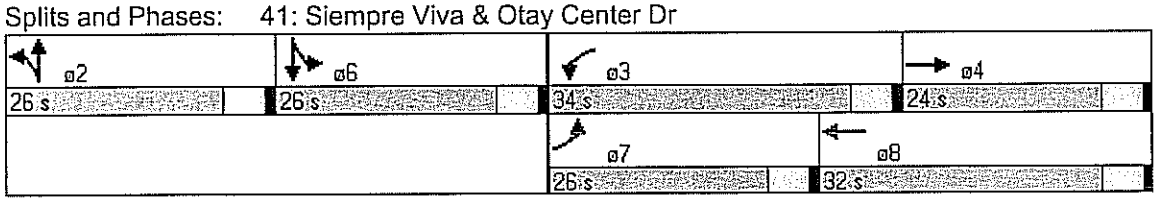
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975			0.958			0.876			0.912	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	4910	0	1752	4824	0	1752	1616	0	1752	1682	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1752	4910	0	1752	4824	0	1752	1616	0	1752	1682	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			87			125			47	
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)		35			35			30			30	
Link Distance (ft)		3779			472			753			755	
Travel Time (s)		73.6			9.2			17.1			17.2	
Volume (vph)	17	135	28	227	342	134	39	24	115	101	30	43
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
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	18	147	30	247	372	146	42	26	125	110	33	47
Lane Group Flow (vph)	18	177	0	247	518	0	42	151	0	110	80	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												
Detector Phases	7	4		3	8		2	2		6	6	
Minimum Initial (s)	10.0	10.0		8.0	10.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	21.0	21.0		13.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	26.0	24.0	0.0	34.0	32.0	0.0	26.0	26.0	0.0	26.0	26.0	0.0
Total Split (%)	23.6%	21.8%	0.0%	30.9%	29.1%	0.0%	23.6%	23.6%	0.0%	23.6%	23.6%	0.0%
Maximum Green (s)	21.0	19.0		29.0	27.0		21.0	21.0		21.0	21.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		Max	Max		Max	Max	
Walk Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	11.0	27.9		22.1	48.0		22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.10	0.25		0.20	0.44		0.20	0.20		0.20	0.20	
v/c Ratio	0.10	0.14		0.70	0.24		0.12	0.36		0.31	0.21	
Control Delay	46.6	28.9		51.1	16.2		37.3	12.5		40.5	19.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	46.6	28.9		51.1	16.2		37.3	12.5		40.5	19.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C		D	B		D	B		D	B	
Approach Delay		30.5			27.5			17.9			31.7	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	12	29		149	60		25	15		67	19	
Queue Length 95th (ft)	35	54		198	83		56	71		120	61	
Internal Link Dist (ft)		3699			392			673			675	
Turn Bay Length (ft)	250			200								
Base Capacity (vph)	350	1266		478	2154		350	423		350	374	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.14		0.52	0.24		0.12	0.36		0.31	0.21	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 72 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 27.1 Intersection LOS: C
Intersection Capacity Utilization 49.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 41: Siempre Viva & Otay Center Dr



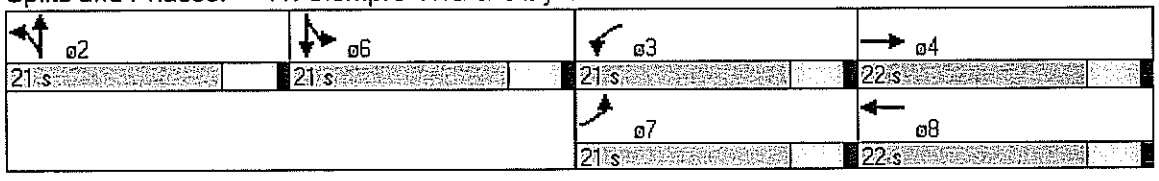
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970			0.942			0.861			0.902	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	4885	0	1752	4744	0	1752	1588	0	1752	1664	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1752	4885	0	1752	4744	0	1752	1588	0	1752	1664	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66			169			285			57	
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)		35			35			30			30	
Link Distance (ft)		3779			472			753			755	
Travel Time (s)		73.6			9.2			17.1			17.2	
Volume (vph)	43	273	69	179	318	200	53	20	262	172	28	52
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
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	47	297	75	195	346	217	58	22	285	187	30	57
Lane Group Flow (vph)	47	372	0	195	563	0	58	307	0	187	87	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												
Detector Phases	7	4		3	8		2	2		6	6	
Minimum Initial (s)	10.0	10.0		8.0	10.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	21.0	21.0		13.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	21.0	22.0	0.0	21.0	22.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Split (%)	24.7%	25.9%	0.0%	24.7%	25.9%	0.0%	24.7%	24.7%	0.0%	24.7%	24.7%	0.0%
Maximum Green (s)	16.0	17.0		16.0	17.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	11.1	11.9		13.8	21.0		17.1	17.1		17.1	17.1	
Actuated g/C Ratio	0.14	0.16		0.18	0.28		0.23	0.23		0.23	0.23	
v/c Ratio	0.20	0.45		0.61	0.39		0.15	0.53		0.48	0.21	
Control Delay	33.0	26.0		37.3	17.4		26.3	8.6		31.3	13.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.0	26.0		37.3	17.4		26.3	8.6		31.3	13.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C		D	B		C	A		C	B	
Approach Delay		26.8			22.5			11.4			25.7	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	20	48		84	60		22	8		77	11	
Queue Length 95th (ft)	52	78		154	92		55	76		148	49	
Internal Link Dist (ft)		3699			392			673			675	
Turn Bay Length (ft)	250			200								
Base Capacity (vph)	340	1126		377	1468		393	578		393	418	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.33		0.52	0.38		0.15	0.53		0.48	0.21	

Intersection Summary

Area Type: Other
Cycle Length: 85
Actuated Cycle Length: 75.9
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 21.8 Intersection LOS: C
Intersection Capacity Utilization 59.1% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 41: Siempre Viva & Otay Center Dr



TIER II TRAFFIC TECHNICAL REPORT

STATE ROUTE 11/
OTAY MESA EAST LAND PORT OF ENTRY

Appendix E – Opening Year (2015) Freeway Capacity Analysis

Prepared for:

Caltrans – District 11

Prepared by:

VRPA Technologies
9520 Padgett Street, Suite 213
San Diego, CA 92126

In association with:

