APPENDIX D

- **Transportation and Circulation Background Information**

--Left turn pocket warrant charts – NCHRP 279
--Traffic Counts
--Existing Level of Service Calculation Worksheets
--Existing Freeway Analysis Calculation Worksheets
--Detailed Trip Generation Table
--Existing with Project Level of Service Calculation Worksheets
--Existing with Project Freeway Analysis Calculation Worksheets
--Existing with Project Signal Warrant Calculation Worksheets
--Cumulative Level of Service Calculation Worksheets
--Cumulative Freeway Analysis Calculation Worksheets
--Cumulative Signal Warrant Calculation Worksheets
--Cumulative with Project Level of Service Calculation Worksheets
--Cumulative with Project Freeway Analysis Calculation Worksheets
--Cumulative with Project Signal Warrant Calculation Worksheets

San Jose Office

NATIONAL COOPERATIVE
HIGHWAY RESEARCH PROGRAM REPORT

279

INTERSECTION CHANNELIZATION DESIGN GUIDE

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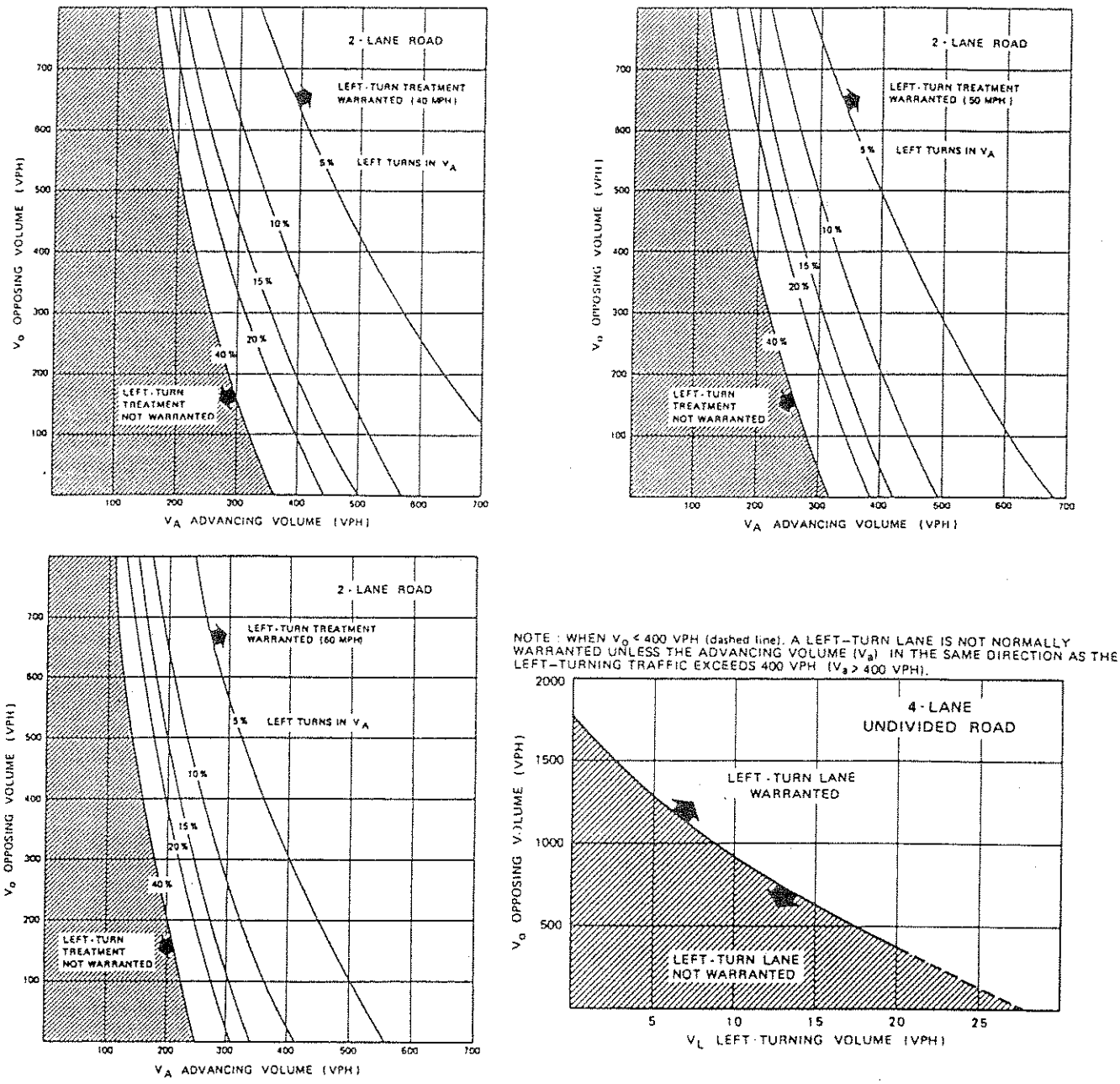

Figure 4-12. Volume warrants for left-turn lanes at unsignalized intersections. (Source: Ref. *4-7*)

a partially shadowed left-turn lane, as illustrated in Figure 4-14. With partially shadowed left-turn lanes, the offset created by the approach taper does not entirely protect or "shadow" the turn lane.

Length of Lane

The left-turn lane length is among the most important design element of left-turn lanes. Its design is directly tied to the particular function of the lane, which is based on prevailing speeds, traffic volumes, and traffic control. The design basis for length can be deceleration, storage, or a combination of both.

Left-turn lanes on high-speed highways should be designed to accommodate vehicle deceleration and braking. The channelization principle of removing slow or decelerating vehicles from through traffic applies at such locations. Figure 4-15 illustrates the functional basis for design of deceleration-based left-turn lanes according to AASHTO. The assumed "reasonable" driver behavior includes deceleration in gear for 3 sec., followed by comfortable braking completely within the turning lane. Where constraints exist and speeds are moderate, an al-

TRAFFIC COUNTS

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	Southbound					DEUTZ RD Westbound					I-101 NB Northbound					DEUTZ RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	0	0	0	0	0	2	0	0	0	2	3	440	0	0	443	0	3	0	0	3	448
04:15 PM	0	0	0	0	0	3	1	0	0	4	1	534	0	0	535	0	0	0	0	0	539
04:30 PM	0	0	0	0	0	2	6	0	0	8	1	488	0	0	489	0	2	0	0	2	499
04:45 PM	0	0	0	0	0	2	2	0	0	4	0	588	1	0	589	0	0	0	0	0	593
Total	0	0	0	0	0	9	9	0	0	18	5	2050	1	0	2056	0	5	0	0	5	2079
05:00 PM	0	0	0	0	0	3	1	0	0	4	0	548	0	0	548	0	2	0	0	2	554
05:15 PM	0	0	0	0	0	4	1	0	0	5	0	597	0	0	597	0	0	0	0	0	602
05:30 PM	0	0	0	0	0	1	0	0	0	1	0	619	0	0	619	0	0	0	0	0	620
05:45 PM	0	0	0	0	0	4	3	0	0	7	0	574	0	0	574	0	0	0	0	0	581
Total	0	0	0	0	0	12	5	0	0	17	0	2338	0	0	2338	0	2	0	0	2	2357
Grand Total	0	0	0	0	0	21	14	0	0	35	5	4388	1	0	4394	0	7	0	0	7	4436
Apprch %	0.0	0.0	0.0	0.0		60.0	40.0	0.0	0.0		0.1	99.9	0.0	0.0		0.0	100.0	0.0	0.0		
Total %	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.8	0.1	98.9	0.0	0.0	99.1	0.0	0.2	0.0	0.0	0.2	

	Southbound					DEUTZ RD Westbound					I-101 NB Northbound					DEUTZ RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	0	0	0	0	0	10	4	0	0	14	0	2352	1	0	2353	0	2	0	0	2	2369
Percent	0.0	0.0	0.0	0.0		71.4	28.6	0.0	0.0		0.0	100.0	0.0	0.0		0.0	100.0	0.0	0.0		
05:30 Volume	0	0	0	0	0	1	0	0	0	1	0	619	0	0	619	0	0	0	0	0	620
Peak Factor																					0.955
High Int.	3:45:00 PM					05:15 PM					05:30 PM					05:00 PM					
Volume	0	0	0	0	0	4	1	0	0	5	0	619	0	0	619	0	2	0	0	2	
Peak Factor										0.700					0.950					0.250	

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Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	0	0	0	0	0	0	1	0	0	1	0	449	1	0	450	0	0	0	0	0	451
07:15 AM	0	0	0	0	0	0	0	0	0	0	1	499	0	0	500	0	0	0	0	0	500
07:30 AM	0	0	0	0	0	0	0	0	0	0	1	521	0	0	522	0	0	1	0	1	523
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	548	3	0	551	0	0	0	0	0	551
Total	0	0	0	0	0	0	1	0	0	1	2	2017	4	0	2023	0	0	1	0	1	2025
08:00 AM	0	0	0	0	0	1	0	0	0	1	1	538	1	0	540	0	0	0	0	0	541
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	459	0	0	459	0	0	2	0	2	461
08:30 AM	0	0	0	0	0	0	0	0	0	0	1	489	0	0	490	0	0	0	0	0	490
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	495	0	0	495	0	0	0	0	0	495
Total	0	0	0	0	0	1	0	0	0	1	2	1981	1	0	1984	0	0	2	0	2	1987
Grand Total	0	0	0	0	0	1	1	0	0	2	4	3998	5	0	4007	0	0	3	0	3	4012
Apprch %	0.0	0.0	0.0	0.0		50.0	50.0	0.0	0.0		0.1	99.8	0.1	0.0		0.0	0.0	100.0	0.0		
Total %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	99.7	0.1	0.0	99.9	0.0	0.0	0.1	0.0	0.1	

	Southbound					DEUTZ RD Westbound					I-101 NB Northbound					DEUTZ RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	0	0	0	0	0	1	0	0	0	1	3	2106	4	0	2113	0	0	1	0	1	2115
Percent	0.0	0.0	0.0	0.0		100.0	0.0	0.0	0.0		0.1	99.7	0.2	0.0		0.0	0.0	100.0	0.0		
07:45 Volume	0	0	0	0	0	0	0	0	0	0	0	548	3	0	551	0	0	0	0	0	551
Peak Factor																					0.960
High Int.	6:45:00 AM					08:00 AM					07:45 AM					07:30 AM					
Volume	0	0	0	0	0	1	0	0	0	1	0	548	3	0	551	0	0	1	0	1	
Peak Factor										0.250					0.959					0.250	

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Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	0	659	3	0	662	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	662
04:15 PM	0	656	0	0	656	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	656
04:30 PM	0	744	2	0	746	0	0	8	0	8	0	0	0	0	0	0	0	0	0	0	754
04:45 PM	0	786	0	0	786	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	789
Total	0	2845	5	0	2850	0	0	11	0	11	0	0	0	0	0	0	0	0	0	0	2861
05:00 PM	0	970	2	0	972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	972
05:15 PM	0	797	0	0	797	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	798
05:30 PM	0	793	0	0	793	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	793
05:45 PM	0	545	0	0	545	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	548
Total	0	3105	2	0	3107	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	3111
Grand Total	0	5950	7	0	5957	0	0	15	0	15	0	0	0	0	0	0	0	0	0	0	5972
Apprch %	0.0	99.9	0.1	0.0		0.0	0.0	100.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		
Total %	0.0	99.6	0.1	0.0	99.7	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

	I-101 SB Southbound					DEUTZ RD Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	0	3346	2	0	3348	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	3352
Percent	0.0	99.9	0.1	0.0		0.0	0.0	100.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		
05:00 Volume	0	970	2	0	972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	972
Peak Factor																					0.862
High Int.	05:00 PM					04:45 PM					3:45:00 PM					3:45:00 PM					
Volume	0	970	2	0	972	0	0	3	0	3											
Peak Factor					0.861					0.333											

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Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	0	317	0	0	317	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	319
07:15 AM	0	408	0	0	408	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	408
07:30 AM	0	551	1	0	552	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	552
07:45 AM	0	504	0	0	504	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	507
Total	0	1780	1	0	1781	0	0	5	0	5	0	0	0	0	0	0	0	0	0	0	1786
08:00 AM	0	484	0	0	484	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	485
08:15 AM	0	505	2	0	507	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	507
08:30 AM	0	399	0	0	399	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	399
08:45 AM	0	455	0	0	455	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	455
Total	0	1843	2	0	1845	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1846
Grand Total	0	3623	3	0	3626	0	0	6	0	6	0	0	0	0	0	0	0	0	0	0	3632
Apprch %	0.0	99.9	0.1	0.0		0.0	0.0	100.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		
Total %	0.0	99.8	0.1	0.0	99.8	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

	I-101 SB Southbound					DEUTZ RD Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	0	2044	3	0	2047	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	2051
Percent	0.0	99.9	0.1	0.0		0.0	0.0	100.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		
07:30 Volume	0	551	1	0	552	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	552
Peak Factor																					0.929
High Int.	07:30 AM					07:45 AM					6:45:00 AM					6:45:00 AM					
Volume	0	551	1	0	552	0	0	3	0	3											
Peak Factor					0.927					0.333											

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Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	8	0	0	0	8	0	0	0	0	0	0	1	4	0	5	1	0	6	0	7	20
04:15 PM	8	0	0	0	8	0	0	0	0	0	0	0	3	0	3	2	0	6	0	8	19
04:30 PM	1	0	0	0	1	0	0	0	0	0	0	0	4	0	4	5	0	12	0	17	22
04:45 PM	5	0	0	0	5	0	0	0	0	0	0	0	2	0	2	4	0	7	0	11	18
Total	22	0	0	0	22	0	0	0	0	0	0	1	13	0	14	12	0	31	0	43	79
05:00 PM	7	0	0	0	7	0	0	0	0	0	0	0	4	0	4	6	0	8	0	14	25
05:15 PM	6	0	0	0	6	0	0	0	0	0	0	0	1	0	1	9	0	9	0	18	25
05:30 PM	2	0	0	0	2	0	0	0	0	0	0	0	2	0	2	2	0	12	0	14	18
05:45 PM	5	1	0	0	6	0	0	0	0	0	0	0	2	0	2	2	0	6	0	8	16
Total	20	1	0	0	21	0	0	0	0	0	0	0	9	0	9	19	0	35	0	54	84
Grand Total	42	1	0	0	43	0	0	0	0	0	0	1	22	0	23	31	0	66	0	97	163
Apprch %	97.7	2.3	0.0	0.0		0.0	0.0	0.0	0.0		0.0	4.3	95.7	0.0		32.0	0.0	68.0	0.0		
Total %	25.8	0.6	0.0	0.0	26.4	0.0	0.0	0.0	0.0	0.0	0.0	0.6	13.5	0.0	14.1	19.0	0.0	40.5	0.0	59.5	

	N. DANA FOOTHHILL RD Southbound					Westbound					N. DANA FOOTHHILL RD Northbound					SHEEHY RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:30 PM																				
Volume	19	0	0	0	19	0	0	0	0	0	0	0	11	0	11	24	0	36	0	60	90
Percent	100.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	100.0	0.0		40.0	0.0	60.0	0.0		
05:15 Volume	6	0	0	0	6	0	0	0	0	0	0	0	1	0	1	9	0	9	0	18	25
Peak Factor																					0.900
High Int.	05:00 PM					3:45:00 PM					04:30 PM					05:15 PM					
Volume	7	0	0	0	7	0	0	0	0	0	0	0	4	0	4	9	0	9	0	18	
Peak Factor					0.679										0.688					0.833	

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Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	7	1	0	0	8	0	0	0	0	0	0	0	4	0	4	0	0	6	0	6	18
07:15 AM	6	0	0	0	6	0	0	0	0	0	0	0	2	0	2	4	0	3	0	7	15
07:30 AM	2	0	0	0	2	0	0	0	0	0	0	0	4	0	4	0	0	1	0	1	7
07:45 AM	8	0	0	0	8	0	0	0	0	0	0	0	7	0	7	3	0	2	0	5	20
Total	23	1	0	0	24	0	0	0	0	0	0	0	17	0	17	7	0	12	0	19	60
08:00 AM	11	0	0	0	11	0	0	0	0	0	0	0	4	0	4	1	0	5	0	6	21
08:15 AM	7	1	0	0	8	0	0	0	0	0	0	0	9	0	9	0	0	4	0	4	21
08:30 AM	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3	10
08:45 AM	5	1	0	0	6	0	0	0	0	0	0	0	7	0	7	3	0	4	0	7	20
Total	30	2	0	0	32	0	0	0	0	0	0	0	20	0	20	5	0	15	0	20	72
Grand Total	53	3	0	0	56	0	0	0	0	0	0	0	37	0	37	12	0	27	0	39	132
Apprch %	94.6	5.4	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	100.0	0.0		30.8	0.0	69.2	0.0		
Total %	40.2	2.3	0.0	0.0	42.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.0	0.0	28.0	9.1	0.0	20.5	0.0	29.5	

	N. DANA FOOTHILL RD Southbound					Westbound					N. DANA FOOTHILL RD Northbound					SHEEHY RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Intersection	07:45 AM																				
Volume	33	1	0	0	34	0	0	0	0	0	0	0	20	0	20	5	0	13	0	18	72
Percent	97.1	2.9	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	100.0	0.0		27.8	0.0	72.2	0.0		
08:15 Volume	7	1	0	0	8	0	0	0	0	0	0	0	9	0	9	0	0	4	0	4	21
Peak Factor																					0.857
High Int.	08:00 AM					6:45:00 AM					08:15 AM					08:00 AM					
Volume	11	0	0	0	11	0	0	0	0	0	0	0	9	0	9	1	0	5	0	6	
Peak Factor					0.773										0.556					0.750	

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	N. THOMPSON RD Southbound					SHEEHY RD Westbound					N. THOMPSON RD Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	0	39	12	0	51	13	0	3	0	16	0	24	0	0	24	0	0	0	0	0	91
04:15 PM	0	45	13	0	58	11	0	5	0	16	7	29	0	0	36	0	0	0	0	0	110
04:30 PM	0	35	16	0	51	3	0	8	0	11	3	30	0	0	33	0	0	0	0	0	95
04:45 PM	0	42	7	0	49	7	0	4	0	11	6	16	0	0	22	0	0	0	0	0	82
Total	0	161	48	0	209	34	0	20	0	54	16	99	0	0	115	0	0	0	0	0	378
05:00 PM	0	38	12	0	50	9	0	6	0	15	1	47	0	0	48	0	0	0	0	0	113
05:15 PM	0	32	20	0	52	5	0	2	0	7	5	31	0	0	36	0	0	0	0	0	95
05:30 PM	0	46	15	0	61	5	0	2	0	7	6	26	0	0	32	0	0	0	0	0	100
05:45 PM	0	44	9	0	53	6	0	4	0	10	1	15	0	0	16	0	0	0	0	0	79
Total	0	160	56	0	216	25	0	14	0	39	13	119	0	0	132	0	0	0	0	0	387
Grand Total	0	321	104	0	425	59	0	34	0	93	29	218	0	0	247	0	0	0	0	0	765
Apprch %	0.0	75.5	24.5	0.0		63.4	0.0	36.6	0.0		11.7	88.3	0.0	0.0		0.0	0.0	0.0	0.0		
Total %	0.0	42.0	13.6	0.0	55.6	7.7	0.0	4.4	0.0	12.2	3.8	28.5	0.0	0.0	32.3	0.0	0.0	0.0	0.0	0.0	