AECOM

November 5, 2010

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	529	vph

On Ramp Data

..de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	396	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?	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)	529	396		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	139	104		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	600	449	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 600 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1049	4700	No
v_{R12}	1049	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.297

Space mean speed in ramp influence area, S_R = 58.2 mph

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

Space mean speed for all vehicles, S = 58.2 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	771	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	360	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?	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)	771	360		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	203	95		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	874	408	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 874 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1282	4700	No
v_{R12}	1282	4600	No

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable, M_S = 0.300

ıce mean speed in ramp influence area, S_R = 58.1 mph

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

Space mean speed for all vehicles, S = 58.1 mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	925	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	243	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	350	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	350	pc/h/ln
..e-flow speed, FFS	59.5	mi/h
..erage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	5.9	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1131	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	298	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	427	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	427	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	7.2	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	925	vph

Off Ramp Data

..de of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	277	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)	925		277			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	243		73			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1049	314	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1049 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1049	4700	No
v_{12}	1049	4400	No
$v_{FO} = v_F - v_R$	735	4700	No
v_R	314	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -0.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.456	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1131	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	252	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)	1131		252			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	298		66			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1282	286	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1282 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1282	4700	No
v_{12}	1282	4400	No
$v_{FO} = v_F - v_R$	996	4700	No
v_R	286	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 1.8 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 = 54.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.6	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	648	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	342	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?	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)	648	342		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	171	90		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	767	405	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 767 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1172	4700	No
v_{R12}	1172	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 11.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.299	
ıce mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	879	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	420	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?	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)	879	420		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	231	111		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1041	497	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1041 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1538	4700	No
v_{R12}	1538	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.304	
ace mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	990	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	261	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	391	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	391	pc/h/ln
ee-flow speed, FFS	59.5	mi/h
erage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	6.6	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1299	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	342	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	513	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	513	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	8.6	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	990	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	885	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)	990		885			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	261		233			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1122	1003	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1122 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1122	4700	No
v_{12}	1122	4400	No
$v_{FO} = v_F - v_R$	119	4700	No
v_R	1003	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 0.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.518	
Space mean speed in ramp influence area,	S_R = 53.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.1	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1299	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	1205	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)	1299		1205				vph
Peak-hour factor, PHF	0.95		0.95				
Peak 15-min volume, v15	342		317				v
Trucks and buses	15		15				%
Recreational vehicles	1		1				%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1473	1366	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1473 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1473	4700	No
v_{12}	1473	4400	No
$v_{FO} = v_F - v_R$	107	4700	No
v_R	1366	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 3.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.551	
Space mean speed in ramp influence area,	S_R = 52.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.3	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	28	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	62	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	62	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	94	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	25	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	56	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	56	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.0	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	786	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	207	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	414	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	414	pc/h/ln
..e-flow speed, FFS	58.0	mi/h
.. erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	7.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1115	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	293	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	587	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	587	pc/h/ln
;e-flow speed, FFS	58.0	mi/h
.erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1330	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	350	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	700	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	700	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.1	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1206	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	317	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	635	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	635	pc/h/ln
..e-flow speed, FFS	58.0	mi/h
..erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.9	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	139	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	37	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	82	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	82	pc/h/ln
e-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.4	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	137	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	36	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	81	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	81	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.4	pc/mi/ln

Level of service, LOS A

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

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1330	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	81	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?	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)	1330	81		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	350	21		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1508	92	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 892 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1600	7050	No
v_{R12}	984	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.0- pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.296	
ıce mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = 64.6	mph
Space mean speed for all vehicles,	S = 60.5	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1206	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	500	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)	1206	110		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	317	29		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1367	125	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 809 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1492	7050	No
v_{R12}	934	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.296	
ce mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = 64.8	mph
Space mean speed for all vehicles,	S = 60.5	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1550	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	408	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	586	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	586	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	9.8	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1453	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	382	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	549	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	549	pc/h/ln
..e-flow speed, FFS	59.5	mi/h
..erage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	9.2	pc/mi/ln

Level of service, LOS A

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1550	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	378	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)	1550		378			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	408		99			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1757	429	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1757 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1757	4700	No
v_{12}	1757	4400	No
$v_{FO} = v_F - v_R$	1328	4700	No
v_R	429	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 5.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.467	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.3	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1453	vph

Off Ramp Data

..de of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	380	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)	1453		380			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	382		100			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1647	431	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1647 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1647	4700	No
v_{12}	1647	4400	No
$v_{FO} = v_F - v_R$	1216	4700	No
v_R	431	3800	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 = 0.467	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.3	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1172	vph

On Ramp Data

..de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	227	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?	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)	1172	227		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	308	60		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1329	257	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1329 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1586	4700	No
v_{R12}	1586	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.6 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 = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1073	vph

On Ramp Data

de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	308	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?	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)	1073	308		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	282	81		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1216	349	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1216 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1565	4700	No
v_{R12}	1565	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.4 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 = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1402	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	369	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	530	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	530	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	8.9	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1381	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	363	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	522	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	522	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	8.8	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1381	vph

Off Ramp Data

..de of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	324	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?	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)	1381		324			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	363		85			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1566	367	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1566 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1566	4700	No
v_{12}	1566	4400	No
$v_{FO} = v_F - v_R$	1199	4700	No
v_R	367	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.461	
Space mean speed in ramp influence area,	S_R = 54.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.4	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1402	vph

Off Ramp Data

..de of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	440	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?	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)	1402		440			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	369		116			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1589	499	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1589 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1589	4700	No
v_{12}	1589	4400	No
$v_{FO} = v_F - v_R$	1090	4700	No
v_R	499	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.473	
Space mean speed in ramp influence area,	S_R = 54.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.1	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	354	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	366	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?	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)	354	366		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	93	96		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	401	415	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 401 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	816	4700	No
v_{R12}	816	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 8.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.295	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	506	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	333	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?	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)	506	333		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	133	88		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	574	378	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 574 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	952	4700	No
v_{R12}	952	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.296	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - Alta Rd Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	720	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	189	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	408	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	408	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	7.0	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - Alta Rd Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	839	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	221	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	476	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	476	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	8.2	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	720	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	307	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?	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)	720		307			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	189		81			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	816	348	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 816 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	816	4700	No
v_{12}	816	4400	No
$v_{FO} = v_F - v_R$	468	4700	No
v_R	348	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 6.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.459	
Space mean speed in ramp influence area,	S_R = 54.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.4	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	839	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	279	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?	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)	839		279			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	221		73			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	951	316	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 951 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	951	4700	No
v_{12}	951	4400	No
$v_{FO} = v_F - v_R$	635	4700	No
v_R	316	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 7.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.456	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	413	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	478	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?	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)	413	478		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	109	126		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	489	566	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 489 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1055	4700	No
v_{R12}	1055	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.297