	N. THOMPSON RD Southbound					SHEEHY RD Westbound					N. THOMPSON RD Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	0	160	48	0	208	30	0	23	0	53	17	122	0	0	139	0	0	0	0	0	400
Percent	0.0	76.9	23.1	0.0		56.6	0.0	43.4	0.0		12.2	87.8	0.0	0.0		0.0	0.0	0.0	0.0		
05:00 Volume	0	38	12	0	50	9	0	6	0	15	1	47	0	0	48	0	0	0	0	0	113
Peak Factor																					0.885
High Int.	04:15 PM					04:15 PM					05:00 PM					3:45:00 PM					
Volume	0	45	13	0	58	11	0	5	0	16	1	47	0	0	48						
Peak Factor					0.897					0.828					0.724						

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	N. THOMPSON RD Southbound					SHEEHY RD Westbound					N. THOMPSON RD Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	0	11	11	0	22	15	0	1	0	16	1	18	0	0	19	0	0	0	0	0	57
07:15 AM	0	10	2	0	12	6	0	1	0	7	4	31	0	0	35	0	0	0	0	0	54
07:30 AM	0	11	3	0	14	9	0	2	0	11	0	32	0	0	32	0	0	0	0	0	57
07:45 AM	0	16	5	0	21	16	0	5	0	21	5	35	0	0	40	0	0	0	0	0	82
Total	0	48	21	0	69	46	0	9	0	55	10	116	0	0	126	0	0	0	0	0	250
08:00 AM	0	20	6	0	26	18	0	1	0	19	3	24	0	0	27	0	0	0	0	0	72
08:15 AM	0	19	7	0	26	16	0	3	0	19	2	23	0	0	25	0	0	0	0	0	70
08:30 AM	0	10	5	0	15	7	0	3	0	10	0	25	0	0	25	0	0	0	0	0	50
08:45 AM	0	12	10	0	22	19	0	6	0	25	2	32	0	0	34	0	0	0	0	0	81
Total	0	61	28	0	89	60	0	13	0	73	7	104	0	0	111	0	0	0	0	0	273
Grand Total	0	109	49	0	158	106	0	22	0	128	17	220	0	0	237	0	0	0	0	0	523
Apprch %	0.0	69.0	31.0	0.0		82.8	0.0	17.2	0.0		7.2	92.8	0.0	0.0		0.0	0.0	0.0	0.0		
Total %	0.0	20.8	9.4	0.0	30.2	20.3	0.0	4.2	0.0	24.5	3.3	42.1	0.0	0.0	45.3	0.0	0.0	0.0	0.0	0.0	

	N. THOMPSON RD Southbound					SHEEHY RD Westbound					N. THOMPSON RD Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	0	66	21	0	87	59	0	11	0	70	10	114	0	0	124	0	0	0	0	0	281
Percent	0.0	75.9	24.1	0.0		84.3	0.0	15.7	0.0		8.1	91.9	0.0	0.0		0.0	0.0	0.0	0.0		
07:45 Volume	0	16	5	0	21	16	0	5	0	21	5	35	0	0	40	0	0	0	0	0	82
Peak Factor																					0.857
High Int.	08:00 AM					07:45 AM					07:45 AM					6:45:00 AM					
Volume	0	20	6	0	26	16	0	5	0	21	5	35	0	0	40						
Peak Factor					0.837					0.833					0.775						

Traffic Data Service
Vehicle Counts

VehicleCount-2350 -- English (enu)

Datasets:

Site:	**[2W] WB UPPER LOS BERROS RD N/O SYCAMORE CREEK RD**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	West (bound)
Separation:	All - (Headway)
Name:	Factory default profile
Scheme:	Vehicle classification (Scheme F)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)

* Tuesday, January 03, 2006 - Total=44 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
–	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**0**	**2**	**7**	**3**	**10**	**9**	**5**	**4**	**0**	**1**	**3**	**0**	
–	–	–	–	–	–	–	–	–	–	–	–	0	0	0	1	**2**	0	1	1	0	0	0	0	0
–	–	–	–	–	–	–	–	–	–	–	–	0	0	1	2	**3**	4	2	0	0	1	0	0	0
–	–	–	–	–	–	–	–	–	–	–	–	0	1	1	0	**2**	2	2	3	0	0	3	0	0
–	–	–	–	–	–	–	–	–	–	–	–	0	1	5	0	**3**	3	0	0	0	0	0	0	0

PM Peak 1600 - 1700 (10), PM PHF=0.83

* Wednesday, January 04, 2006 - Total=120, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**0**	**0**	**1**	**1**	**4**	**10**	**6**	**12**	**8**	**7**	**8**	**9**	**8**	**9**	**8**	**3**	**7**	**7**	**5**	**1**	**3**	**3**	**0**	
0	0	0	0	0	2	4	1	**4**	4	3	4	3	1	1	**2**	1	2	3	2	1	1	0	0	0
0	0	0	0	0	1	4	1	**2**	1	2	0	3	1	0	**3**	0	2	2	2	0	2	2	0	0
0	0	0	1	0	0	1	0	**3**	2	1	2	1	2	**4**	3	0	1	2	0	0	0	0	0	0
0	0	0	0	1	1	1	**4**	3	1	1	2	2	4	**4**	0	2	2	0	1	0	0	1	0	0

AM Peak 0745 - 0845 (13), AM PHF=0.81 PM Peak 1430 - 1530 (13), PM PHF=0.81

* Thursday, January 05, 2006 - Total=111, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**1**	**0**	**1**	**0**	**4**	**10**	**8**	**10**	**7**	**7**	**8**	**6**	**8**	**7**	**2**	**7**	**9**	**5**	**4**	**3**	**4**	**0**	**0**	
0	0	0	0	0	3	**4**	2	3	2	2	1	1	1	0	1	3	1	**2**	1	0	3	0	0	0
0	0	0	0	0	1	**3**	1	2	0	1	3	1	3	1	1	0	**3**	0	0	0	1	0	0	0
0	1	0	1	0	0	**1**	3	2	1	1	1	3	3	2	0	4	**4**	3	2	3	0	0	0	0
0	0	0	0	0	0	**2**	2	3	4	3	3	1	1	4	0	0	**1**	0	1	0	0	0	0	0

AM Peak 0600 - 0700 (10), AM PHF=0.63 PM Peak 1715 - 1815 (10), PM PHF=0.63

Traffic Data Service
Vehicle Counts

VehicleCount-2351 -- English (enu)

Datasets:

Site:	**[2E] EB UPPER LOS BERROS RD N/O SYCAMORE CREEK RD**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	East (bound)
Separation:	All - (Headway)
Name:	Factory default profile
Scheme:	Vehicle classification (Scheme F)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)

* Tuesday, January 03, 2006 - Total=81 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
–	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**0**	**4**	**10**	**8**	**16**	**13**	**13**	**7**	**2**	**3**	**5**	**0**	
–	–	–	–	–	–	–	–	–	–	–	–	0	0	2	2	3	**3**	2	2	0	1	1	0	0
–	–	–	–	–	–	–	–	–	–	–	–	0	0	1	2	2	**3**	5	2	2	2	1	0	0
–	–	–	–	–	–	–	–	–	–	–	–	0	3	5	1	**7**	5	1	1	0	0	1	0	1
–	–	–	–	–	–	–	–	–	–	–	–	0	1	2	3	**4**	2	5	2	0	0	2	0	0

PM Peak 1630 - 1730 (17), PM PHF=0.61

* Wednesday, January 04, 2006 - Total=116, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
1	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**3**	**9**	**5**	**8**	**10**	**9**	**9**	**8**	**16**	**9**	**5**	**6**	**8**	**3**	**1**	
0	0	0	0	0	0	1	0	2	1	2	2	**5**	3	1	1	3	**6**	4	0	0	3	1	0	0
0	0	0	0	0	0	0	1	0	1	1	1	**0**	2	3	3	1	**4**	2	2	3	3	0	0	1
1	0	0	0	0	0	0	1	0	1	3	0	**3**	3	3	1	1	**3**	1	2	2	2	0	1	0
0	0	0	0	0	0	1	0	0	0	3	**2**	0	2	2	4	**3**	3	2	1	1	0	2	0	0

AM Peak 1145 - 1245 (10), AM PHF=0.50 PM Peak 1645 - 1745 (16), PM PHF=0.67

* Thursday, January 05, 2006 - Total=106, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
1	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**3**	**6**	**6**	**2**	**4**	**14**	**6**	**10**	**10**	**10**	**17**	**7**	**3**	**2**	**1**	**0**	
0	0	0	0	0	0	0	1	0	2	**4**	0	1	6	2	0	4	4	**2**	2	1	0	0	0	2
1	0	0	0	0	0	0	0	0	**2**	0	0	1	4	1	4	1	1	**8**	3	2	1	1	0	0
0	0	0	0	0	0	0	2	1	**1**	0	1	2	2	2	4	4	2	**4**	2	0	1	0	0	1
0	0	0	0	0	0	0	1	2	**1**	2	1	0	2	1	2	1	**3**	3	0	0	0	0	0	0

AM Peak 0915 - 1015 (8), AM PHF=0.50 PM Peak 1745 - 1845 (17), PM PHF=0.53

Traffic Data Service
Vehicle Counts

VehicleCount-2349 -- English (enu)

Datasets:

Site:	**[1S] SB NORTH DANA FOOTHILL RD BETWEEN RIM ROCK RD AND RIATA LN**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	South (bound)
Separation:	All - (Headway)
Name:	Factory default profile
Scheme:	Vehicle classification (Scheme F)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)

* Tuesday, January 03, 2006 - Total=93 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
–	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**0**	**5**	**10**	**12**	**21**	**17**	**9**	**11**	**1**	**1**	**5**	**1**	
–	–	–	–	–	–	–	–	–	–	–	–	0	0	3	3	**6**	4	3	4	1	0	1	0	0
–	–	–	–	–	–	–	–	–	–	–	–	0	0	1	3	**7**	6	0	2	0	1	0	1	0
–	–	–	–	–	–	–	–	–	–	–	–	0	0	2	3	**2**	1	2	1	0	0	3	0	0
–	–	–	–	–	–	–	–	–	–	–	–	0	5	4	3	**6**	6	4	4	0	0	1	0	0

PM Peak 1600 - 1700 (21), PM PHF=0.75

* Wednesday, January 04, 2006 - Total=226, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	**0**	**0**	**1**	**1**	**4**	**15**	**12**	**28**	**12**	**13**	**13**	**15**	**14**	**13**	**20**	**10**	**19**	**15**	**10**	**1**	**6**	**3**	**1**	
0	0	0	0	0	2	3	4	**11**	2	3	6	6	1	0	**1**	1	7	4	5	1	1	0	1	0
0	0	0	0	0	1	6	4	**7**	5	4	2	4	3	3	**4**	3	5	4	3	0	3	3	0	0
0	0	0	1	0	0	5	1	**6**	3	2	2	3	4	6	**7**	3	4	5	1	0	2	0	0	2
0	0	0	0	1	1	1	3	**4**	2	4	3	2	6	4	**8**	3	3	2	1	0	0	0	0	0

AM Peak 0800 - 0900 (28), AM PHF=0.64 PM Peak 1500 - 1600 (20), PM PHF=0.63

* Thursday, January 05, 2006 - Total=214, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
2	**2**	**1**	**1**	**0**	**4**	**13**	**18**	**17**	**9**	**9**	**18**	**16**	**6**	**20**	**13**	**14**	**25**	**6**	**4**	**6**	**7**	**1**	**2**	
0	0	0	0	0	3	3	4	**7**	2	3	4	5	0	2	3	5	**10**	3	1	3	4	0	1	1
0	1	0	0	0	1	6	**4**	2	0	1	6	4	2	5	1	3	**4**	0	1	0	1	0	1	0
2	1	1	1	0	0	1	**5**	3	2	2	3	3	3	5	3	4	**7**	3	2	3	1	0	0	0
0	0	0	0	0	0	3	**5**	5	5	3	5	4	1	8	6	2	**4**	0	0	0	1	1	0	0

AM Peak 0715 - 0815 (21), AM PHF=0.75 PM Peak 1700 - 1800 (25), PM PHF=0.63

Traffic Data Service
Vehicle Counts

VehicleCount-2348 -- English (enu)

Datasets:

Site:	**[1N] NB NORTH DANA FOOTHILL RD BETWEEN RIM ROCK RD AND RIATA LN**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	North (bound)
Separation:	All - (Headway)
Name:	Factory default profile
Scheme:	Vehicle classification (Scheme F)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)

* Tuesday, January 03, 2006 - Total=130 (Incomplete) , 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2300	2300	
–	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**0**	**4**	**16**	**13**	**22**	**24**	**18**	**16**	**5**	**4**	**8**	**0**	
–	–	–	–	–	–	–	–	–	–	–	–	0	0	3	4	4	**7**	3	9	1	1	3	0	0
–	–	–	–	–	–	–	–	–	–	–	–	0	0	3	3	5	**8**	5	2	3	3	1	0	0
–	–	–	–	–	–	–	–	–	–	–	–	0	0	6	2	**10**	6	4	3	0	0	1	0	1
–	–	–	–	–	–	–	–	–	–	–	–	0	4	4	4	**3**	3	6	2	1	0	3	0	0

PM Peak 1630 - 1730 (28), PM PHF=0.70

* Wednesday, January 04, 2006 - Total=225, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2300	2300	
1	**0**	**0**	**0**	**0**	**0**	**8**	**11**	**7**	**6**	**13**	**13**	**10**	**18**	**20**	**13**	**24**	**29**	**17**	**7**	**11**	**9**	**6**	**2**	
0	0	0	0	0	0	1	**5**	2	1	4	3	3	7	4	2	6	3	**7**	1	2	3	4	0	1
0	0	0	0	0	0	0	**4**	4	1	1	3	3	5	6	3	4	**9**	4	3	4	4	0	0	1
1	0	0	0	0	0	**4**	1	1	4	5	2	4	3	6	3	4	**10**	2	2	2	2	0	2	0
0	0	0	0	0	0	**3**	1	0	0	3	5	0	3	4	5	10	**7**	4	1	3	0	2	0	0

AM Peak 0630 - 0730 (16), AM PHF=0.80 PM Peak 1715 - 1815 (33), PM PHF=0.82

* Thursday, January 05, 2006 - Total=210, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2300	2300	
2	**0**	**1**	**0**	**0**	**0**	**6**	**10**	**8**	**17**	**8**	**9**	**11**	**19**	**9**	**24**	**17**	**22**	**23**	**7**	**6**	**7**	**3**	**1**	
1	0	0	0	0	0	0	2	0	**4**	3	1	3	5	3	1	5	4	**2**	1	3	2	0	0	4
1	0	1	0	0	0	1	5	0	**5**	0	2	1	7	3	12	2	2	**13**	4	3	2	1	0	0
0	0	0	0	0	0	1	1	3	**5**	0	3	4	3	2	5	5	**10**	4	2	0	2	2	1	1
0	0	0	0	0	0	4	2	**5**	3	5	3	3	4	1	6	5	**6**	4	0	0	1	0	0	2

AM Peak 0845 - 0945 (19), AM PHF=0.95 PM Peak 1730 - 1830 (31), PM PHF=0.60

EXISTING LEVEL OF SERVICE CALCULATION WORKSHEETS

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	4	1	2258	2	3	1840
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	5	1	2656	2	4	2165
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	5					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3747	1329			2659	
vC1, stage 1 conf vol	2658					
vC2, stage 2 conf vol	1089					
vCu, unblocked vol	3747	1329			2659	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	99			98	
cM capacity (veh/h)	39	145			155	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	5	1	1771	888	4	1082	1082
Volume Left	5	0	0	0	4	0	0
Volume Right	0	1	0	2	0	0	0
cSH	39	145	1700	1700	155	1700	1700
Volume to Capacity	0.12	0.01	1.04	0.52	0.02	0.64	0.64
Queue Length 95th (ft)	10	1	0	0	2	0	0
Control Delay (s)	111.1	30.0	0.0	0.0	28.8	0.0	0.0
Lane LOS	F	D			D		
Approach Delay (s)	94.9		0.0		0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	243	196	55	290	0	0	0	0	100	1	55
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	286	231	65	341	0	0	0	0	118	1	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												1
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	341			516			905	872	401	872	987	341
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	341			516			905	872	401	872	987	341
tC, single (s)	4.1			4.1			7.1	6.5	6.2	*6.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	100	62	99	91
cM capacity (veh/h)	1218			1049			222	271	649	308	232	701

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	516	406	184
Volume Left	0	65	118
Volume Right	231	0	65
cSH	1700	1049	428
Volume to Capacity	0.30	0.06	0.43
Queue Length 95th (ft)	0	5	53
Control Delay (s)	0.0	1.9	19.6
Lane LOS		A	C
Approach Delay (s)	0.0	1.9	19.6
Approach LOS			C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	103	237	0	0	198	133	143	6	44	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	121	279	0	0	233	156	168	7	52	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									1			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	389			279			832	911	279	862	832	311
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389			279			832	911	279	862	832	311
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			46	97	93	100	100	100
cM capacity (veh/h)	1169			1284			313	246	760	231	273	729

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	400	389	227
Volume Left	121	0	168
Volume Right	0	156	52
cSH	1169	1700	380
Volume to Capacity	0.10	0.23	0.60
Queue Length 95th (ft)	9	0	93
Control Delay (s)	3.3	0.0	27.5
Lane LOS	A		D
Approach Delay (s)	3.3	0.0	27.5
Approach LOS			D

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	21	66	114	10	11	59
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	25	78	134	12	13	69
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	146				267	140
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	146				267	140
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	92
cM capacity (veh/h)	1436				710	908

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	102	146	82
Volume Left	25	0	13
Volume Right	0	12	69
cSH	1436	1700	870
Volume to Capacity	0.02	0.09	0.09
Queue Length 95th (ft)	1	0	8
Control Delay (s)	1.9	0.0	9.6
Lane LOS	A		A
Approach Delay (s)	1.9	0.0	9.6
Approach LOS			A

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	25.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1	38	24	0	12	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	45	28	0	14	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			46		80	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			46		80	24
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	100
cM capacity (veh/h)			1562		906	1053