Space mean speed in ramp influence area, S_R = 58.2 mph

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

Space mean speed for all vehicles, S = 58.2 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	560	vph

On Ramp Data

de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	649	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?	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)	560	649		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	147	171		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	663	769	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 663 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1432	4700	No
v_{R12}	1432	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.302

Space mean speed in ramp influence area, S_R = 58.0 mph

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

Space mean speed for all vehicles, S = 58.0 mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	AM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Southbound / Eastbound
Weaving Location:	Alta Road On Ramp - P.C Off Ra
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	1400	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
Volume ratio, VR	0.54	
Weaving ratio, R	0.21	

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	98	364	422	112	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	26	96	111	29	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	103	383	444	117	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
(Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.80	0.10
Weaving and non-weaving speeds, Si	45.54	65.08
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.45
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	52.91	mph
Weaving segment density, D	6.60	pc/mi/ln
Level of service, LOS	A	
Capacity of base condition, cb	4800	pc/h
Capacity as a 15-minute flow rate, c	4800	pc/h
Capacity as a full-hour volume, ch	4560	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	561	2800	a
Average flow rate (pcphpl)	349	2350	b
Volume ratio, VR	0.54	0.45	c
Weaving ratio, R	0.21	N/A	d
Weaving length (ft)	1400	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.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	PM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Southbound / Eastbound
Weaving Location:	Alta Road On Ramp - P.C Off Ra
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	1700	ft
Terrain type	Level	
Grade		%
Length		mi
aving type	A	
lume ratio, VR	0.54	
Weaving ratio, R	0.15	

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	86	517	598	102	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	23	136	157	27	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	90	544	629	107	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
(Exhibit 24-6)	0.80	0.75
aving intensity factor, Wi	0.89	0.12
Weaving and non-weaving speeds, Si	44.07	64.07
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.54
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	51.51	mph
Weaving segment density, D	8.87	pc/mi/ln
Level of service, LOS	A	
Capacity of base condition, cb	4978	pc/h
Capacity as a 15-minute flow rate, c	4978	pc/h
Capacity as a full-hour volume, ch	4729	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	736	2800	a
Average flow rate (pcphpl)	456	2350	b
Volume ratio, VR	0.54	0.45	c
Weaving ratio, R	0.15	N/A	d
Weaving length (ft)	1700	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.

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Passenger car off ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	891	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	786	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)	891		786				vph
Peak-hour factor, PHF	0.95		0.95				
Peak 15-min volume, v15	234		207				v
Trucks and buses	15		15				%
Recreational vehicles	1		1				%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1010	891	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1010 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1010	4700	No
v_{12}	1010	4400	No
$v_{FO} = v_F - v_R$	119	4700	No
v_R	891	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -0.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.508	
Space mean speed in ramp influence area,	S_R = 53.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.3	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Passenger car off ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1201	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	1115	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)	1201		1115			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	316		293			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1362	1264	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1362 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1362	4700	No
v_{12}	1362	4400	No
$v_{FO} = v_F - v_R$	98	4700	No
v_R	1264	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 2.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.542	
Space mean speed in ramp influence area,	S_R = 52.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.5	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	786	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	207	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	414	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	414	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	7.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	1115	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	293	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	587	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	587	pc/h/ln
e-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	28	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	62	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	62	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	94	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	25	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	56	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	56	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.0	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	1330	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	350	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	700	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	700	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.1	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	1206	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	317	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	635	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	635	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.9	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	139	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	37	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	82	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	82	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.4	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	137	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	36	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	81	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	81	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.4	pc/mi/ln

Level of service, LOS A

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

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Passenger Car On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	139	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	1330	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?	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)	139	1330		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	37	350		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	165	1575	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 165 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1740	4700	No
v_{R12}	1740	4600	No

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable,	M_S = 0.308	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.9	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Passenger Car On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	137	vph

On Ramp Data

..de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1206	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?	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)	137	1206		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	36	317		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	162	1428	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 162 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1590	4700	No
v_{R12}	1590	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.1 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 = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	AM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Northbound / Westbound
Weaving Location:	P.C On Ramp - Alta Rd Off Ramp
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	2200	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
Volume ratio, VR	0.58	
Weaving ratio, R	0.06	

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	529	84	55	801	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	139	22	14	211	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	556	88	57	843	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
(Exhibit 24-6)	0.80	0.75
Weaving intensity factor, Wi	0.87	0.13
Weaving and non-weaving speeds, Si	44.42	63.63
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.71
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	50.82	mph
Weaving segment density, D	10.13	pc/mi/ln
Level of service, LOS	B	
Capacity of base condition, cb	5220	pc/h
Capacity as a 15-minute flow rate, c	5220	pc/h
Capacity as a full-hour volume, ch	4959	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	900	2800	a
Average flow rate (pcphpl)	514	2350	b
Volume ratio, VR	0.58	0.45	c
Weaving ratio, R	0.06	N/A	d
Weaving length (ft)	2200	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.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	PM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Northbound / Westbound
Weaving Location:	P.C On Ramp - Alta Rd Off Ramp
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	2200	ft
Terrain type	Level	
Grade		%
Length		mi
[illegible]ving type	A	
[illegible]ume ratio, VR	0.58	
Weaving ratio, R	0.07	

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	477	83	54	729	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	126	22	14	192	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	502	87	56	767	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
(Exhibit 24-6)	0.80	0.75
[illegible]aving intensity factor, Wi	0.80	0.12
Weaving and non-weaving speeds, Si	45.61	64.26
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.69
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	51.89	mph
Weaving segment density, D	9.07	pc/mi/ln
Level of service, LOS	A	
Capacity of base condition, cb	5220	pc/h
Capacity as a 15-minute flow rate, c	5220	pc/h
Capacity as a full-hour volume, ch	4959	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	823	2800	a
Average flow rate (pcphpl)	470	2350	b
Volume ratio, VR	0.58	0.45	c
Weaving ratio, R	0.07	N/A	d
Weaving length (ft)	2200	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.