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	46	28	19
Volume Left	0	28	14
Volume Right	45	0	5
cSH	1700	1562	939
Volume to Capacity	0.03	0.02	0.02
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	7.3	8.9
Lane LOS		A	A
Approach Delay (s)	0.0	7.3	8.9
Approach LOS			A

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	11	11	2385	1	4	2903
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	13	13	2806	1	5	3415
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	5					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4524	1404			2807	
vC1, stage 1 conf vol	2806					
vC2, stage 2 conf vol	1717					
vCu, unblocked vol	4524	1404			2807	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	59	90			97	
cM capacity (veh/h)	32	129			135	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	13	13	1871	936	5	1708	1708
Volume Left	13	0	0	0	5	0	0
Volume Right	0	13	0	1	0	0	0
cSH	32	129	1700	1700	135	1700	1700
Volume to Capacity	0.41	0.10	1.10	0.55	0.03	1.00	1.00
Queue Length 95th (ft)	33	8	0	0	3	0	0
Control Delay (s)	182.9	35.9	0.0	0.0	32.6	0.0	0.0
Lane LOS	F	E			D		
Approach Delay (s)	109.4		0.0		0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	107	233	40	245	0	0	0	0	216	1	79
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	126	274	47	288	0	0	0	0	254	1	93
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												1
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	288			400			692	645	263	645	782	288
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	288			400			692	645	263	645	782	288
tC, single (s)	4.1			4.1			7.1	6.5	6.2	*6.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	100	40	100	88
cM capacity (veh/h)	1274			1159			303	375	776	424	312	751

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	400	335	348
Volume Left	0	47	254
Volume Right	274	0	93
cSH	1700	1159	512
Volume to Capacity	0.24	0.04	0.68
Queue Length 95th (ft)	0	3	127
Control Delay (s)	0.0	1.5	25.6
Lane LOS		A	D
Approach Delay (s)	0.0	1.5	25.6
Approach LOS			D

Intersection Summary			
Average Delay		8.7	
Intersection Capacity Utilization		57.1%	ICU Level of Service B
Analysis Period (min)		15	

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	54	269	0	0	87	47	176	1	22	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	64	316	0	0	102	55	207	1	26	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									1			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	158			316			574	601	316	587	574	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	158			316			574	601	316	587	574	130
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			56	100	96	100	100	100
cM capacity (veh/h)	1422			1244			466	396	724	391	410	920

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	380	158	234
Volume Left	64	0	207
Volume Right	0	55	26
cSH	1422	1700	504
Volume to Capacity	0.04	0.09	0.46
Queue Length 95th (ft)	4	0	61
Control Delay (s)	1.6	0.0	18.2
Lane LOS	A		C
Approach Delay (s)	1.6	0.0	18.2
Approach LOS			C

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	55	147	124	15	20	24
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	65	173	146	18	24	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	164				457	155
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	164				457	155
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				96	97
cM capacity (veh/h)	1415				536	891

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	238	164	52
Volume Left	65	0	24
Volume Right	0	18	28
cSH	1415	1700	685
Volume to Capacity	0.05	0.10	0.08
Queue Length 95th (ft)	4	0	6
Control Delay (s)	2.4	0.0	10.7
Lane LOS	A		B
Approach Delay (s)	2.4	0.0	10.7
Approach LOS			B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	19	11	0	24	36
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	22	13	0	28	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			22		37	11
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			22		37	11
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	96
cM capacity (veh/h)			1593		967	1070

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	22	13	71
Volume Left	0	13	28
Volume Right	22	0	42
cSH	1700	1593	1026
Volume to Capacity	0.01	0.01	0.07
Queue Length 95th (ft)	0	1	6
Control Delay (s)	0.0	7.3	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	7.3	8.8
Approach LOS			A

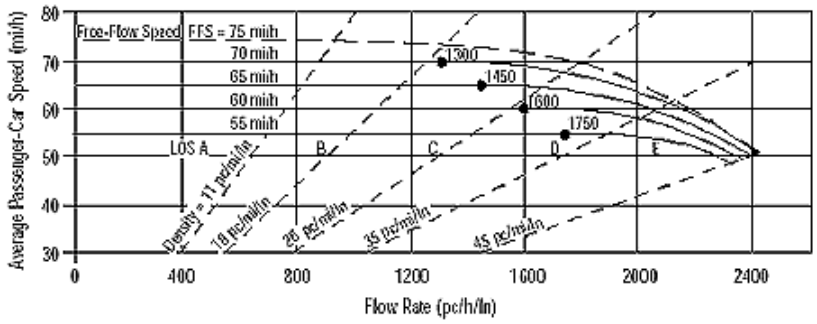
Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		

EXISTING FREEWAY ANALYSIS

CALCULATION WORKSHEETS

FEHR & PEERS
TRANSPORTATION CONSULTANTS

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 SB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*AM*	Analysis Year	*2005*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*1926*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1138*	pc/h/ln	Design LOS	
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*17.5*	pc/mi/ln	S	mi/h
LOS	*B*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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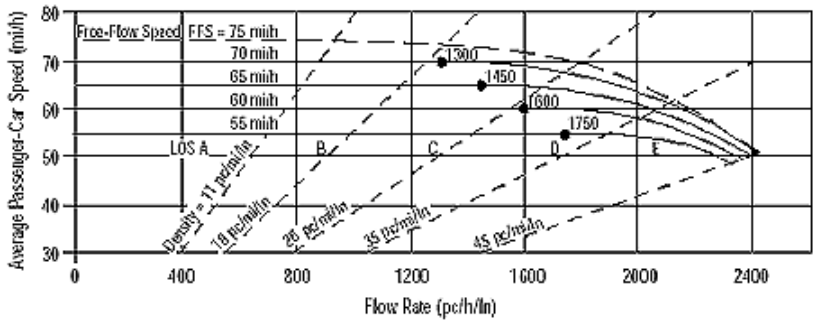
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 NB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*AM*	Analysis Year	*2005*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*2210*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1306*	pc/h/ln	Design LOS	
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*20.1*	pc/mi/ln	S	mi/h
LOS	*C*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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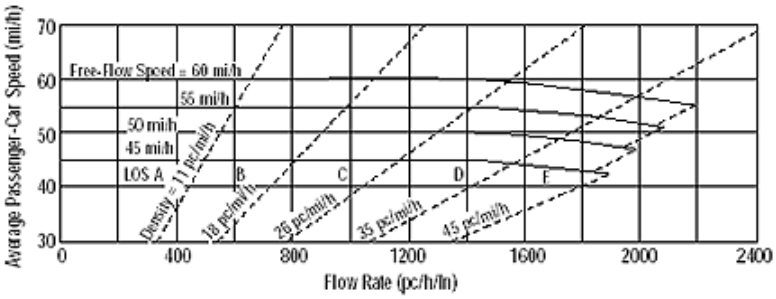
MULTILANE HIGHWAYS WORKSHEET(Direction 2)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	AM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	1840	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1087
Speed, S (mi/h)	60.0
D (pc/mi/ln)	18.1
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

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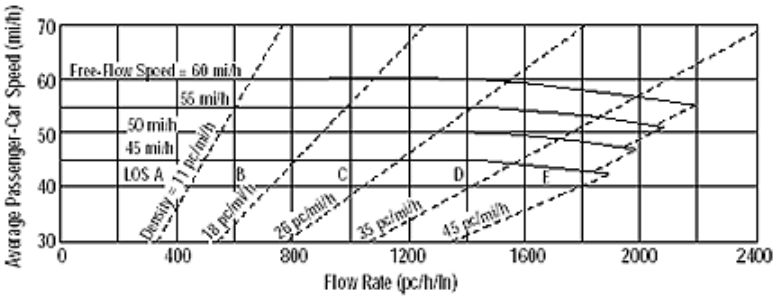
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	AM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2258	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1334
Speed, S (mi/h)	60.0
D (pc/mi/ln)	22.2
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Joe Fernandez	Freeway/Dir of Travel	Highway 101 SB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	1/27/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	1840	0.88	Level	8	0	0.962	1.00	2175
Ramp	156	0.88	Level	8	0	0.962	1.00	184
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge Areas)

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

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

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

V_{12}= pc/h

Estimation of v_{12} (Diverge Areas)

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 2175 pc/h

Capacity Checks (Merge Areas)

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Capacity Checks (Diverge Areas)

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2175	4700	No
V_{12}	2175	4400:All	No
$V_{FO} = V_F - V_R$	1991	4700	No
V_R	184	2100	No

Level of Service Determination (if not F) (Merge Areas)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Level of Service Determination (if not F) (Diverge Areas)

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

D_R = 21.6 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation (Merge Areas)

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Speed Estimation (Diverge Areas)

D_s = 0.315 (Exhibit 25-19)

S_R= 57.8 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.8 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101 NB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2210	0.88	Level	8	0	0.962	1.00	2612
Ramp	194	0.88	Level	8	0	0.962	1.00	229
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 2612 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2612	4700	No
V_{12}	2612	4400:All	No
$V_{FO} = V_F - V_R$	2383	4700	No
V_R	229	2100	No

Level of Service Determination (if not F)

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

D_R = 25.4 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.319 (Exhibit 25-19)

S_R= 57.7 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.7 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101
Agency or Company	Fehr & Peers	Junction	NB Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2016	0.88	Level	8	0	0.962	1.00	2383
Ramp	242	0.88	Level	8	0	0.962	1.00	286
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 2383 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	2669	See Exhibit 25-7	No
V_{R12}	2669	4600:All	No

Level of Service Determination (if not F)

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

D_R = 22.4 (pc/ m/ln)

LOS = C (Exhibit 25-4)

Speed Estimation

M_S = 0.323 (Exibit 25-19)

S_R= 57.6 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 57.6 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Onramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	1684	0.88	Level	8	0	0.962	1.00	1990
Ramp	252	0.88	Level	8	0	0.962	1.00	298
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 1990 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	2288	See Exhibit 25-7	No
V_{R12}	2288	4600:All	No

Level of Service Determination (if not F)

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

D_R = 19.4 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.305 (Exibit 25-19)

S_R= 58.0 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 58.0 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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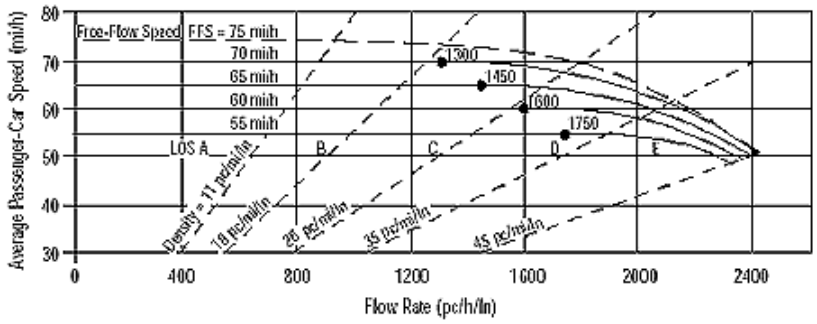
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 SB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*PM*	Analysis Year	*2005*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*2881*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1702*	pc/h/ln	Design LOS	
S	*64.5*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*26.4*	pc/mi/ln	S	mi/h
LOS	*D*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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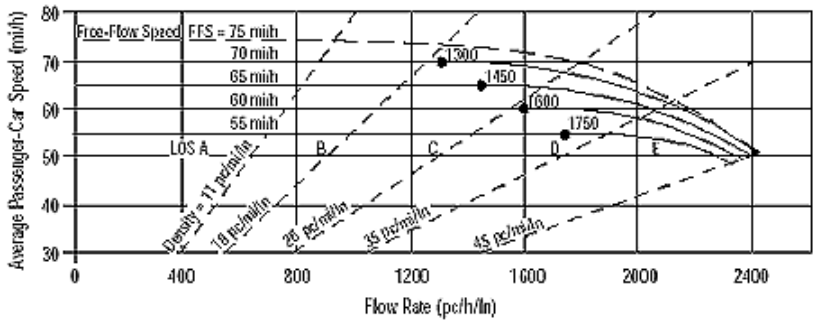
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 NB*
Agency or Company	*Fehr & Peers*	From/To	*North of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*PM*	Analysis Year	*2005*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*2482*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1467*	pc/h/ln	Design LOS	
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*22.6*	pc/mi/ln	S	mi/h
LOS	*C*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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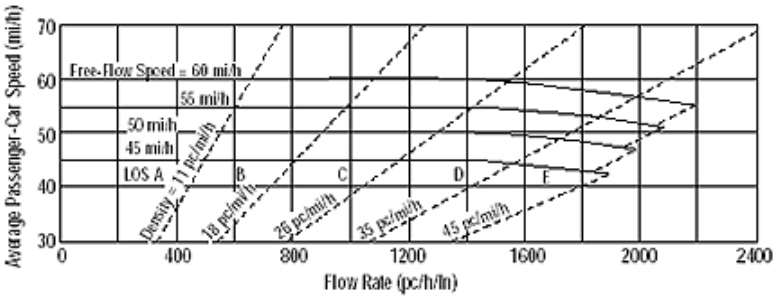
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	PM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2385	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1409
Speed, S (mi/h)	60.0
D (pc/mi/ln)	23.5
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

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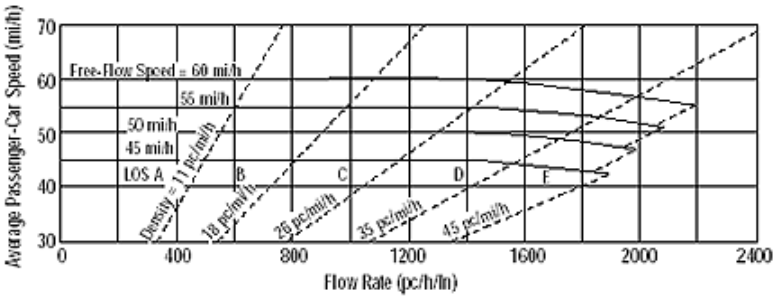
MULTILANE HIGHWAYS WORKSHEET(Direction 2)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	PM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2903	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1715
Speed, S (mi/h)	58.5
D (pc/mi/ln)	29.3
LOS	D

Design

Design (N)

Required Number of Lanes, N

Flow Rate, v_p (pc/h)

Max Service Flow Rate (pc/h/ln)

Design LOS

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 NB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2482	0.88	Level	8	0	0.962	1.00	2933
Ramp	199	0.88	Level	8	0	0.962	1.00	235
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 2933 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2933	4700	No
V_{12}	2933	4400:All	No
$V_{FO} = V_F - V_R$	2698	4700	No
V_R	235	2100	No

Level of Service Determination (if not F)

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

D_R = 28.1 (pc/ mi /ln)

LOS= D (Exhibit 25-4)

Speed Estimation

D_s = 0.319 (Exhibit 25-19)

S_R= 57.7 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.7 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Joe Fernandez	Freeway/Dir of Travel	Highway 101 SB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	1/27/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2903	0.88	Level	8	0	0.962	1.00	3431
Ramp	296	0.88	Level	8	0	0.962	1.00	350
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 3431 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3431	4700	No
V_{12}	3431	4400:All	No
$V_{FO} = V_F - V_R$	3081	4700	No
V_R	350	2100	No

Level of Service Determination (if not F)

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

D_R = 32.4 (pc/ mi /ln)

LOS= D (Exhibit 25-4)

Speed Estimation

D_s = 0.329 (Exhibit 25-19)

S_R= 57.4 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.4 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101
Agency or Company	Fehr & Peers	Junction	NB Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2283	0.88	Level	8	0	0.962	1.00	2698
Ramp	102	0.88	Level	8	0	0.962	1.00	121
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 2698 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	2819	See Exhibit 25-7	No
V_{R12}	2819	4600:All	No

Level of Service Determination (if not F)

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

D_R = 23.6 (pc/ m/ln)

LOS = C (Exhibit 25-4)

Speed Estimation

M_S = 0.332 (Exibit 25-19)

S_R= 57.4 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 57.4 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Onramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2607	0.88	Level	8	0	0.962	1.00	3081
Ramp	274	0.88	Level	8	0	0.962	1.00	324
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 3081 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3405	See Exhibit 25-7	No
V_{R12}	3405	4600:All	No

Level of Service Determination (if not F)

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

D_R = 28.1 (pc/ m/ln)

LOS = D (Exhibit 25-4)

Speed Estimation

M_S = 0.384 (Exibit 25-19)

S_R= 56.2 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 56.2 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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DETAILED TRIP GENERATION TABLE

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Table 1
Laetitia Agricultural Cluster Trip Generation

Land Use	Weekday Daily Trips	AM Peak			PM Peak		
		In	Out	Total	In	Out	Total
Single Family Homes (101 Units)[a]	1,049	20	60	80	68	40	108
Resort Hotel (75 Lodging Units)[b, c]	185	20	8	28	16	21	37
Net New Trips	***1,234***	***40***	***68***	***108***	***84***	***61***	***145***

Notes:

a. Trip generation for residential units determined from fitted curve equations for Single Family Residences (Land Use 210) in ITE's *Trip Generation* (7th Edition), as presented below:

Single Family Homes:

Daily Equation: Ln(T) = 0.92 Ln(X) + 2.71 (inbound = 50 percent, outbound = 50 percent)

AM Equation: T = 0.70(X) + 9.43 (inbound = 25 percent, outbound = 75 percent)

PM Equation: Ln (T) = 0.90 Ln(X) + 0.53 (inbound = 67 percent, outbound = 33 percent)

Where: T = trip ends, LN = logarithmic equation, and X = number of dwelling units.

b. Trip generation for dude ranch determined from average rates for Resort Hotel (Land Use 330) in ITE's *Trip Generation* (7th Edition)

c. Daily trips for the resort hotel are assumed to be five times the PM peak hour trips

Source: ITE; Fehr & Peers, 2005.