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1469	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	584	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?	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)	1469		584			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	387		154			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1665	662	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1665 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1665	4700	No
v_{12}	1665	4400	No
$v_{FO} = v_F - v_R$	1003	4700	No
v_R	662	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 14.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.488	
Space mean speed in ramp influence area,	S_R = 53.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.8	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1343	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	531	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?	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)	1343		531			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	353		140			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1523	602	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1523 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1523	4700	No
v_{12}	1523	4400	No
$v_{FO} = v_F - v_R$	921	4700	No
v_R	602	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.482	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	885	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	251	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?	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)	885	251		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	233	66		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1003	285	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1003 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1288	4700	No
v_{R12}	1288	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.300	
Space mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	812	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	341	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?	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)	812	341		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	214	90		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	921	387	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 921 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1308	4700	No
v_{R12}	1308	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.300	
Space mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	Alta Rd On Rmp - SR 125 Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	1153	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	303	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	654	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	654	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	11.3	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	Alta Rd On Rmp - SR 125 Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: Toll One Interchange

Flow Inputs and Adjustments

Volume, V	1153	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	303	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	654	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	654	pc/h/ln
..e-flow speed, FFS	58.0	mi/h
..erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	11.3	pc/mi/ln

Level of service, LOS B

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1136	vph

Off Ramp Data

de of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	300	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?	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)	1136		300			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	299		79			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1288	340	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1288 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1288	4700	No
v_{12}	1288	4400	No
$v_{FO} = v_F - v_R$	948	4700	No
v_R	340	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 10.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.459	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1153	vph

Off Ramp Data

de of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	407	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?	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)	1153		407			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	303		107			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1307	461	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1307 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1307	4700	No
v_{12}	1307	4400	No
$v_{FO} = v_F - v_R$	846	4700	No
v_R	461	2000	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 = 0.469	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	525	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	366	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?	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)	525	366		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	138	96		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	595	415	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 595 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1010	4700	No
v_{R12}	1010	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.0+ pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.297	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	876	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	333	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?	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)	876	333		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	231	88		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	993	378	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 993 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1371	4700	No
v_{R12}	1371	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.301	
Space mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	891	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	234	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	505	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	505	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	8.7	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1209	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	318	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	685	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	685	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	11.8	pc/mi/ln

Level of service, LOS B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	28	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	62	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	62	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	94	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	25	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	56	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	56	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.0	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	786	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	207	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	446	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	446	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	7.7	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1115	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	293	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	632	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	632	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.9	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

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Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1320	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	347	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	748	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	748	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
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.

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1197	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	315	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	679	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	679	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	11.7	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	139	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	37	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	82	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	82	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.4	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	126	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	33	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	75	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	75	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.3	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1459	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	384	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	827	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	827	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	14.3	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1323	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	348	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	750	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	750	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
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.

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1459	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	300	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?	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)	1459	300		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	384	79		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1654	340	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1654 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1994	4700	No
v_{R12}	1994	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.315	
ace mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1323	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	407	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?	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)	1323	407		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	348	107		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1500	461	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1500 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1961	4700	No
v_{R12}	1961	4600	No

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable,	M_S = 0.314	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.8	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	657	vph

On Ramp Data

de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	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?	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)	657	485		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	173	128		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	745	550	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 745 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1295	4700	No
v_{R12}	1295	4600	No

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable,	M_S = 0.300	
Space mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	950	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	441	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?	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)	950	441		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	250	116		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1077	500	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1077 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1577	4700	No
v_{R12}	1577	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.305

ace mean speed in ramp influence area, S_R = 58.0 mph

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

Space mean speed for all vehicles, S = 58.0 mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1142	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	301	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	432	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	432	pc/h/ln
e-flow speed, FFS	59.5	mi/h
rage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	7.3	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1391	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	366	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	526	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	526	pc/h/ln
e-flow speed, FFS	59.5	mi/h
rage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	8.8	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1142	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	356	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)	1142		356			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	301		94			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1295	404	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1295 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1295	4700	No
v_{12}	1295	4400	No
$v_{FO} = v_F - v_R$	891	4700	No
v_R	404	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 1.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.464

Space mean speed in ramp influence area, S_R = 54.3 mph

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

Space mean speed for all vehicles, S = 54.3 mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1391	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	324	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)	1391		324			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	366		85			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1577	367	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1577 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1577	4700	No
v_{12}	1577	4400	No
$v_{FO} = v_F - v_R$	1210	4700	No
v_R	367	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 4.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.461	
Space mean speed in ramp influence area,	S_R = 54.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.4	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	786	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	362	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?	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)	786	362		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	207	95		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	931	429	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 931 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1360	4700	No
v_{R12}	1360	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.301

ıce mean speed in ramp influence area, S_R = 58.1 mph

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

Space mean speed for all vehicles, S = 58.1 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1067	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	438	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?	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)	1067	438		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	281	115		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1706	1583	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1706 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1706	4700	No
v_{12}	1706	4400	No
$v_{FO} = v_F - v_R$	123	4700	No
v_R	1583	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 5.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.570

Space mean speed in ramp influence area, S_R = 51.9 mph

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

Space mean speed for all vehicles, S = 51.9 mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1148	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	302	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	453	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	453	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	7.6	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	ER Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1505	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	396	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	594	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	594	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	10.0	pc/mi/ln

Level of service, LOS A

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1148	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	1029	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)	1148		1029			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	302		271			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1301	1167	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1301 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1301	4700	No
v_{12}	1301	4400	No
$v_{FO} = v_F - v_R$	134	4700	No
v_R	1167	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 1.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.533	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.7	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1505	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	1396	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)	1505		1396			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	396		367			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1706	1583	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1706 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1706	4700	No
v_{12}	1706	4400	No
$v_{FO} = v_F - v_R$	123	4700	No
v_R	1583	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 5.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.570	
Space mean speed in ramp influence area,	S_R = 51.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.9	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Road (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	121	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	32	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	72	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	72	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.2	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	109	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	29	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	65	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	65	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	908	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	239	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	478	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	478	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	8.2	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

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Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1288	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	339	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	678	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	678	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	11.7	pc/mi/ln

Level of service, LOS B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1528	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	402	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	804	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	804	pc/h/ln
..e-flow speed, FFS	58.0	mi/h
..rage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	13.9	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1386	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	365	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	729	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	729	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.6	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Road(Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	159	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	42	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	94	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	94	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.6	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	144	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	38	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	85	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	85	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.5	pc/mi/ln