EXISTING WITH PROJECT LEVEL OF SERVICE CALCULATION WORKSHEETS

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	4	1	2295	2	3	1862
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	5	1	2700	2	4	2191
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	5					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3804	1351			2702	
vC1, stage 1 conf vol	2701					
vC2, stage 2 conf vol	1102					
vCu, unblocked vol	3804	1351			2702	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	99			98	
cM capacity (veh/h)	36	140			149	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	5	1	1800	902	4	1095	1095
Volume Left	5	0	0	0	4	0	0
Volume Right	0	1	0	2	0	0	0
cSH	36	140	1700	1700	149	1700	1700
Volume to Capacity	0.13	0.01	1.06	0.53	0.02	0.64	0.64
Queue Length 95th (ft)	10	1	0	0	2	0	0
Control Delay (s)	118.3	30.9	0.0	0.0	29.8	0.0	0.0
Lane LOS	F	D			D		
Approach Delay (s)	100.8		0.0		0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	245	196	79	293	0	0	0	0	122	1	55
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	288	231	93	345	0	0	0	0	144	1	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												1
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	345			519			967	934	404	934	1049	345
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	345			519			967	934	404	934	1049	345
tC, single (s)	4.1			4.1			7.1	6.5	6.2	*6.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			91			100	100	100	48	99	91
cM capacity (veh/h)	1214			1047			197	242	647	276	207	698

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	519	438	209
Volume Left	0	93	144
Volume Right	231	0	65
cSH	1700	1047	369
Volume to Capacity	0.31	0.09	0.57
Queue Length 95th (ft)	0	7	84
Control Delay (s)	0.0	2.6	26.8
Lane LOS		A	D
Approach Delay (s)	0.0	2.6	26.8
Approach LOS			D

Intersection Summary			
Average Delay		5.8	
Intersection Capacity Utilization		61.5%	ICU Level of Service B
Analysis Period (min)		15	

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	103	261	0	0	225	170	143	6	58	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	121	307	0	0	265	200	168	7	68	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									1			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	465			307			914	1014	307	952	914	365
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	465			307			914	1014	307	952	914	365
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			40	97	91	100	100	100
cM capacity (veh/h)	1097			1254			279	212	733	194	243	680

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	428	465	244
Volume Left	121	0	168
Volume Right	0	200	68
cSH	1097	1700	350
Volume to Capacity	0.11	0.27	0.69
Queue Length 95th (ft)	9	0	124
Control Delay (s)	3.3	0.0	35.6
Lane LOS	A		E
Approach Delay (s)	3.3	0.0	35.6
Approach LOS			E

Intersection Summary			
Average Delay	8.9		
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	59	66	114	12	14	124
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	69	78	134	14	16	146
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	148				358	141
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	148				358	141
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				97	84
cM capacity (veh/h)	1433				610	907

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	147	148	162
Volume Left	69	0	16
Volume Right	0	14	146
cSH	1433	1700	864
Volume to Capacity	0.05	0.09	0.19
Queue Length 95th (ft)	4	0	17
Control Delay (s)	3.8	0.0	10.1
Lane LOS	A		B
Approach Delay (s)	3.8	0.0	10.1
Approach LOS			B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1	106	24	0	52	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	125	28	0	61	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			126		120	64
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			126		120	64
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		93	100
cM capacity (veh/h)			1461		859	1001

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	126	28	66
Volume Left	0	28	61
Volume Right	125	0	5
cSH	1700	1461	867
Volume to Capacity	0.07	0.02	0.08
Queue Length 95th (ft)	0	1	6
Control Delay (s)	0.0	7.5	9.5
Lane LOS		A	A
Approach Delay (s)	0.0	7.5	9.5
Approach LOS			A

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	11	11	2419	1	4	2949
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	13	13	2846	1	5	3469
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	5					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4591	1424			2847	
vC1, stage 1 conf vol	2846					
vC2, stage 2 conf vol	1744					
vCu, unblocked vol	4591	1424			2847	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	57	90			96	
cM capacity (veh/h)	30	125			130	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	13	13	1897	950	5	1735	1735
Volume Left	13	0	0	0	5	0	0
Volume Right	0	13	0	1	0	0	0
cSH	30	125	1700	1700	130	1700	1700
Volume to Capacity	0.43	0.10	1.12	0.56	0.04	1.02	1.02
Queue Length 95th (ft)	35	8	0	0	3	0	0
Control Delay (s)	196.8	37.0	0.0	0.0	33.7	0.0	0.0
Lane LOS	F	E			D		
Approach Delay (s)	116.9		0.0		0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	111	233	61	248	0	0	0	0	262	1	79
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	131	274	72	292	0	0	0	0	308	1	93
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												1
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	292			405			750	703	268	703	840	292
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	292			405			750	703	268	703	840	292
tC, single (s)	4.1			4.1			7.1	6.5	6.2	*6.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	100	20	100	88
cM capacity (veh/h)	1270			1154			272	339	771	386	283	747

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	405	364	402
Volume Left	0	72	308
Volume Right	274	0	93
cSH	1700	1154	448
Volume to Capacity	0.24	0.06	0.90
Queue Length 95th (ft)	0	5	244
Control Delay (s)	0.0	2.1	51.7
Lane LOS		A	F
Approach Delay (s)	0.0	2.1	51.7
Approach LOS			F

Intersection Summary			
Average Delay	18.4		
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	54	319	0	0	111	81	176	1	51	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	64	375	0	0	131	95	207	1	60	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									1			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	226			375			681	728	375	711	681	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	226			375			681	728	375	711	681	178
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			49	100	91	100	100	100
cM capacity (veh/h)	1343			1183			403	333	671	304	355	865

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	439	226	268
Volume Left	64	0	207
Volume Right	0	95	60
cSH	1343	1700	480
Volume to Capacity	0.05	0.13	0.56
Queue Length 95th (ft)	4	0	84
Control Delay (s)	1.5	0.0	21.6
Lane LOS	A		C
Approach Delay (s)	1.5	0.0	21.6
Approach LOS			C

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	135	147	124	19	23	82
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	159	173	146	22	27	96
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	168				648	157
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	168				648	157
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				93	89
cM capacity (veh/h)	1409				386	888

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	332	168	124
Volume Left	159	0	27
Volume Right	0	22	96
cSH	1409	1700	691
Volume to Capacity	0.11	0.10	0.18
Queue Length 95th (ft)	10	0	16
Control Delay (s)	4.3	0.0	11.3
Lane LOS	A		B
Approach Delay (s)	4.3	0.0	11.3
Approach LOS			B

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	80	11	0	108	36
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	94	13	0	127	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			94		73	47
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			94		73	47
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		86	96
cM capacity (veh/h)			1500		923	1022

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	94	13	169
Volume Left	0	13	127
Volume Right	94	0	42
cSH	1700	1500	946
Volume to Capacity	0.06	0.01	0.18
Queue Length 95th (ft)	0	1	16
Control Delay (s)	0.0	7.4	9.6
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.6
Approach LOS			A

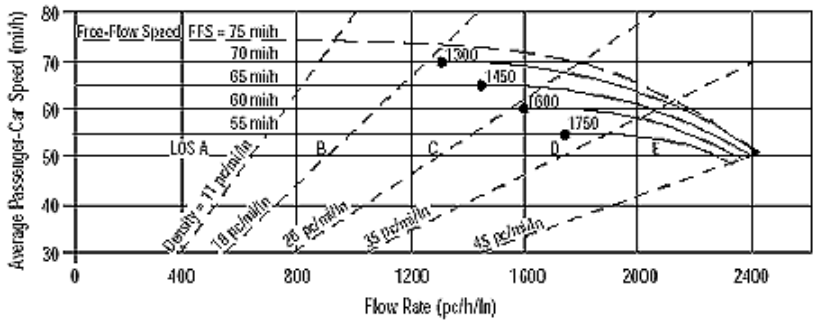
Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

EXISTING WITH PROJECT FREEWAY ANALYSIS

CALCULATION WORKSHEETS

FEHR & PEERS
TRANSPORTATION CONSULTANTS

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 SB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*AM*	Analysis Year	*2005*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*1950*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1152*	pc/h/ln	Design LOS	
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*17.7*	pc/mi/ln	S	mi/h
LOS	*B*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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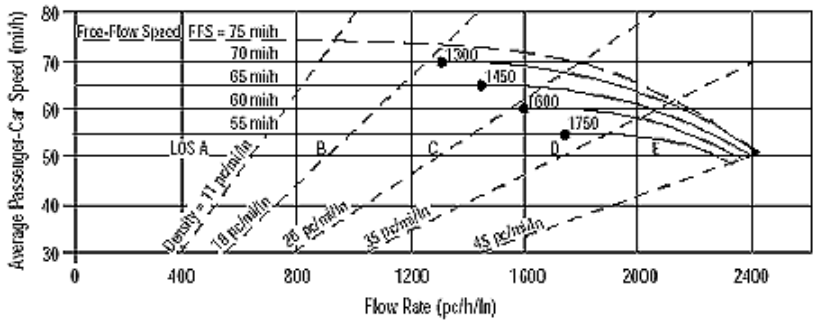
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 NB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*AM*	Analysis Year	*2005*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*2224*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1314*	pc/h/ln	Design LOS	
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*20.2*	pc/mi/ln	S	mi/h
LOS	*C*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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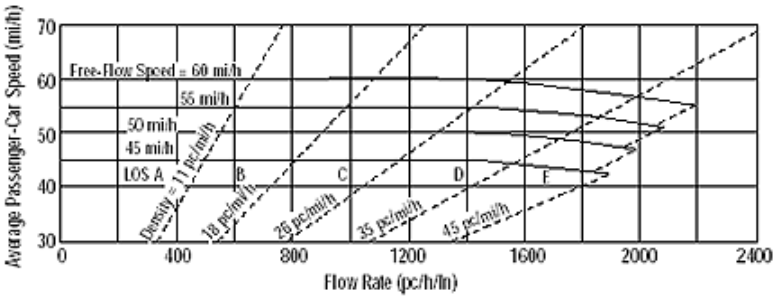
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	AM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2295	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1356
Speed, S (mi/h)	60.0
D (pc/mi/ln)	22.6
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

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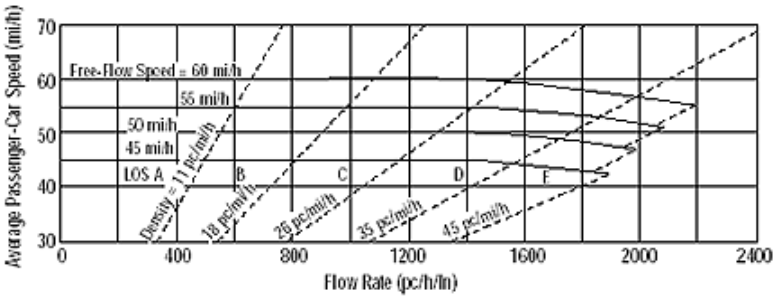
MULTILANE HIGHWAYS WORKSHEET(Direction 2)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	AM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	1862	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1100
Speed, S (mi/h)	60.0
D (pc/mi/ln)	18.3
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Joe Fernandez	Freeway/Dir of Travel	Highway 101 SB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	1/27/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	1862	0.88	Level	8	0	0.962	1.00	2201
Ramp	178	0.88	Level	8	0	0.962	1.00	210
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 2201 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2201	4700	No
V_{12}	2201	4400:All	No
$V_{FO} = V_F - V_R$	1991	4700	No
V_R	210	2100	No

Level of Service Determination (if not F)

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

D_R = 21.8 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.317 (Exhibit 25-19)

S_R= 57.7 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.7 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Joe Fernandez	Freeway/Dir of Travel	Highway 101 NB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	1/27/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2224	0.88	Level	8	0	0.962	1.00	2628
Ramp	208	0.88	Level	8	0	0.962	1.00	246
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 2628 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2628	4700	No
V_{12}	2628	4400:All	No
$V_{FO} = V_F - V_R$	2382	4700	No
V_R	246	2100	No

Level of Service Determination (if not F)

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

D_R = 25.5 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.320 (Exhibit 25-19)

S_R= 57.6 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.6 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101
Agency or Company	Fehr & Peers	Junction	NB Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2016	0.88	Level	8	0	0.962	1.00	2383
Ramp	279	0.88	Level	8	0	0.962	1.00	330
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 2383 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	2713	See Exhibit 25-7	No
V_{R12}	2713	4600:All	No

Level of Service Determination (if not F)

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

D_R = 22.7 (pc/ m/ln)

LOS = C (Exhibit 25-4)

Speed Estimation

M_S = 0.326 (Exibit 25-19)

S_R= 57.5 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 57.5 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Onramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	1684	0.88	Level	8	0	0.962	1.00	1990
Ramp	276	0.88	Level	8	0	0.962	1.00	326
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 1990 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	2316	See Exhibit 25-7	No
V_{R12}	2316	4600:All	No

Level of Service Determination (if not F)

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

D_R = 19.6 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.307 (Exibit 25-19)

S_R= 57.9 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 57.9 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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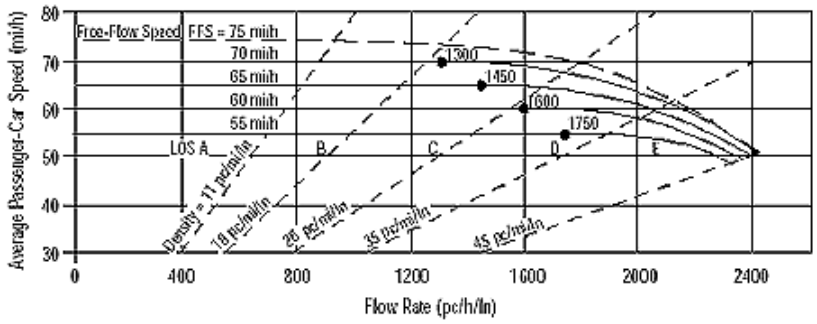
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 SB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*PM*	Analysis Year	*2005*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*2902*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1715*	pc/h/ln	Design LOS	
S	*64.5*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*26.6*	pc/mi/ln	S	mi/h
LOS	*D*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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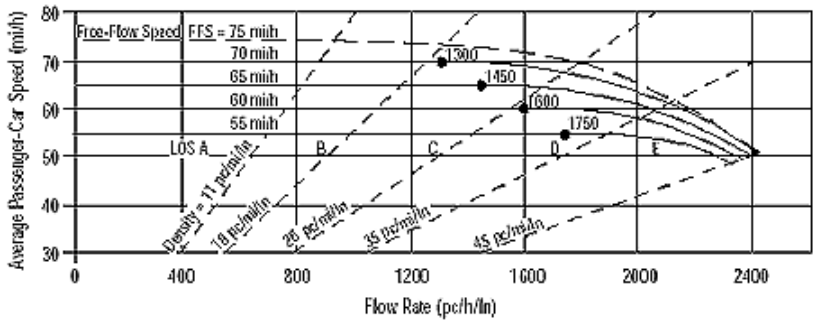
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information / Site Information

General Information		Site Information	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 NB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*PM*	Analysis Year	*2005*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs

Volume, V	*2511*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs / Calc Speed Adj and FFS

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures / Design (N)

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1484*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*65.0*	mi/h	S	mi/h
D = v_p / S	*22.8*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary / Factor Location

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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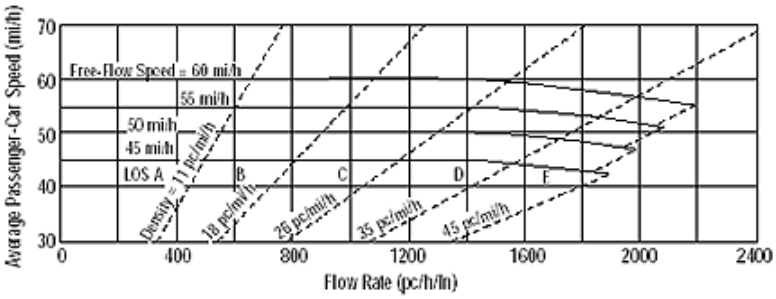
MULTILANE HIGHWAYS WORKSHEET(Direction 2)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	PM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2949	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1742
Speed, S (mi/h)	58.4
D (pc/mi/ln)	29.9
LOS	D

Design

Design (N)

Required Number of Lanes, N

Flow Rate, v_p (pc/h)

Max Service Flow Rate (pc/h/ln)

Design LOS

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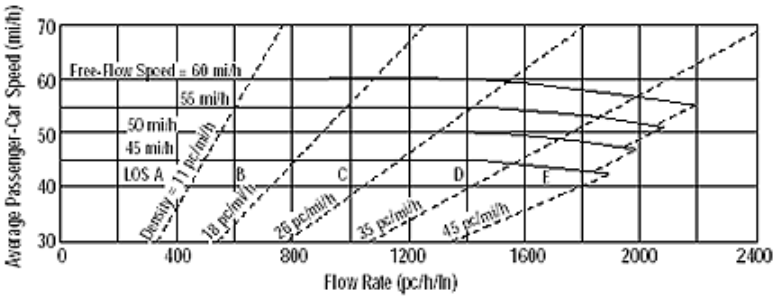
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	PM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2419	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1429
Speed, S (mi/h)	59.9
D (pc/mi/ln)	23.8
LOS	C

Design

Design (N)

Required Number of Lanes, N

Flow Rate, v_p (pc/h)

Max Service Flow Rate (pc/h/ln)

Design LOS

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Joe Fernandez	Freeway/Dir of Travel	Highway 101 SB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	1/27/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2949	0.88	Level	8	0	0.962	1.00	3485
Ramp	342	0.88	Level	8	0	0.962	1.00	404
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 3485 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3485	4700	No
V_{12}	3485	4400:All	No
$V_{FO} = V_F - V_R$	3081	4700	No
V_R	404	2100	No

Level of Service Determination (if not F)

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

D_R = 32.9 (pc/ mi /ln)

LOS= D (Exhibit 25-4)

Speed Estimation

D_s = 0.334 (Exhibit 25-19)

S_R= 57.3 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.3 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Joe Fernandez	Freeway/Dir of Travel	Highway 101 NB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	1/27/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2511	0.88	Level	8	0	0.962	1.00	2968
Ramp	228	0.88	Level	8	0	0.962	1.00	269
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 2968 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2968	4700	No
V_{12}	2968	4400:All	No
$V_{FO} = V_F - V_R$	2699	4700	No
V_R	269	2100	No

Level of Service Determination (if not F)

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

D_R = 28.4 (pc/ mi /ln)

LOS= D (Exhibit 25-4)

Speed Estimation

D_s = 0.322 (Exhibit 25-19)

S_R= 57.6 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.6 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Onramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2607	0.88	Level	8	0	0.962	1.00	3081
Ramp	295	0.88	Level	8	0	0.962	1.00	349
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 3081 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3430	See Exhibit 25-7	No
V_{R12}	3430	4600:All	No

Level of Service Determination (if not F)

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

D_R = 28.3 (pc/ m/ln)

LOS = D (Exhibit 25-4)

Speed Estimation

M_S = 0.387 (Exibit 25-19)

S_R= 56.1 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 56.1 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101
Agency or Company	Fehr & Peers	Junction	NB Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2283	0.88	Level	8	0	0.962	1.00	2698
Ramp	136	0.88	Level	8	0	0.962	1.00	161
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 2698 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	2859	See Exhibit 25-7	No
V_{R12}	2859	4600:All	No

Level of Service Determination (if not F)

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

D_R = 23.9 (pc/ m/ln)

LOS = C (Exhibit 25-4)

Speed Estimation

M_S = 0.335 (Exibit 25-19)

S_R= 57.3 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 57.3 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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EXISTING WITH PROJECT SIGNAL WARRANT CALCULATION WORKSHEETS

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Ex + Project AM	2.1	207	966
Limiting Value	4	100	650
Met/ Not Met	Not Met	Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

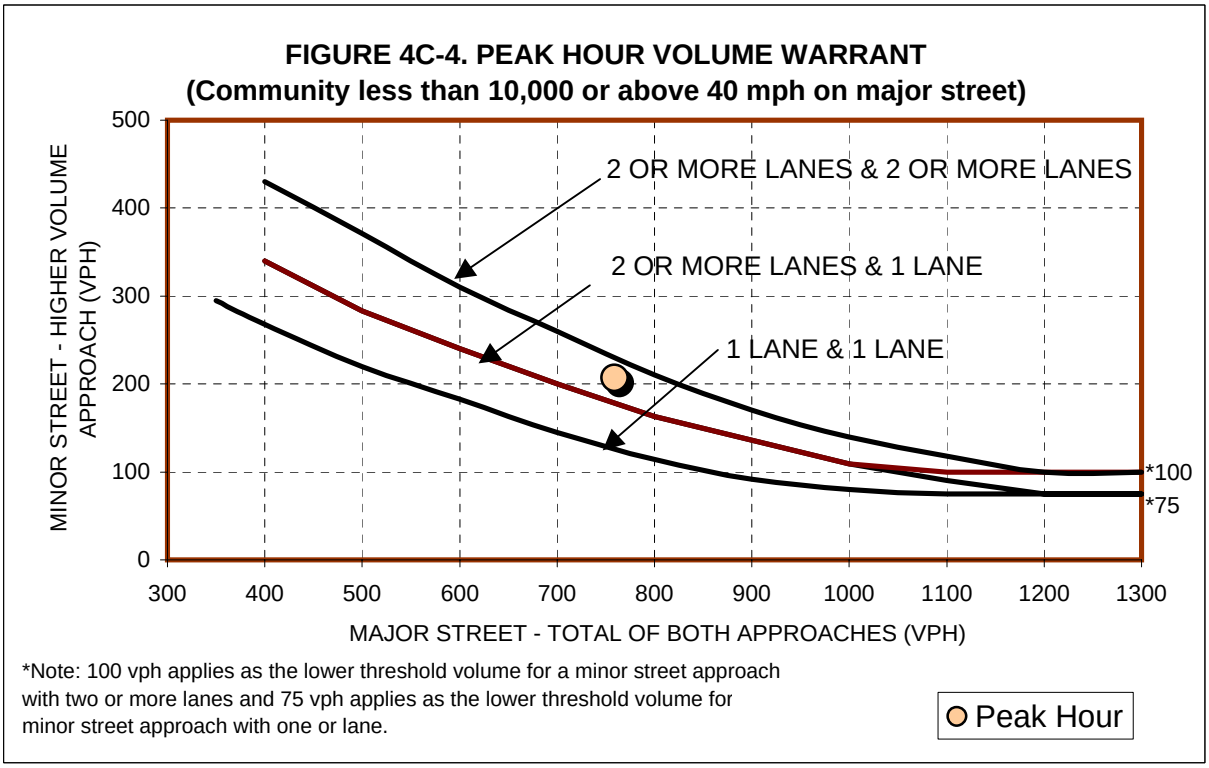
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
7:00 AM	759	207



Warrant	Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Ex + Project AM	1.3	178	991
Limiting Value	4	100	650
Met/ Not Met	Not Met	Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

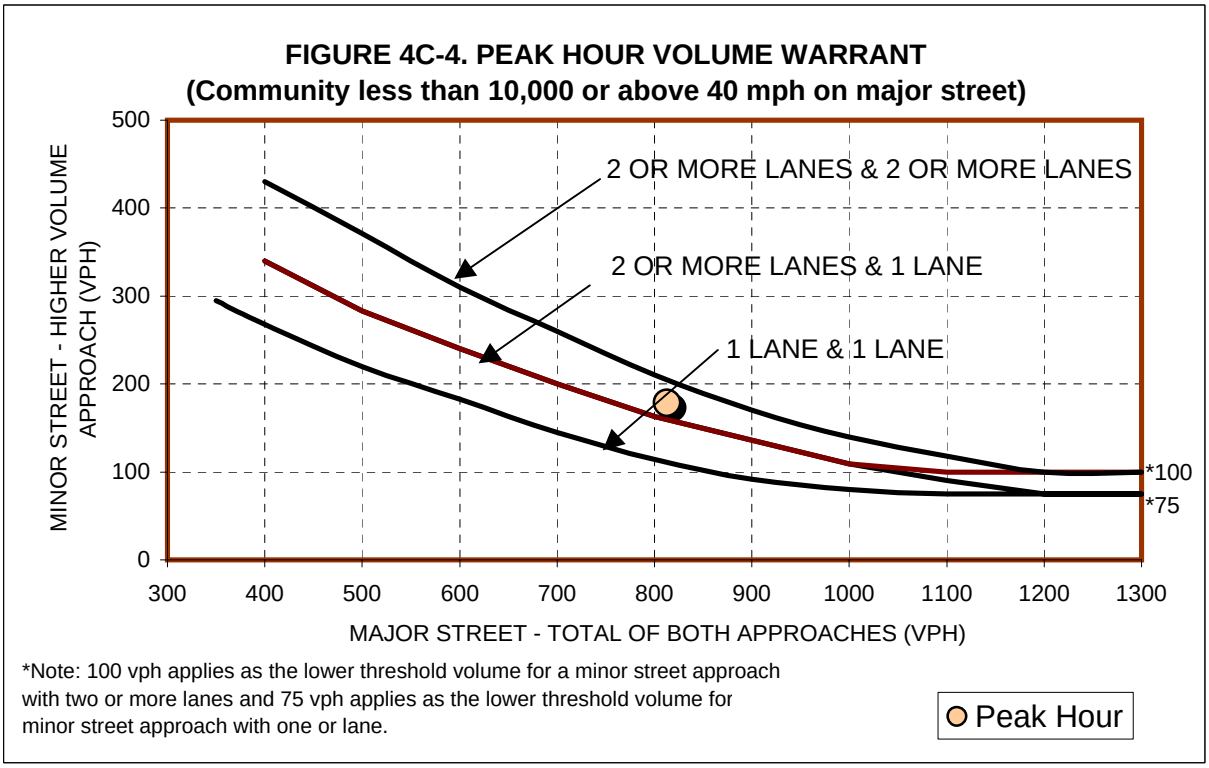
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
7:00 AM	813	178



Warrant	Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	4

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Ex + Project AM	0.1	5	4,167
Limiting Value	4	100	800
Met/ Not Met	Not Met	Not Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

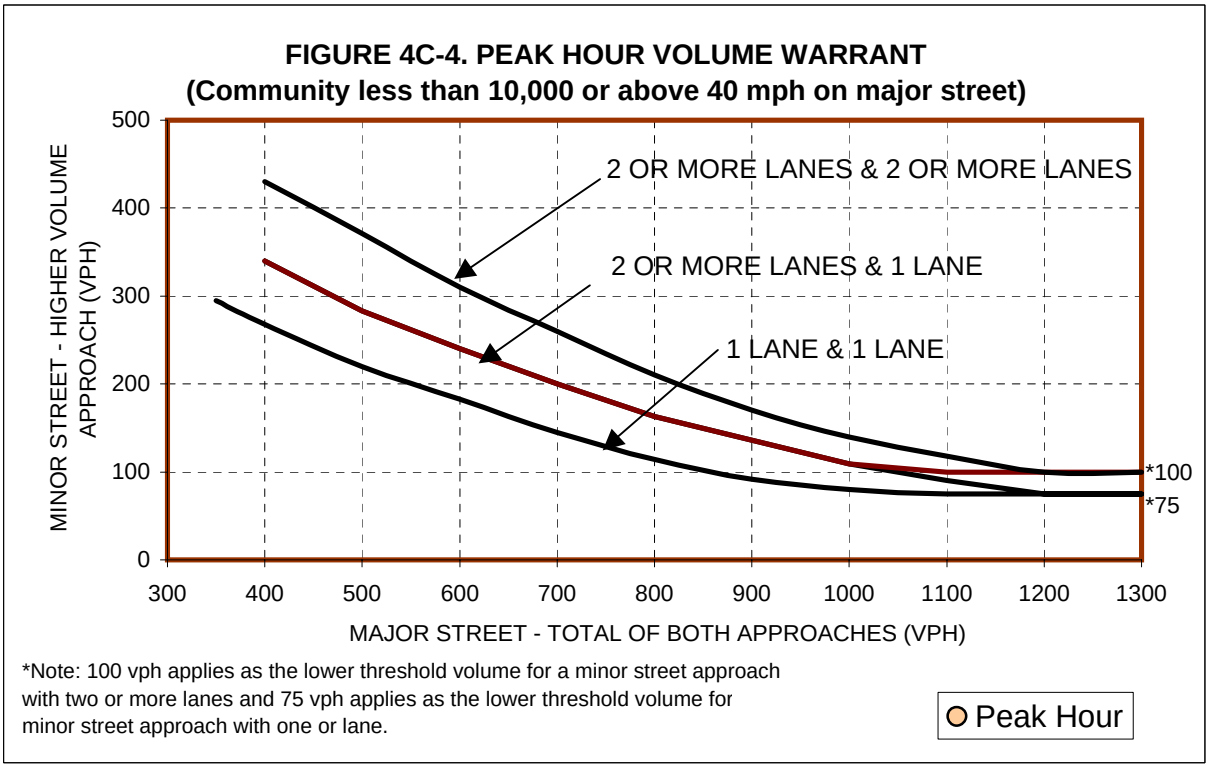
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
7:00 AM	4,162	5



Warrant	Not Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Ex + Project PM	1.4	228	793
Limiting Value	4	100	650
Met/ Not Met	Not Met	Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

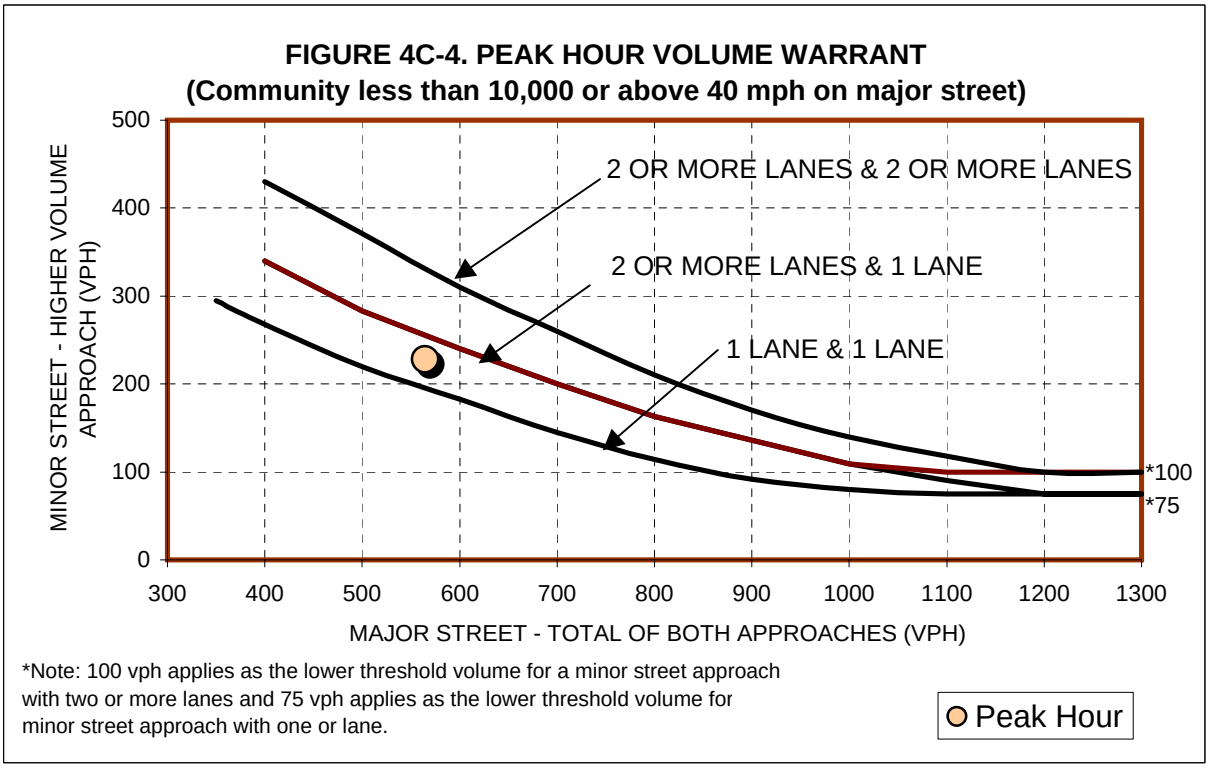
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	565	228



Warrant	Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Ex + Project PM	4.9	342	995
Limiting Value	4	100	650
Met/ Not Met	Met	Met	Met

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

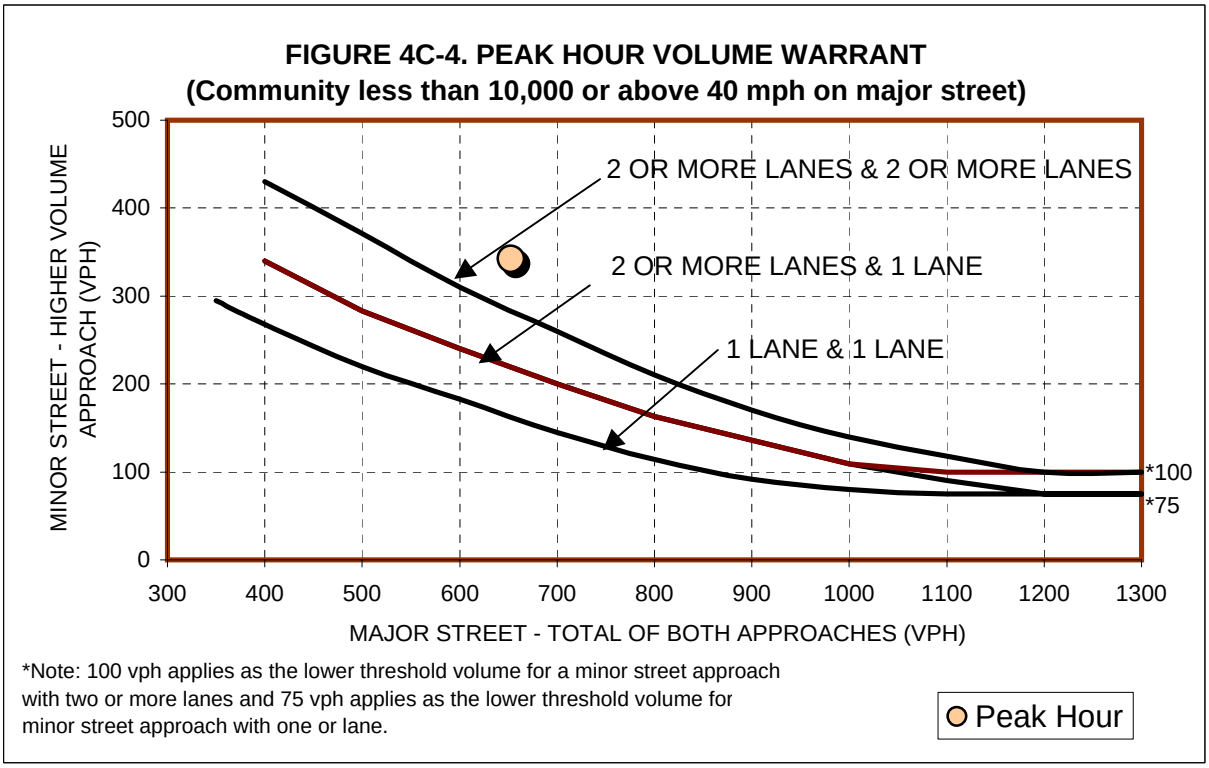
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	653	342



Warrant	Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	4

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Ex + Project PM	0.7	22	5,395
Limiting Value	4	100	800
Met/ Not Met	Not Met	Not Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

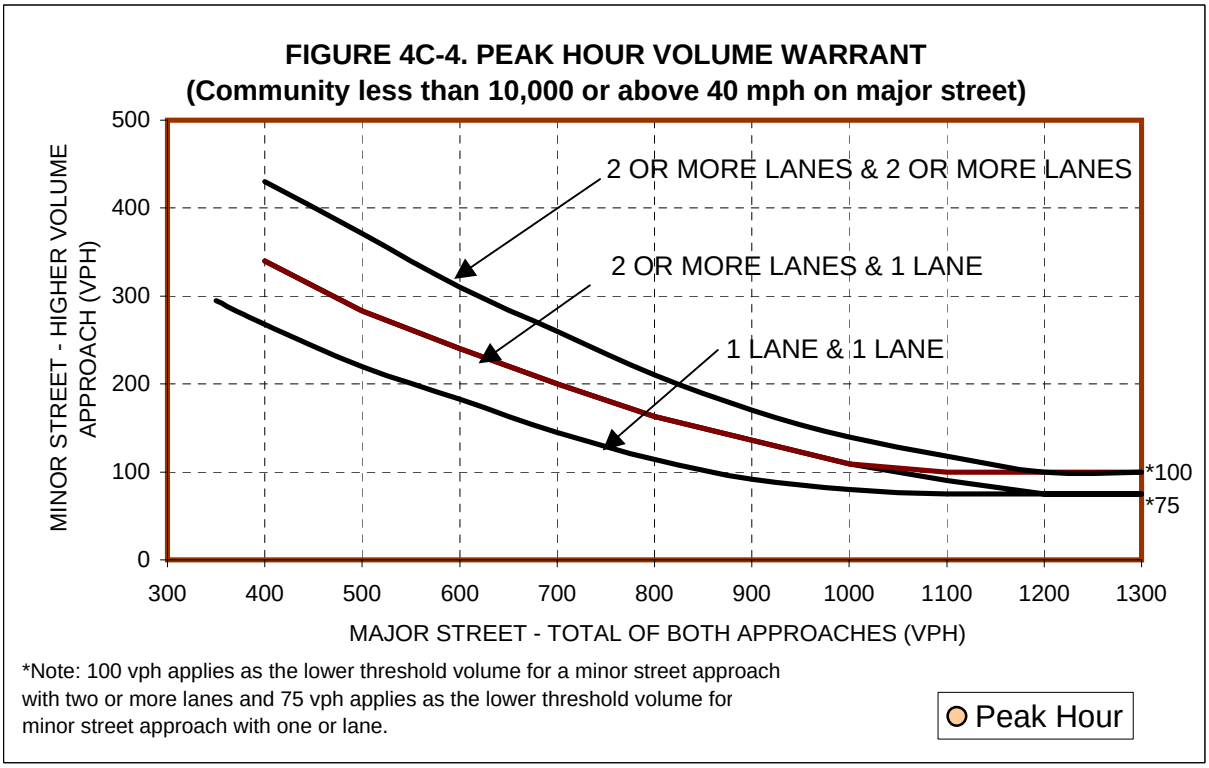
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	5,609	22