Level of service, LOS A

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

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1687	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	97	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?	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)	1687	97		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	444	26		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1913	110	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1132 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2023	7050	No
v_{R12}	1242	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.300

ice mean speed in ramp influence area, S_R = 58.1 mph

Space mean speed in outer lanes, S_O = 64.0 mph

Space mean speed for all vehicles, S = 60.2 mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1530	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	132	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?	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)	1530	132		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	403	35		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1735	150	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1026 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1885	7050	No
v_{R12}	1176	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 11.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.299	
ce mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_O = 64.2	mph
Space mean speed for all vehicles,	S = 60.3	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1784	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	469	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	674	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	674	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	11.3	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1662	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	437	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	628	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	628	pc/h/ln
..e-flow speed, FFS	59.5	mi/h
..rage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	10.6	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1784	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	394	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)	1784		394			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	469		104			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2022	447	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2022 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2022	4700	No
v_{12}	2022	4400	No
$v_{FO} = v_F - v_R$	1575	4700	No
v_R	447	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 8.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.468	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1662	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	402	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)	1662		402			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	437		106			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1884	456	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1884 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1884	4700	No
v_{12}	1884	4400	No
$v_{FO} = v_F - v_R$	1428	4700	No
v_R	456	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 7.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.469	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1390	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	292	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?	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)	1390	292		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	366	77		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1576	331	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1576 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1907	4700	No
v_{R12}	1907	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.312	
ce mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1260	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	396	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?	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)	1260	396		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	332	104		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1428	449	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1428 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1877	4700	No
v_{R12}	1877	4600	No

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable,	M_S = 0.311	
ce mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.8	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1682	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	443	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	636	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	636	pc/h/ln
e-flow speed, FFS	59.5	mi/h
.rage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	10.7	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1656	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	436	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	626	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	626	pc/h/ln
e-flow speed, FFS	59.5	mi/h
rage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	10.5	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1682	vph

Off Ramp Data

.de of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	397	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?	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)	1682		397			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	443		104			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1907	450	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1907 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1907	4700	No
v_{12}	1907	4400	No
$v_{FO} = v_F - v_R$	1457	4700	No
v_R	450	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 16.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.469	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 124 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1656	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	539	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?	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)	1656		539			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	436		142			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1877	611	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1877 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1877	4700	No
v_{12}	1877	4400	No
$v_{FO} = v_F - v_R$	1266	4700	No
v_R	611	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 15.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.483	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	442	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	465	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?	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)	442	465		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	116	122		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	501	527	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 501 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1028	4700	No
v_{R12}	1028	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.297

ce mean speed in ramp influence area, S_R = 58.2 mph

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

Space mean speed for all vehicles, S = 58.2 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	609	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	423	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?	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)	609	423		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	160	111		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	690	480	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 690 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1170	4700	No
v_{R12}	1170	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 11.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.299

ıce mean speed in ramp influence area, S_R = 58.1 mph

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

Space mean speed for all vehicles, S = 58.1 mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - Alta Rd Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	907	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	239	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	514	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	514	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	8.9	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - Alta Rd Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	1032	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	272	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	585	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	585	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.1	pc/mi/ln

Level of service, LOS A

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	907	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	445	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?	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)	907		445			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	239		117			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1028	504	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1028 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1028	4700	No
v_{12}	1028	4400	No
$v_{FO} = v_F - v_R$	524	4700	No
v_R	504	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 8.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.473	
Space mean speed in ramp influence area,	S_R = 54.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.1	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1032	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	405	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?	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)	1032		405				vph
Peak-hour factor, PHF	0.95		0.95				
Peak 15-min volume, v15	272		107				v
Trucks and buses	15		15				%
Recreational vehicles	1		1				%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1170	459	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1170 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1170	4700	No
v_{12}	1170	4400	No
$v_{FO} = v_F - v_R$	711	4700	No
v_R	459	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.469	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	462	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	567	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?	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)	462	567		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	122	149		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	547	671	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 547 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1218	4700	No
v_{R12}	1218	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 11.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.299

ıce mean speed in ramp influence area, S_R = 58.1 mph

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

Space mean speed for all vehicles, S = 58.1 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	627	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	770	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?	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)	627	770		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	165	203		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	743	912	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 743 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1655	4700	No
v_{R12}	1655	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.306	
ıce mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	AM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Eastbound
Weaving Location:	Alta Road On Ramp - P.C Off Ra
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2015
Description:	No Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	1400	ft
Terrain type	Level	
Grade		%
Length		mi
ıving type	A	
.olume ratio, VR	0.54	
Weaving ratio, R	0.22	

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	104	421	487	138	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	27	111	128	36	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	109	443	512	145	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
'Exhibit 24-6)	0.80	0.75
. aving intensity factor, Wi	0.93	0.12
Weaving and non-weaving speeds, Si	43.48	64.07
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.48
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	50.96	mph
Weaving segment density, D	7.91	pc/mi/ln
Level of service, LOS	A	
Capacity of base condition, cb	4800	pc/h
Capacity as a 15-minute flow rate, c	4800	pc/h
Capacity as a full-hour volume, ch	4560	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	657	2800	a
Average flow rate (pcphpl)	403	2350	b
Volume ratio, VR	0.54	0.45	c
Weaving ratio, R	0.22	N/A	d
Weaving length (ft)	1400	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.

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.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	PM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Eastbound
Weaving Location:	Alta Road On Ramp - P.C Off Ra
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2015
Description:	No Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	1700	ft
Terrain type	Level	
Grade		%
Length		mi
ıving type	A	
..lume ratio, VR	0.54	
Weaving ratio, R	0.15	

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	94	597	691	124	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	25	157	182	33	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	98	628	727	130	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
'Exhibit 24-6)	0.80	0.75
..aving intensity factor, Wi	1.03	0.15
Weaving and non-weaving speeds, Si	42.06	62.93
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.56
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

.ving segment speed, S	49.61	mph
weaving segment density, D	10.64	pc/mi/ln
Level of service, LOS	B	
Capacity of base condition, cb	4978	pc/h
Capacity as a 15-minute flow rate, c	4978	pc/h
Capacity as a full-hour volume, ch	4729	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	857	2800	a
Average flow rate (pcphpl)	527	2350	b
Volume ratio, VR	0.54	0.45	c
Weaving ratio, R	0.15	N/A	d
Weaving length (ft)	1700	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.
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.