Warrant	Not Met

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.94			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1770	1863			1755			1777	1583			
Flt Permitted	0.45	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	837	1863			1755			1777	1583			
Volume (vph)	103	261	0	0	225	170	143	6	58	0	0	0
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	121	307	0	0	265	200	168	7	68	0	0	0
RTOR Reduction (vph)	0	0	0	0	45	0	0	0	52	0	0	0
Lane Group Flow (vph)	121	307	0	0	420	0	0	175	16	0	0	0
Turn Type	Perm						Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)	22.7	22.7			22.7			8.9	8.9			
Effective Green, g (s)	23.7	23.7			23.7			9.9	9.9			
Actuated g/C Ratio	0.57	0.57			0.57			0.24	0.24			
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	477	1061			1000			423	377			
v/s Ratio Prot		0.16			c0.24							
v/s Ratio Perm	0.14							0.10	0.01			
v/c Ratio	0.25	0.29			0.42			0.41	0.04			
Uniform Delay, d1	4.5	4.6			5.1			13.4	12.2			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	0.3	0.2			0.3			0.7	0.0			
Delay (s)	4.8	4.8			5.4			14.1	12.2			
Level of Service	A	A			A			B	B			
Approach Delay (s)		4.8			5.4			13.6			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	41.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						1.00	1.00
Frt		0.91		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.95	1.00
Satd. Flow (prot)		1693		1770	1863						1774	1583
Flt Permitted		1.00		0.46	1.00						0.95	1.00
Satd. Flow (perm)		1693		848	1863						1774	1583
Volume (vph)	0	111	233	61	248	0	0	0	0	262	1	79
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	131	274	72	292	0	0	0	0	308	1	93
RTOR Reduction (vph)	0	142	0	0	0	0	0	0	0	0	0	41
Lane Group Flow (vph)	0	263	0	72	292	0	0	0	0	0	309	52
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		13.6		13.6	13.6						11.4	11.4
Effective Green, g (s)		14.6		14.6	14.6						12.4	12.4
Actuated g/C Ratio		0.42		0.42	0.42						0.35	0.35
Clearance Time (s)		5.0		5.0	5.0						5.0	5.0
Vehicle Extension (s)		3.0		3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		706		354	777						629	561
v/s Ratio Prot		0.16			c0.16							
v/s Ratio Perm				0.08							0.17	0.03
v/c Ratio		0.37		0.20	0.38						0.49	0.09
Uniform Delay, d1		7.0		6.5	7.1						8.8	7.5
Progression Factor		1.00		1.00	1.00						1.00	1.00
Incremental Delay, d2		0.3		0.3	0.3						0.6	0.1
Delay (s)		7.4		6.8	7.4						9.4	7.6
Level of Service		A		A	A						A	A
Approach Delay (s)		7.4			7.2			0.0			9.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Onramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2607	0.88	Level	8	0	0.962	1.00	3081
Ramp	295	0.88	Level	8	0	0.962	1.00	349
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 0.594 using Equation (Exhibit 25-5)

V_{12}= 1831 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3430	See Exhibit 25-7	No
V_{R12}	2180	4600:All	No

Level of Service Determination (if not F)

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

D_R = 18.6 (pc/ m/ln)

LOS = B (Exhibit 25-4)

Speed Estimation

M_S = 0.302 (Exibit 25-19)

S_R= 58.1 mph (Exhibit 25-19)

S_0= 62.3 mph(Exhibit 25-19)

S= 59.5 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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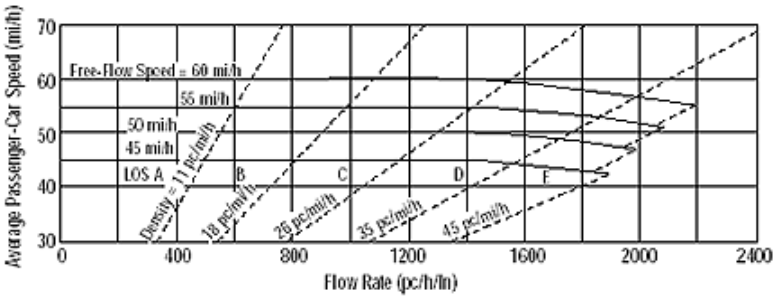
MULTILANE HIGHWAYS WORKSHEET(Direction 2)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	PM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2005

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2949	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	3

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1161
Speed, S (mi/h)	60.0
D (pc/mi/ln)	19.4
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst	Joe Fernandez	Freeway/Dir of Travel	Highway 101 NB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	1/27/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2511	0.88	Level	8	0	0.962	1.00	2968
Ramp	228	0.88	Level	8	0	0.962	1.00	269
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 0.673 using Equation (Exhibit 25-11)

V_{12} = 2087 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2968	7050	No
V_{12}	2087	4400:All	No
$V_{FO} = V_F - V_R$	2699	7050	No
V_R	269	2100	No

Level of Service Determination (if not F)

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

D_R = 20.9 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.322 (Exhibit 25-19)

S_R= 57.6 mph (Exhibit 25-19)

S_0= 71.3 mph (Exhibit 25-19)

S = 61.1 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Joe Fernandez	Freeway/Dir of Travel	Highway 101 SB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	1/27/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2949	0.88	Level	8	0	0.962	1.00	3485
Ramp	342	0.88	Level	8	0	0.962	1.00	404
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 0.654 using Equation (Exhibit 25-11)

V_{12} = 2420 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3485	7050	No
V_{12}	2420	4400:All	No
$V_{FO} = V_F - V_R$	3081	7050	No
V_R	404	2100	No

Level of Service Determination (if not F)

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

D_R = 23.7 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation

D_s = 0.334 (Exhibit 25-19)

S_R= 57.3 mph (Exhibit 25-19)

S_0= 71.1 mph (Exhibit 25-19)

S = 60.9 mph (Exhibit 25-15)

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CUMULATIVE LEVEL OF SERVICE

CALCULATION WORKSHEETS

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	6	1	3251	3	5	2649
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	1	3251	3	5	2649
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	5					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4587	1627			3254	
vC1, stage 1 conf vol	3252					
vC2, stage 2 conf vol	1334					
vCu, unblocked vol	4587	1627			3254	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	65	99			94	
cM capacity (veh/h)	17	91			89	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	6	1	2167	1087	5	1324	1324
Volume Left	6	0	0	0	5	0	0
Volume Right	0	1	0	3	0	0	0
cSH	17	91	1700	1700	89	1700	1700
Volume to Capacity	0.35	0.01	1.27	0.64	0.06	0.78	0.78
Queue Length 95th (ft)	24	1	0	0	4	0	0
Control Delay (s)	297.9	45.0	0.0	0.0	47.8	0.0	0.0
Lane LOS	F	E			E		
Approach Delay (s)	261.7		0.0		0.1		
Approach LOS	F						

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	300	250	65	385	0	0	0	0	125	0	100
Peak Hour 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
Hourly flow rate (vph)	0	300	250	65	385	0	0	0	0	125	0	100
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												1
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	385			550			990	940	425	940	1065	385
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	385			550			990	940	425	940	1065	385
tC, single (s)	4.1			4.1			7.1	6.5	6.2	*6.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	100	55	100	85
cM capacity (veh/h)	1173			1020			182	247	629	280	208	663

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	550	450	225
Volume Left	0	65	125
Volume Right	250	0	100
cSH	1700	1020	440
Volume to Capacity	0.32	0.06	0.51
Queue Length 95th (ft)	0	5	71
Control Delay (s)	0.0	1.9	21.4
Lane LOS		A	C
Approach Delay (s)	0.0	1.9	21.4
Approach LOS			C

Intersection Summary			
Average Delay		4.6	
Intersection Capacity Utilization		71.8%	ICU Level of Service C
Analysis Period (min)		15	

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	150	275	0	0	250	153	200	0	53	0	0	0
Peak Hour 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
Hourly flow rate (vph)	150	275	0	0	250	153	200	0	53	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									1			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	403			275			902	978	275	928	902	326
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	403			275			902	978	275	928	902	326
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			28	100	93	100	100	100
cM capacity (veh/h)	1156			1288			279	218	764	208	242	715

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	425	403	253
Volume Left	150	0	200
Volume Right	0	153	53
cSH	1156	1700	332
Volume to Capacity	0.13	0.24	0.76
Queue Length 95th (ft)	11	0	149
Control Delay (s)	3.9	0.0	43.3
Lane LOS	A		E
Approach Delay (s)	3.9	0.0	43.3
Approach LOS			E

Intersection Summary			
Average Delay		11.7	
Intersection Capacity Utilization		66.3%	ICU Level of Service C
Analysis Period (min)		15	

* User Entered Value

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	36	114	198	17	19	102
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	36	114	198	17	19	102
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	215				392	206
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	215				392	206
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				97	88
cM capacity (veh/h)	1355				596	834

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	150	215	121
Volume Left	36	0	19
Volume Right	0	17	102
cSH	1355	1700	785
Volume to Capacity	0.03	0.13	0.15
Queue Length 95th (ft)	2	0	14
Control Delay (s)	2.0	0.0	10.4
Lane LOS	A		B
Approach Delay (s)	2.0	0.0	10.4
Approach LOS			B

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1	66	41	0	20	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	66	41	0	20	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			67		116	34
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			67		116	34
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	99
cM capacity (veh/h)			1535		857	1039

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	67	41	26
Volume Left	0	41	20
Volume Right	66	0	6
cSH	1700	1535	893
Volume to Capacity	0.04	0.03	0.03
Queue Length 95th (ft)	0	2	2
Control Delay (s)	0.0	7.4	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	19	19	3434	1	6	4180
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	19	19	3434	1	6	4180
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	5					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5536	1718			3435	
vC1, stage 1 conf vol	3434					
vC2, stage 2 conf vol	2102					
vCu, unblocked vol	5536	1718			3435	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	76			92	
cM capacity (veh/h)	14	79			75	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	19	19	2289	1146	6	2090	2090
Volume Left	19	0	0	0	6	0	0
Volume Right	0	19	0	1	0	0	0
cSH	14	79	1700	1700	75	1700	1700
Volume to Capacity	1.40	0.24	1.35	0.67	0.08	1.23	1.23
Queue Length 95th (ft)	76	21	0	0	6	0	0
Control Delay (s)	782.1	64.6	0.0	0.0	57.0	0.0	0.0
Lane LOS	F	F			F		
Approach Delay (s)	423.3		0.0		0.1		
Approach LOS	F						

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	125.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	150	275	50	355	0	0	0	0	262	0	137
Peak Hour 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
Hourly flow rate (vph)	0	150	275	50	355	0	0	0	0	262	0	137
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												1
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	355			425			811	742	288	742	880	355
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	355			425			811	742	288	742	880	355
tC, single (s)	4.1			4.1			7.1	6.5	6.2	*6.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	100	29	100	80
cM capacity (veh/h)	1204			1134			231	328	752	371	273	689

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	425	405	399
Volume Left	0	50	262
Volume Right	275	0	137
cSH	1700	1134	472
Volume to Capacity	0.25	0.04	0.84
Queue Length 95th (ft)	0	3	212
Control Delay (s)	0.0	1.4	41.8
Lane LOS		A	E
Approach Delay (s)	0.0	1.4	41.8
Approach LOS			E

Intersection Summary			
Average Delay		14.1	
Intersection Capacity Utilization		70.7%	ICU Level of Service C
Analysis Period (min)		15	

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	100	312	0	0	150	50	255	0	45	0	0	0
Peak Hour 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
Hourly flow rate (vph)	100	312	0	0	150	50	255	0	45	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									1			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	200			312			687	712	312	710	687	175
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	200			312			687	712	312	710	687	175
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			35	100	94	100	100	100
cM capacity (veh/h)	1372			1248			391	332	728	309	343	868

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	412	200	300
Volume Left	100	0	255
Volume Right	0	50	45
cSH	1372	1700	434
Volume to Capacity	0.07	0.12	0.69
Queue Length 95th (ft)	6	0	129
Control Delay (s)	2.4	0.0	29.9
Lane LOS	A		D
Approach Delay (s)	2.4	0.0	29.9
Approach LOS			D

Intersection Summary			
Average Delay	10.9		
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	95	255	215	26	34	41
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	95	255	215	26	34	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	241				673	228
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	241				673	228
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				91	95
cM capacity (veh/h)	1326				390	811

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	350	241	75
Volume Left	95	0	34
Volume Right	0	26	41
cSH	1326	1700	545
Volume to Capacity	0.07	0.14	0.14
Queue Length 95th (ft)	6	0	12
Control Delay (s)	2.6	0.0	12.7
Lane LOS	A		B
Approach Delay (s)	2.6	0.0	12.7
Approach LOS			B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	33	19	0	41	62
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	33	19	0	41	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			33		54	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			33		54	16
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	94
cM capacity (veh/h)			1579		942	1063

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	33	19	103
Volume Left	0	19	41
Volume Right	33	0	62
cSH	1700	1579	1011
Volume to Capacity	0.02	0.01	0.10
Queue Length 95th (ft)	0	1	8
Control Delay (s)	0.0	7.3	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	7.3	9.0
Approach LOS			A

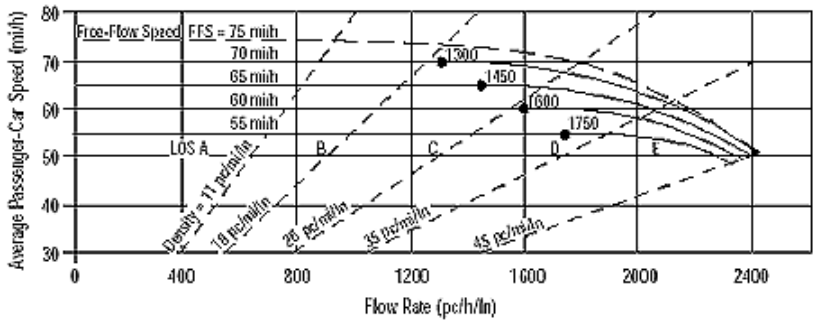
Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

CUMULATIVE FREEWAY ANALYSIS

CALCULATION WORKSHEETS

FEHR & PEERS
TRANSPORTATION CONSULTANTS

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 SB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*AM*	Analysis Year	*2025*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*2773*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1518*	pc/h/ln	Design LOS	
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*23.4*	pc/mi/ln	S	mi/h
LOS	*C*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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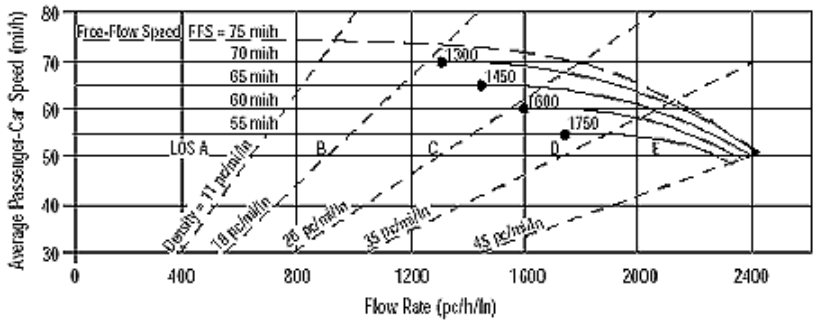
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information / Site Information

General Information		Site Information	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 NB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*AM*	Analysis Year	*2025*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs

Volume, V	*3182*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs / Calc Speed Adj and FFS

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures / Design (N)

LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1742*	pc/h/ln	Design LOS		
S	*64.3*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*27.1*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary / Factor Location

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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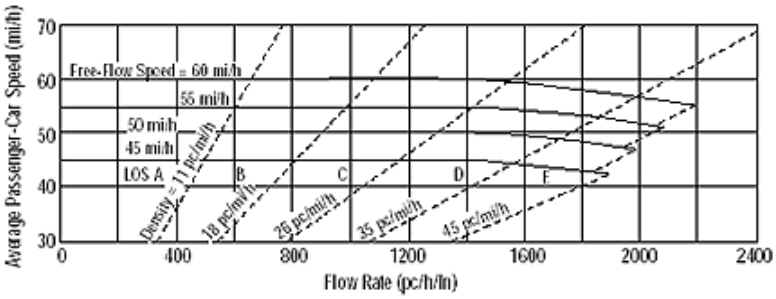
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	AM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	3252	Peak-Hour Factor, PHF	0.95
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1780
Speed, S (mi/h)	58.1
D (pc/mi/ln)	30.6
LOS	D

Design

Design (N)

Required Number of Lanes, N

Flow Rate, v_p (pc/h)

Max Service Flow Rate (pc/h/ln)

Design LOS

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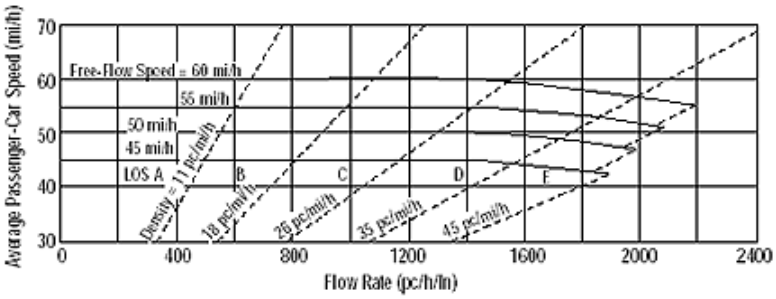
MULTILANE HIGHWAYS WORKSHEET(Direction 2)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	AM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2650	Peak-Hour Factor, PHF	0.95
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1450
Speed, S (mi/h)	59.9
D (pc/mi/ln)	24.2
LOS	C

Design

Design (N)

Required Number of Lanes, N

Flow Rate, v_p (pc/h)

Max Service Flow Rate (pc/h/ln)

Design LOS

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2650	0.95	Level	8	0	0.962	1.00	2901
Ramp	225	0.95	Level	8	0	0.962	1.00	246
UpStream								
DownStream								

Merge Areas | Diverge Areas

Estimation of v_{12} (Merge Areas)

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

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

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

V_{12}= pc/h

Estimation of v_{12} (Diverge Areas)

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 2901 pc/h

Capacity Checks (Merge Areas)

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Capacity Checks (Diverge Areas)

	Actual	Maximum	LOS F?
V_{FI}=V_F	2901	4700	No
V_{12}	2901	4400:All	No
V_{FO} = V_F - V_R	2655	4700	No
V_R	246	2100	No

Level of Service Determination (if not F) (Merge Areas)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Level of Service Determination (if not F) (Diverge Areas)

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

D_R = 27.9 (pc/ mi /ln)

LOS= C (Exhibit 25-4)

Speed Estimation (Merge Areas)

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Speed Estimation (Diverge Areas)

D_s = 0.320 (Exhibit 25-19)

S_R= 57.6 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.6 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101 NB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2025

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3182	0.95	Level	8	0	0.962	1.00	3483
Ramp	253	0.95	Level	8	0	0.962	1.00	277
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 3483 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3483	4700	No
V_{12}	3483	4400:All	No
$V_{FO} = V_F - V_R$	3206	4700	No
V_R	277	2100	No

Level of Service Determination (if not F)

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

D_R = 32.9 (pc/ mi /ln)

LOS= D (Exhibit 25-4)

Speed Estimation

D_s = 0.323 (Exhibit 25-19)

S_R= 57.6 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.6 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Onramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2478	0.95	Level	8	0	0.962	1.00	2713
Ramp	315	0.95	Level	8	0	0.962	1.00	345
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 2713 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3058	See Exhibit 25-7	No
V_{R12}	3058	4600:All	No

Level of Service Determination (if not F)

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

D_R = 25.4 (pc/ m/ln)

LOS = C (Exhibit 25-4)

Speed Estimation

M_S = 0.350 (Exibit 25-19)

S_R= 56.9 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 56.9 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101
Agency or Company	Fehr & Peers	Junction	NB Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2988	0.95	Level	8	0	0.962	1.00	3271
Ramp	303	0.95	Level	8	0	0.962	1.00	332
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 3271 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3603	See Exhibit 25-7	No
V_{R12}	3603	4600:All	No

Level of Service Determination (if not F)

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

D_R = 29.7 (pc/ m/ln)

LOS = D (Exhibit 25-4)

Speed Estimation

M_S = 0.410 (Exibit 25-19)

S_R= 55.6 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 55.6 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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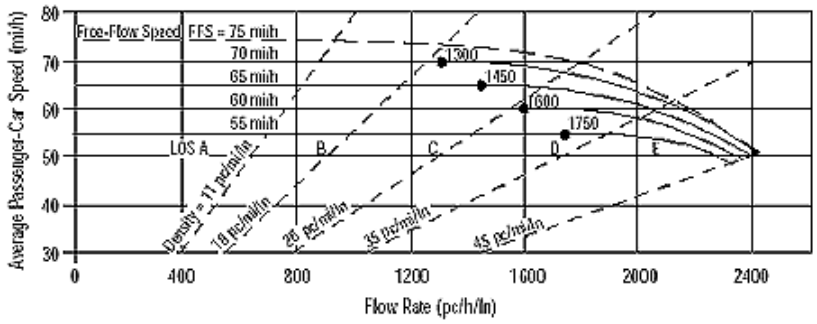
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information / Site Information

General Information		Site Information	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 NB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*PM*	Analysis Year	*2025*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs

Volume, V	*3574*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs / Calc Speed Adj and FFS

Speed Inputs			Calc Speed Adj and FFS		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures / Design (N)

LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
			Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1956*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*62.1*	mi/h	S		mi/h
D = v_p / S	*31.5*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*D*		Required Number of Lanes, N		

Glossary / Factor Location

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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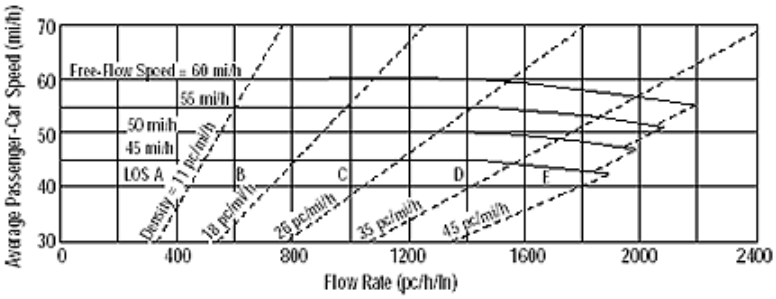
MULTILANE HIGHWAYS WORKSHEET(Direction 2)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	PM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	4180	Peak-Hour Factor, PHF	0.95
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	2288
Speed, S (mi/h)	
D (pc/mi/ln)	
LOS	F

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

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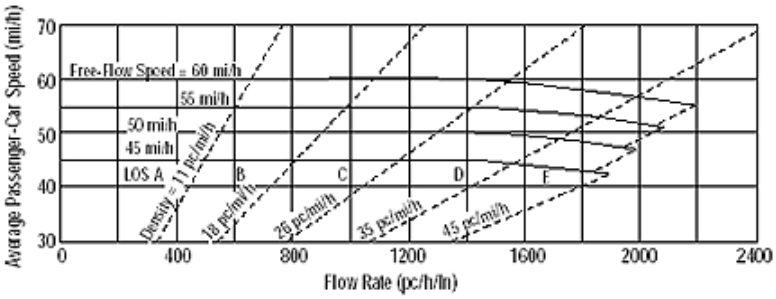
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	PM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	3434	Peak-Hour Factor, PHF	0.95
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1879
Speed, S (mi/h)	57.4
D (pc/mi/ln)	32.7
LOS	D

Design

Design (N)

Required Number of Lanes, N

Flow Rate, v_p (pc/h)

Max Service Flow Rate (pc/h/ln)

Design LOS

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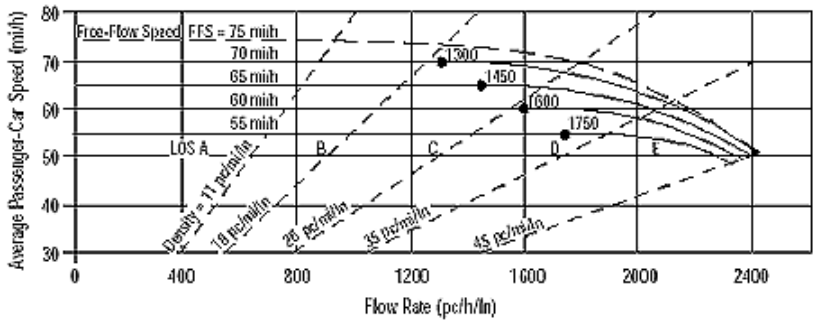
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 SB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*PM*	Analysis Year	*2025*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*4189*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2293*	pc/h/ln	Design LOS	
S	*54.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*42.3*	pc/mi/ln	S	mi/h
LOS	*E*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2025

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	4180	0.95	Level	8	0	0.962	1.00	4576
Ramp	399	0.95	Level	8	0	0.962	1.00	437
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 4576 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	4576	4700	No
V_{12}	4576	4400:All	Yes
$V_{FO} = V_F - V_R$	4139	4700	No
V_R	437	2100	No

Level of Service Determination (if not F)

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

D_R = 42.3 (pc/ mi /ln)

LOS= F (Exhibit 25-4)

Speed Estimation

D_s = 0.337 (Exhibit 25-19)

S_R= 57.2 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.2 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101 NB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2025

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3574	0.95	Level	8	0	0.962	1.00	3913
Ramp	300	0.95	Level	8	0	0.962	1.00	328
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 3913 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3913	4700	No
V_{12}	3913	4400:All	No
$V_{FO} = V_F - V_R$	3585	4700	No
V_R	328	2100	No

Level of Service Determination (if not F)

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

D_R = 36.6 (pc/ mi /ln)

LOS= E (Exhibit 25-4)

Speed Estimation

D_s = 0.328 (Exhibit 25-19)

S_R= 57.5 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.5 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101
Agency or Company	Fehr & Peers	Junction	NB Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	3575	0.95	Level	8	0	0.962	1.00	3914
Ramp	150	0.95	Level	8	0	0.962	1.00	164
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 3914 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4078	See Exhibit 25-7	No
V_{R12}	4078	4600:All	No

Level of Service Determination (if not F)

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

D_R = 33.4 (pc/ m/ln)

LOS = D (Exhibit 25-4)

Speed Estimation

M_S = 0.497 (Exibit 25-19)

S_R= 53.6 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 53.6 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Onramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	3864	0.95	Level	8	0	0.962	1.00	4230
Ramp	325	0.95	Level	8	0	0.962	1.00	356
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 4230 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4586	See Exhibit 25-7	No
V_{R12}	4586	4600:All	No

Level of Service Determination (if not F)

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

D_R = 37.3 (pc/ m/ln)

LOS = E (Exhibit 25-4)

Speed Estimation

M_S = 0.650 (Exibit 25-19)

S_R= 50.1 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 50.1 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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CUMULATIVE SIGNAL WARRANT

CALCULATION WORKSHEETS

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative AM	0.6	7	5,915
Limiting Value	4	100	650
Met/ Not Met	Not Met	Not Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

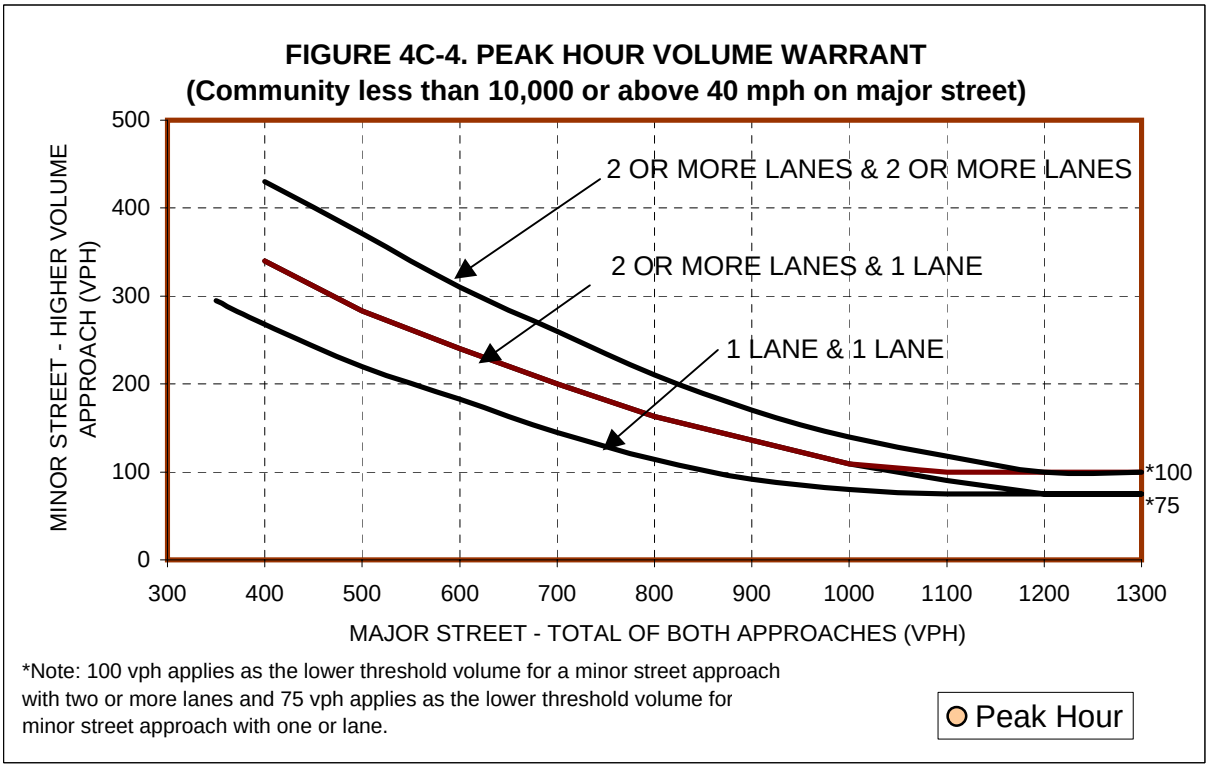
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
7:00 AM	5,908	7



Warrant	Not Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative AM	1.3	225	1,225
Limiting Value	4	100	650
Met/ Not Met	Not Met	Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

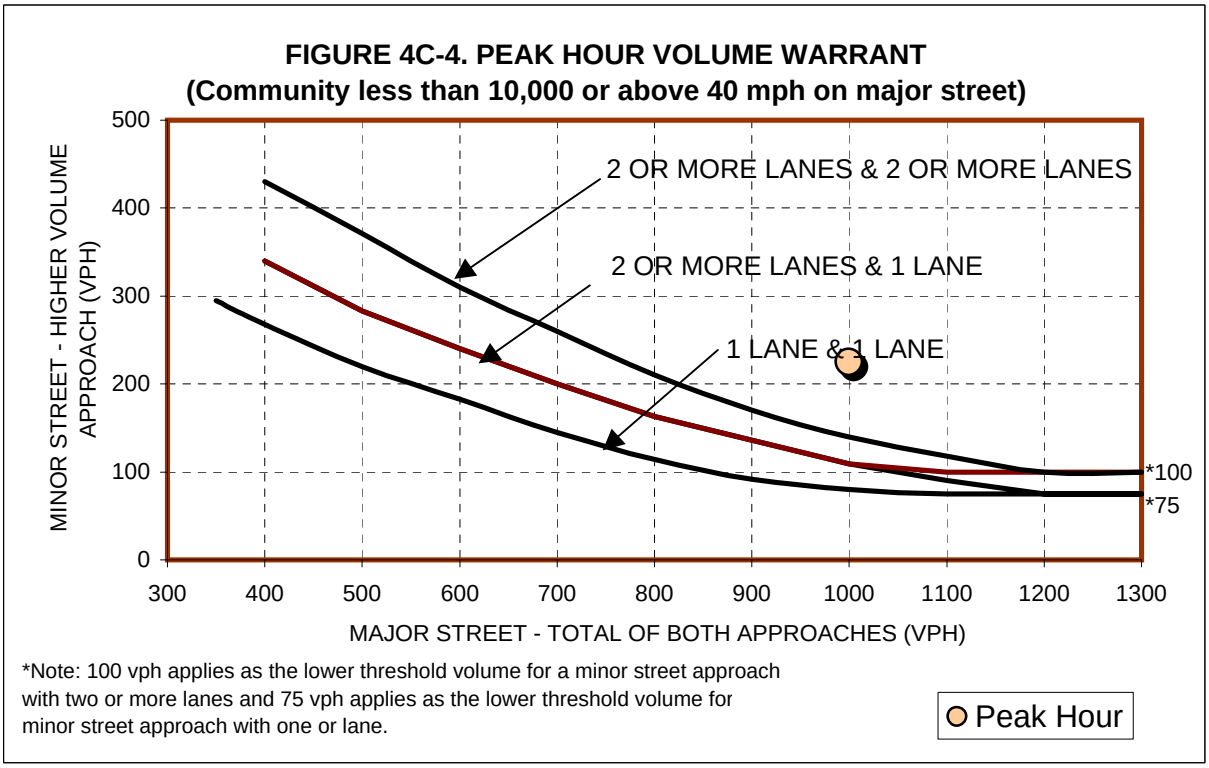
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
7:00 AM	1,000	225



Warrant	Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative AM	3.0	253	1,081
Limiting Value	4	100	650
Met/ Not Met	Not Met	Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

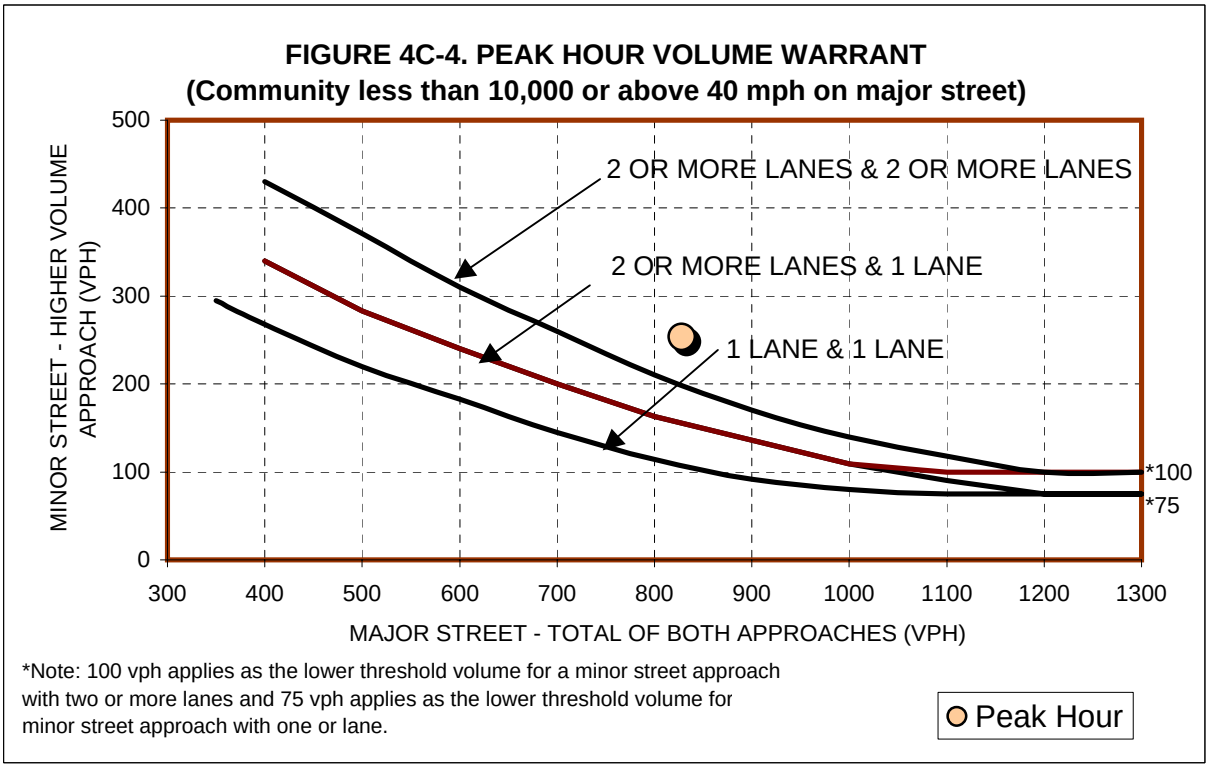
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
7:00 AM	828	253



Warrant	Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative PM	2.5	300	912
Limiting Value	4	100	650
Met/ Not Met	Not Met	Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