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Passenger car off ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1029	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	908	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)	1029		908			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	271		239			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1167	1029	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1167 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1167	4700	No
v_{12}	1167	4400	No
$v_{FO} = v_F - v_R$	138	4700	No
v_R	1029	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 0.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.521	
Space mean speed in ramp influence area,	S_R = 53.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.0	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Passenger car off ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1397	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	1288	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)	1397		1288			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	368		339			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1584	1460	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1584 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1584	4700	No
v_{12}	1584	4400	No
$v_{FO} = v_F - v_R$	124	4700	No
v_R	1460	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 4.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.559	
Space mean speed in ramp influence area,	S_R = 52.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.1	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Road (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	908	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	239	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	478	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	478	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	8.2	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Altra Road (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	1288	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	339	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	678	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	678	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	11.7	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Road (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	121	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	32	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	75	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	75	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.3	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Road (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	109	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	29	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	67	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	67	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.2	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Road (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	1528	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	402	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	804	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	804	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	13.9	pc/mi/ln

Level of service, LOS B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Road (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	1386	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	365	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	729	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	729	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.6	pc/mi/ln

Level of service, LOS B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Road (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	159	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	42	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	98	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	98	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.7	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Road (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	144	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	38	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	89	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	89	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.5	pc/mi/ln

Level of service, LOS A

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Passenger Car On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	159	vph

On Ramp Data

de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1528	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?	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)	159	1528		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	42	402		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	188	1809	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 188 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1997	4700	No
v_{R12}	1997	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.315

Space mean speed in ramp influence area, S_R = 57.8 mph

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

Space mean speed for all vehicles, S = 57.8 mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Passenger Car On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	144	vph

On Ramp Data

.de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1386	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?	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)	144	1386		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	38	365		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	171	1641	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 171 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1812	4700	No
v_{R12}	1812	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.310	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.9	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	AM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Westbound
Weaving Location:	P.C On Ramp - Alta Rd Off Ramp
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2015
Description:	No Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	2200	ft
Terrain type	Level	
Grade		%
Length		mi
ıving type	A	
ıume ratio, VR	0.56	
Weaving ratio, R	0.13	

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	628	188	130	900	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	165	49	34	237	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	661	197	136	947	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
'Exhibit 24-6)	0.80	0.75
ıving intensity factor, Wi	1.05	0.17
Weaving and non-weaving speeds, Si	41.86	62.19
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.69
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

ving segment speed, S	48.93	mph
eaving segment density, D	13.22	pc/mi/ln
Level of service, LOS	B	
Capacity of base condition, cb	5220	pc/h
Capacity as a 15-minute flow rate, c	5220	pc/h
Capacity as a full-hour volume, ch	4959	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1083	2800	a
Average flow rate (pcphpl)	647	2350	b
Volume ratio, VR	0.56	0.45	c
Weaving ratio, R	0.13	N/A	d
Weaving length (ft)	2200	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.
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.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	PM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Westbound
Weaving Location:	P.C On Ramp - Alta Rd Off Ramp
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2015
Description:	No Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	2200	ft
Terrain type	Level	
Grade		%
Length		mi
ıving type	A	
ıume ratio, VR	0.56	
Weaving ratio, R	0.13	

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	570	170	118	816	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	150	45	31	215	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	600	178	124	858	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
'Exhibit 24-6)	0.80	0.75
ıving intensity factor, Wi	0.95	0.15
Weaving and non-weaving speeds, Si	43.16	63.01
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.68
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

.ving segment speed, S	50.14	mph
weaving segment density, D	11.70	pc/mi/ln
Level of service, LOS	B	
Capacity of base condition, cb	5220	pc/h
Capacity as a 15-minute flow rate, c	5220	pc/h
Capacity as a full-hour volume, ch	4959	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	982	2800	a
Average flow rate (pcphpl)	586	2350	b
Volume ratio, VR	0.56	0.45	c
Weaving ratio, R	0.13	N/A	d
Weaving length (ft)	2200	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.
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.

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1687	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	693	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?	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)	1687		693			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	444		182			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1913	786	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1913 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1913	4700	No
v_{12}	1913	4400	No
$v_{FO} = v_F - v_R$	1127	4700	No
v_R	786	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 16.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.499	
Space mean speed in ramp influence area,	S_R = 53.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.5	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1530	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	630	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?	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)	1530		630			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	403		166			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1735	714	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1735 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1735	4700	No
v_{12}	1735	4400	No
$v_{FO} = v_F - v_R$	1021	4700	No
v_R	714	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 14.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.492	
Space mean speed in ramp influence area,	S_R = 53.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.7	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	994	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	365	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?	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)	994	365		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	262	96		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1127	414	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1127 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1541	4700	No
v_{R12}	1541	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.304	
ace mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	900	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	396	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?	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)	900	396		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	237	104		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1020	449	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1020 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1469	4700	No
v_{R12}	1469	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.303	
ace mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	Alta Rd On Rmp - SR 125 Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	1413	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	372	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	801	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	801	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	13.8	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	Alta Rd On Rmp - SR 125 Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	1296	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	341	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	735	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	735	pc/h/ln
e-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.7	pc/mi/ln

Level of service, LOS B

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1413	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	381	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?	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)	1413		381			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	372		100			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1602	432	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1602 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1602	4700	No
v_{12}	1602	4400	No
$v_{FO} = v_F - v_R$	1170	4700	No
v_R	432	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.467	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.3	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1296	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	517	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?	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)	1296		517			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	341		136			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1469	586	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1469 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1469	4700	No
v_{12}	1469	4400	No
$v_{FO} = v_F - v_R$	883	4700	No
v_R	586	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.481	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	613	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	416	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?	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)	613	416		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	161	109		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	695	472	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 695 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1167	4700	No
v_{R12}	1167	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 11.2 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 = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1019	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	378	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?	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)	1019	378		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	268	99		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1155	429	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1155 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1584	4700	No
v_{R12}	1584	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.305	
ace mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - SV Road
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1029	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	271	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	583	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	583	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1397	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	368	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	792	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	792	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	13.7	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	121	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	32	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	72	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	72	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.2	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	109	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	29	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	65	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	65	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	908	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	239	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	515	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	515	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	8.9	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1288	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	339	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	730	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	730	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.6	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1518	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	399	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	860	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	860	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	14.8	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1377	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	362	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	781	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	781	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	13.5	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	159	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	42	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	94	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	94	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.6	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	144	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	38	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	85	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	85	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.5	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1667	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	439	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	945	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	945	pc/h/ln
;e-flow speed, FFS	58.0	mi/h
. erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	16.3	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1521	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	400	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	862	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	862	pc/h/ln
;e-flow speed, FFS	58.0	mi/h
.erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	14.9	pc/mi/ln

Level of service, LOS B

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Sr 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1677	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	340	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?	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)	1677	340		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	441	89		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1901	385	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1901 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2286	4700	No
v_{R12}	2286	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 B

Speed Estimation

Intermediate speed variable, M_S = 0.324

ıce mean speed in ramp influence area, S_R = 57.5 mph

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

Space mean speed for all vehicles, S = 57.5 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	No Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1521	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	462	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?	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)	1521	462		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	400	122		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1724	524	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1724 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2248	4700	No
v_{R12}	2248	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.323	
ıce mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.6	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	552	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	347	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?	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)	552	347		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	145	91		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	626	393	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 626 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1019	4700	No
v_{R12}	1019	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.297	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	336	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	315	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?	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)	336	315		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	88	83		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	381	357	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 381 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	738	4700	No
v_{R12}	738	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 7.9 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 = 58.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	899	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	237	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	510	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	510	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	8.8	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	651	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	171	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	369	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	369	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	6.4	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	794	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	209	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	450	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	450	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	7.8	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	557	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	147	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	316	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	316	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	5.4	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	28	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	62	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	62	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	94	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	25	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	56	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	56	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.0	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	1340	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	353	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	760	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	760	pc/h/ln
ree-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	13.1	pc/mi/ln

Level of service, LOS B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	1215	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	320	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	689	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	689	pc/h/ln
ree-flow speed, FFS	58.0	mi/h
verage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	11.9	pc/mi/ln

Level of service, LOS B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	139	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	37	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	82	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	82	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.4	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	126	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	33	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	75	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	75	pc/h/ln
F ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.3	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	1479	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	389	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	838	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	838	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	14.4	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	1341	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	353	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	760	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	760	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	13.1	pc/mi/ln

Level of service, LOS B

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1479	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	283	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?	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)	1479	283		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	389	74		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1677	321	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1677 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1998	4700	No
v_{R12}	1998	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.315	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.8	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1341	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	385	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?	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)	1341	385		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	353	101		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1520	436	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1520 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1956	4700	No
v_{R12}	1956	4600	No

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable,	M_S = 0.314	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	507	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	376	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?	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)	507	376		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	133	99		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	575	426	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 575 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1001	4700	No
v_{R12}	1001	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.0- pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.297	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	736	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	342	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?	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)	736	342		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	194	90		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	834	388	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 834 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1222	4700	No
v_{R12}	1222	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 11.7 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 = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	883	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	232	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	334	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	334	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	5.6	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1078	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	284	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	407	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	407	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	6.8	pc/mi/ln

Level of service, LOS A

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	963	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	267	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)	963		267			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	253		70			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1092	303	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1092 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1092	4700	No
v_{12}	1092	4400	No
$v_{FO} = v_F - v_R$	789	4700	No
v_R	303	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 0.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.455	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1078	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	243	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)	1078		243			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	284		64			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1222	275	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1222 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1222	4700	No
v_{12}	1222	4400	No
$v_{FO} = v_F - v_R$	947	4700	No
v_R	275	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 1.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.453	
Space mean speed in ramp influence area,	S_R = 54.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.6	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	616	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	196	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?	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)	616	196		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	162	52		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	729	232	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 729 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	961	4700	No
v_{R12}	961	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.296	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Rd Design Vari

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	835	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	222	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?	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)	835	222		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	220	58		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	989	263	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 989 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1252	4700	No
v_{R12}	1252	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.300	
Space mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	812	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	214	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	321	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	321	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	5.4	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1057	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	278	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	417	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	417	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	7.0	pc/mi/ln

Level of service, LOS A

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & Pass Car Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	812	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	728	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?	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)	812		728			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	214		192			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	921	825	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.699 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 892 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	921	7050	No
v_{12}	892	4400	No
$v_{FO} = v_F - v_R$	96	7050	No
v_R	825	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 7.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.502	
Space mean speed in ramp influence area,	S_R = 53.4	mph
Space mean speed in outer lanes,	S_O = 71.3	mph
Space mean speed for all vehicles,	S = 53.9	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd and Pass Car Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1057	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	982	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)	1057		982			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	278		258			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1198	1113	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1198 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1198	4700	No
v_{12}	1198	4400	No
$v_{FO} = v_F - v_R$	85	4700	No
v_R	1113	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 1.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.528	
Space mean speed in ramp influence area,	S_R = 52.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.9	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	713	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	178	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?	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)	713	178		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	188	47		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	844	211	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 844 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1055	4700	No
v_{R12}	1055	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.297	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	967	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	242	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?	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)	967	242		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	254	64		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1145	287	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1145 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1432	4700	No
v_{R12}	1432	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.302	
Space mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Road (Comm)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	28	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	62	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	62	pc/h/ln
' ee-flow speed, FFS	58.0	mi/h
. erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Road (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	94	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	25	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	56	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	56	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.0	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	786	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	207	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	414	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	414	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	7.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1115	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	293	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	587	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	587	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1330	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	350	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	700	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	700	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.1	pc/mi/ln

Level of service, LOS B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1206	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	317	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	635	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	635	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.9	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	139	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	37	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	82	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	82	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.4	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Road (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	126	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	33	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	75	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	75	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.3	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1469	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	218	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)	1469		218			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	387		57			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1665	247	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1665 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1665	4700	No
v_{12}	1665	4400	No
$v_{FO} = v_F - v_R$	1418	4700	No
v_R	247	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 5.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.450	
Space mean speed in ramp influence area,	S_R = 54.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.6	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1382	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	198	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?	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)	1382		198			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	364		52			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1567	224	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.711 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1178 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1567	7050	No
v_{12}	1178	4400	No
$v_{FO} = v_F - v_R$	1343	7050	No
v_R	224	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.9 pc/mi/ln

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

Speed Estimation

intermediate speed variable,	D_S = 0.448	
Space mean speed in ramp influence area,	S_R = 54.7	mph
Space mean speed in outer lanes,	S_O = 71.3	mph
Space mean speed for all vehicles,	S = 58.0	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1251	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	81	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?	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)	1251	81		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	329	21		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1418	92	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 839 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1510	7050	No
v_{R12}	931	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.296	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = 64.7	mph
Space mean speed for all vehicles,	S = 60.5	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1134	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	500	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)	1134	110		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	298	29		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1286	125	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 761 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1411	7050	No
v_{R12}	886	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.295	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = 64.9	mph
Space mean speed for all vehicles,	S = 60.5	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1332	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	351	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	503	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	503	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	8.5	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1332	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	200	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)	1332		200			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	351		53			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1510	227	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1510 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1510	4700	No
v_{12}	1510	4400	No
$v_{FO} = v_F - v_R$	1283	4700	No
v_R	227	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 3.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.448	
Space mean speed in ramp influence area,	S_R = 54.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.7	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1244	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	218	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)	1244		218			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	327		57			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1410	247	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1410 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1410	4700	No
v_{12}	1410	4400	No
$v_{FO} = v_F - v_R$	1163	4700	No
v_R	247	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 2.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.450	
Space mean speed in ramp influence area,	S_R = 54.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.6	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1132	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	219	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?	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)	1132	219		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	298	58		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1283	248	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

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

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1531	4700	No
v_{R12}	1531	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.304	
Space mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1026	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	297	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?	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)	1026	297		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	270	78		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1163	337	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1163 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1500	4700	No
v_{R12}	1500	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.303	
Space mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.0	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1244	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	327	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	470	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	470	pc/h/ln
' ee-flow speed, FFS	59.5	mi/h
. erage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	7.9	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rampp - SR 125 Off
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015

Description: SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1351	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	356	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	511	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	511	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	8.6	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Ramp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1323	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	348	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	500	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	500	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	8.4	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Sr 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1351	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	308	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?	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)	1351		308			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	356		81			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1532	349	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1532 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1532	4700	No
v_{12}	1532	4400	No
$v_{FO} = v_F - v_R$	1183	4700	No
v_R	349	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.459	
Space mean speed in ramp influence area,	S_R = 54.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.4	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Sr 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1323	vph

Off Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	418	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?	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)	1323		418			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	348		110			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1500	474	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1500 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1500	4700	No
v_{12}	1500	4400	No
$v_{FO} = v_F - v_R$	1026	4700	No
v_R	474	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.471	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	W of EF Rd - EF Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	784	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	206	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	296	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	296	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	5.0	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	W of EF Rd - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	948	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	249	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	358	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	358	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	6.0	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	784	vph

Off Ramp Data

de of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	257	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)	784		257			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	206		68			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	889	291	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 889 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	889	4700	No
v_{12}	889	4400	No
$v_{FO} = v_F - v_R$	598	4700	No
v_R	291	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -1.6 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 = 54.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.6	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	948	vph

Off Ramp Data

de of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	234	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)	948		234			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	249		62			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1075	265	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1075 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1075	4700	No
v_{12}	1075	4400	No
$v_{FO} = v_F - v_R$	810	4700	No
v_R	265	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -0.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.452	
Space mean speed in ramp influence area,	S_R = 54.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.6	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	527	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	463	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?	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)	527	463		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	139	122		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	624	548	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 624 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1172	4700	No
v_{R12}	1172	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 11.2 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 = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	714	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	585	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?	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)	714	585		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	188	154		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
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	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	846	693	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 846 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1539	4700	No
v_{R12}	1539	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.304

Space mean speed in ramp influence area, S_R = 58.0 mph

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

Space mean speed for all vehicles, S = 58.0 mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	990	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	261	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	391	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	391	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	6.6	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
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Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1299	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	342	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	513	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	513	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	8.6	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	990	vph

Off Ramp Data

...de of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	885	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)	990		885			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	261		233			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1122	1003	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1122 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1122	4700	No
v_{12}	1122	4400	No
$v_{FO} = v_F - v_R$	119	4700	No
v_R	1003	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 0.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.518	
Space mean speed in ramp influence area,	S_R = 53.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.1	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1299	vph

Off Ramp Data

..le of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1205	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)	1299		1205			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	342		317			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1473	1366	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1473 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1473	4700	No
v_{12}	1473	4400	No
$v_{FO} = v_F - v_R$	107	4700	No
v_R	1366	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 3.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.551	
Space mean speed in ramp influence area,	S_R = 52.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.3	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	28	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	62	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	62	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	94	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	25	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	56	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	56	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.0	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	786	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	207	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	414	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	414	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	7.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1115	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	293	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	587	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	587	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.1	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1320	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	347	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	695	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	695	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.0	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1197	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	315	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	630	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	630	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	10.9	pc/mi/ln

Level of service, LOS A

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

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1320	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	81	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?	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)	1320	81		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	347	21		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1496	92	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 885 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1588	7050	No
v_{R12}	977	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.296	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = 64.6	mph
Space mean speed for all vehicles,	S = 60.5	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
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Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1197	vph

On Ramp Data

...de 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	500	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)	1197	110		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	315	29		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1357	125	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 803 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1482	7050	No
v_{R12}	928	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.296	
Space mean speed in ramp influence area,	S_R = 58.2	mph
Space mean speed in outer lanes,	S_O = 64.8	mph
Space mean speed for all vehicles,	S = 60.5	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	139	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	37	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	86	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	86	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.5	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

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Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	126	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	33	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	78	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	78	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.3	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1540	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	405	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	582	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	582	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	9.8	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1433	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	377	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	542	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	542	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	9.1	pc/mi/ln

Level of service, LOS A

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1540	vph

Off Ramp Data

le of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	527	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)	1540		527			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	405		139			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1746	597	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1746 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1746	4700	No
v_{12}	1746	4400	No
$v_{FO} = v_F - v_R$	1149	4700	No
v_R	597	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 5.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.482	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	918	vph

Off Ramp Data

de of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	515	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)	918		515			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	242		136			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1041	584	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1041 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1041	4700	No
v_{12}	1041	4400	No
$v_{FO} = v_F - v_R$	457	4700	No
v_R	584	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -0.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.481	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1013	vph

On Ramp Data

..de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	211	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?	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)	1013	211		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	267	56		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1148	239	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1148 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1387	4700	No
v_{R12}	1387	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 = 0.302	
Space mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 58.1	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1433	vph

On Ramp Data

de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	515	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?	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)	1433	515		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	377	136		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
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	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1625	584	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1625 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2209	4700	No
v_{R12}	2209	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.3 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 = 57.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.6	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - W of EF Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1224	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	322	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	463	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	463	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	7.8	pc/mi/ln

Level of service, LOS A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - W of EF Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2015
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1204	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	317	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	455	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	455	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	7.6	pc/mi/ln

Level of service, LOS A

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