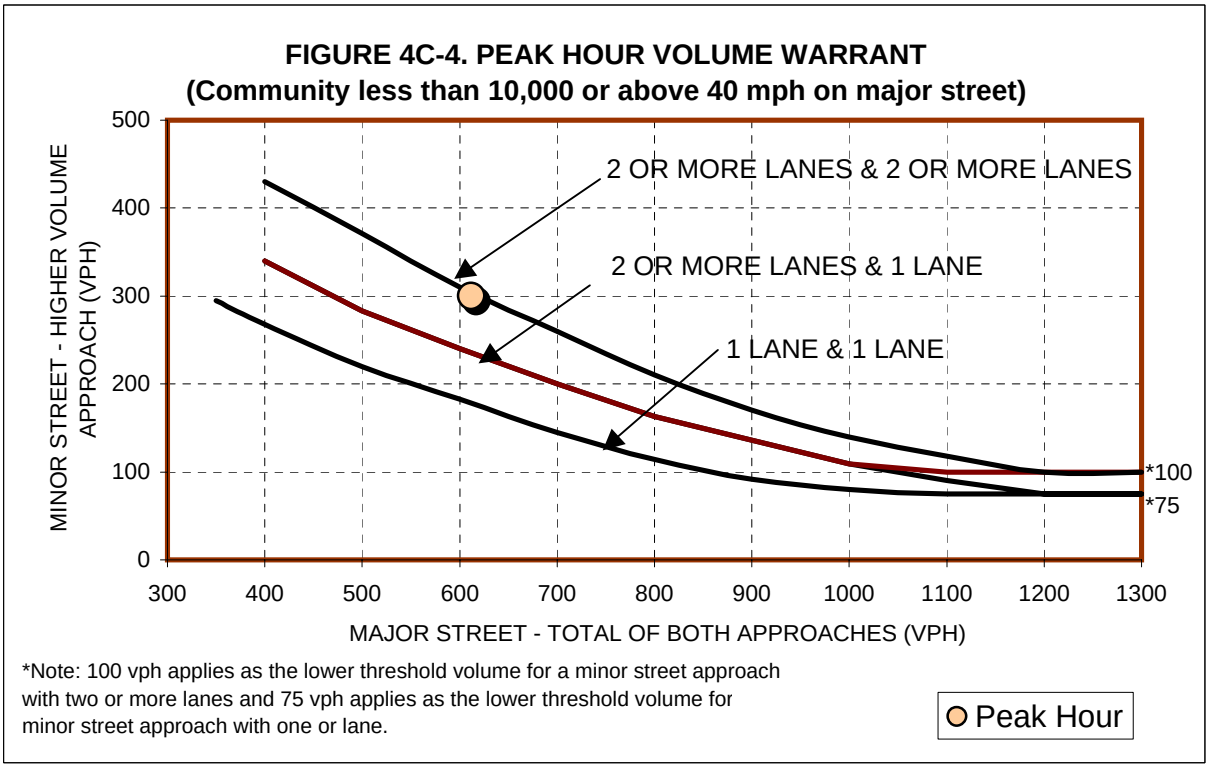
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	612	300



Warrant	Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative PM	4.5	38	7,659
Limiting Value	4	100	650
Met/ Not Met	Met	Not Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

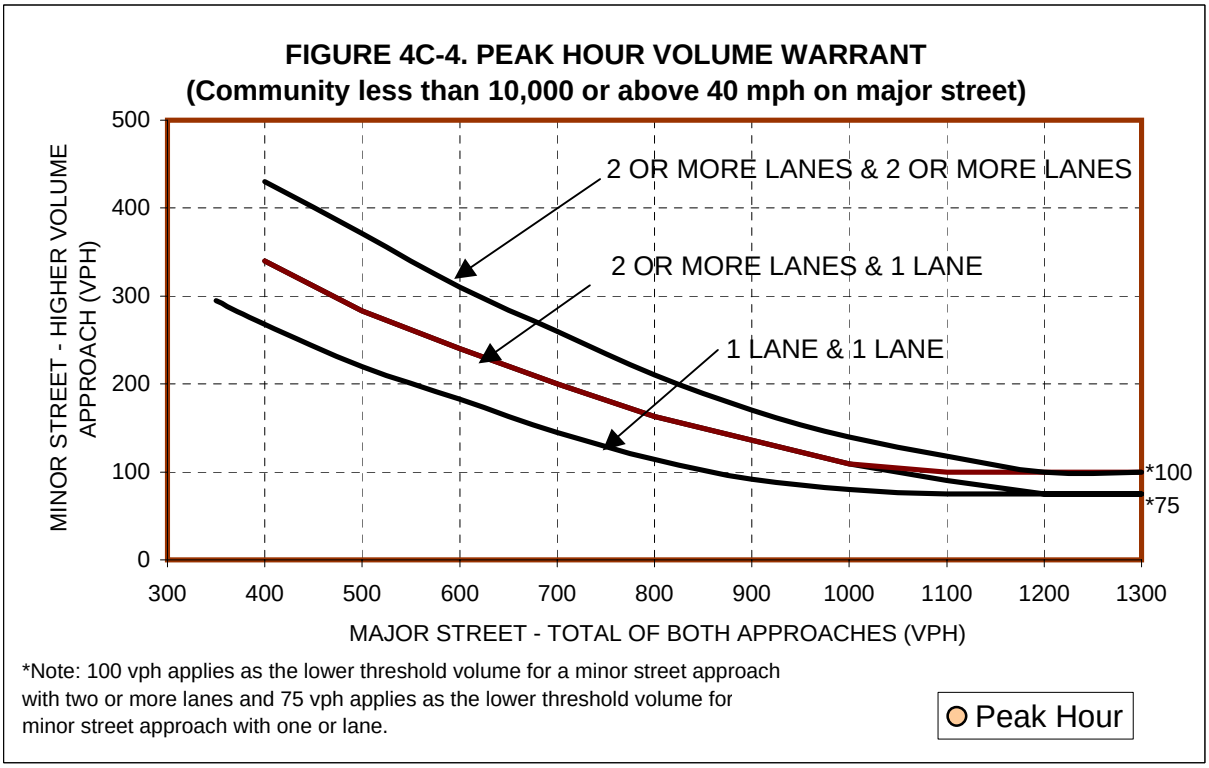
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	7,621	38



Warrant	Not Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative PM	4.7	399	1,229
Limiting Value	4	100	650
Met/ Not Met	Met	Met	Met

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

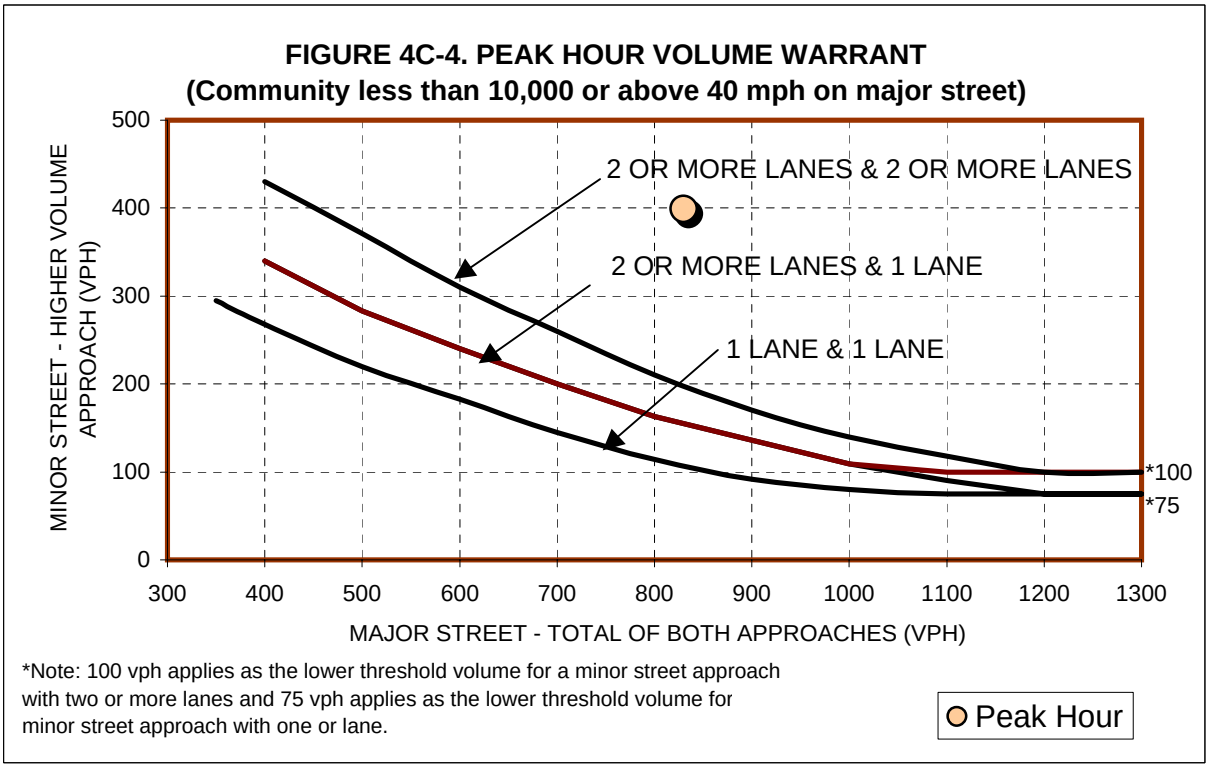
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	830	399



Warrant	Met

CUMULATIVE WITH PROJECT LEVEL OF SERVICE CALCULATION WORKSHEETS

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	6	1	3288	3	5	2671
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	1	3288	3	5	2671
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	5					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	4635	1646			3291	
vC1, stage 1 conf vol	3290					
vC2, stage 2 conf vol	1346					
vCu, unblocked vol	4635	1646			3291	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	64	99			94	
cM capacity (veh/h)	16	88			86	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	6	1	2192	1099	5	1336	1336
Volume Left	6	0	0	0	5	0	0
Volume Right	0	1	0	3	0	0	0
cSH	16	88	1700	1700	86	1700	1700
Volume to Capacity	0.36	0.01	1.29	0.65	0.06	0.79	0.79
Queue Length 95th (ft)	25	1	0	0	5	0	0
Control Delay (s)	317.4	46.2	0.0	0.0	49.4	0.0	0.0
Lane LOS	F	E			E		
Approach Delay (s)	278.6		0.0		0.1		
Approach LOS	F						

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	302	250	89	388	0	0	0	0	147	0	100
Peak Hour 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
Hourly flow rate (vph)	0	302	250	89	388	0	0	0	0	147	0	100
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												1
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	388			552			1043	993	427	993	1118	388
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	388			552			1043	993	427	993	1118	388
tC, single (s)	4.1			4.1			7.1	6.5	6.2	*6.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			91			100	100	100	42	100	85
cM capacity (veh/h)	1170			1018			164	224	628	255	189	660

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	552	477	247
Volume Left	0	89	147
Volume Right	250	0	100
cSH	1700	1018	384
Volume to Capacity	0.32	0.09	0.64
Queue Length 95th (ft)	0	7	108
Control Delay (s)	0.0	2.5	29.7
Lane LOS		A	D
Approach Delay (s)	0.0	2.5	29.7
Approach LOS			D

Intersection Summary			
Average Delay		6.7	
Intersection Capacity Utilization		74.7%	ICU Level of Service D
Analysis Period (min)		15	

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	150	299	0	0	277	190	200	0	67	0	0	0
Peak Hour 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
Hourly flow rate (vph)	150	299	0	0	277	190	200	0	67	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									1			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	467			299			971	1066	299	1004	971	372
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467			299			971	1066	299	1004	971	372
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			100			21	100	91	100	100	100
cM capacity (veh/h)	1094			1262			252	192	741	179	218	674

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	449	467	267
Volume Left	150	0	200
Volume Right	0	190	67
cSH	1094	1700	311
Volume to Capacity	0.14	0.27	0.86
Queue Length 95th (ft)	12	0	191
Control Delay (s)	3.9	0.0	58.8
Lane LOS	A		F
Approach Delay (s)	3.9	0.0	58.8
Approach LOS			F

Intersection Summary			
Average Delay	14.8		
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	74	114	198	19	22	167
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	74	114	198	19	22	167
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	217				470	208
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	217				470	208
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				96	80
cM capacity (veh/h)	1353				522	833

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	188	217	189
Volume Left	74	0	22
Volume Right	0	19	167
cSH	1353	1700	779
Volume to Capacity	0.05	0.13	0.24
Queue Length 95th (ft)	4	0	24
Control Delay (s)	3.4	0.0	11.1
Lane LOS	A		B
Approach Delay (s)	3.4	0.0	11.1
Approach LOS			B

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1	134	41	0	60	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	134	41	0	60	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			135		150	68
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			135		150	68
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		93	99
cM capacity (veh/h)			1449		818	995

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	135	41	66
Volume Left	0	41	60
Volume Right	134	0	6
cSH	1700	1449	832
Volume to Capacity	0.08	0.03	0.08
Queue Length 95th (ft)	0	2	6
Control Delay (s)	0.0	7.6	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	7.6	9.7
Approach LOS			A

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	19	19	3468	1	6	4226
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	19	19	3468	1	6	4226
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	5					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	5594	1734			3469	
vC1, stage 1 conf vol	3468					
vC2, stage 2 conf vol	2125					
vCu, unblocked vol	5594	1734			3469	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	75			92	
cM capacity (veh/h)	13	77			73	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	19	19	2312	1157	6	2113	2113
Volume Left	19	0	0	0	6	0	0
Volume Right	0	19	0	1	0	0	0
cSH	13	77	1700	1700	73	1700	1700
Volume to Capacity	1.47	0.25	1.36	0.68	0.08	1.24	1.24
Queue Length 95th (ft)	77	22	0	0	7	0	0
Control Delay (s)	832.2	66.7	0.0	0.0	58.9	0.0	0.0
Lane LOS	F	F			F		
Approach Delay (s)	449.5		0.0		0.1		
Approach LOS	F						

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	126.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	154	275	71	358	0	0	0	0	308	0	137
Peak Hour 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
Hourly flow rate (vph)	0	154	275	71	358	0	0	0	0	308	0	137
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												1
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	358			429			860	792	292	792	929	358
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	358			429			860	792	292	792	929	358
tC, single (s)	4.1			4.1			7.1	6.5	6.2	*6.4	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	100	10	100	80
cM capacity (veh/h)	1201			1130			210	302	748	343	251	686

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	429	429	445
Volume Left	0	71	308
Volume Right	275	0	137
cSH	1700	1130	420
Volume to Capacity	0.25	0.06	1.06
Queue Length 95th (ft)	0	5	364
Control Delay (s)	0.0	1.9	92.3
Lane LOS		A	F
Approach Delay (s)	0.0	1.9	92.3
Approach LOS			F

Intersection Summary			
Average Delay		32.2	
Intersection Capacity Utilization		74.8%	ICU Level of Service D
Analysis Period (min)		15	

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	100	362	0	0	174	84	255	0	74	0	0	0
Peak Hour 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
Hourly flow rate (vph)	100	362	0	0	174	84	255	0	74	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									1			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	258			362			778	820	362	815	778	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	258			362			778	820	362	815	778	216
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			26	100	89	100	100	100
cM capacity (veh/h)	1307			1197			345	286	683	249	303	824

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	462	258	329
Volume Left	100	0	255
Volume Right	0	84	74
cSH	1307	1700	402
Volume to Capacity	0.08	0.15	0.82
Queue Length 95th (ft)	6	0	186
Control Delay (s)	2.3	0.0	43.4
Lane LOS	A		E
Approach Delay (s)	2.3	0.0	43.4
Approach LOS			E

Intersection Summary			
Average Delay	14.7		
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	175	255	215	30	37	99
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	175	255	215	30	37	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	245				835	230
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	245				835	230
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				87	88
cM capacity (veh/h)	1321				293	809

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	430	245	136
Volume Left	175	0	37
Volume Right	0	30	99
cSH	1321	1700	547
Volume to Capacity	0.13	0.14	0.25
Queue Length 95th (ft)	11	0	24
Control Delay (s)	4.1	0.0	13.7
Lane LOS	A		B
Approach Delay (s)	4.1	0.0	13.7
Approach LOS			B

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	94	19	0	125	62
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	94	19	0	125	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			94		85	47
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			94		85	47
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		86	94
cM capacity (veh/h)			1500		905	1022

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	94	19	187
Volume Left	0	19	125
Volume Right	94	0	62
cSH	1700	1500	941
Volume to Capacity	0.06	0.01	0.20
Queue Length 95th (ft)	0	1	18
Control Delay (s)	0.0	7.4	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	7.4	9.8
Approach LOS			A

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	25.1%	ICU Level of Service	A
Analysis Period (min)	15		

CUMULATIVE WITH PROJECT FREEWAY ANALYSIS CALCULATION WORKSHEETS

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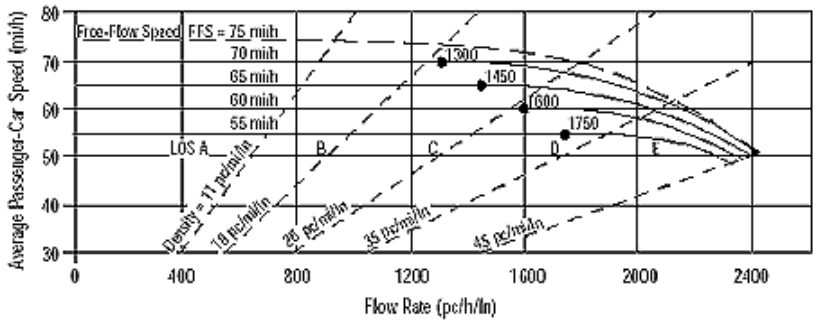
TRANSPORTATION CONSULTANTS

BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 SB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*AM*	Analysis Year	*2025*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*2797*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1531*	pc/h/ln	Design LOS	
S	*65.0*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*23.6*	pc/mi/ln	S	mi/h
LOS	*C*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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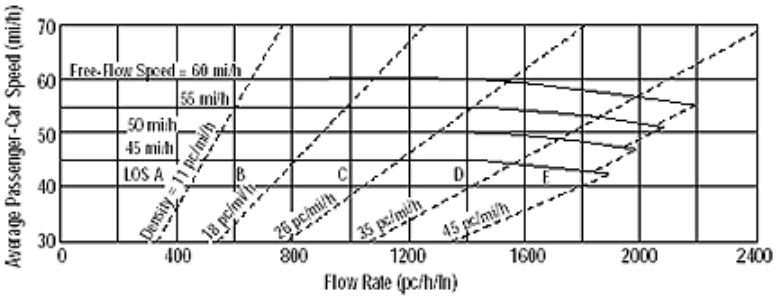
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	AM

Site Information

Highway/Direction to Travel	Highway 101 NB
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	3289	Peak-Hour Factor, PHF	0.95
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1800
Speed, S (mi/h)	58.0
D (pc/mi/ln)	31.0
LOS	D

Design

Design (N)

Required Number of Lanes, N

Flow Rate, v_p (pc/h)

Max Service Flow Rate (pc/h/ln)

Design LOS

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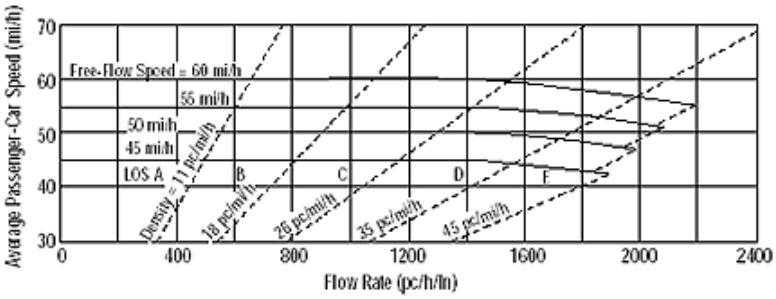
MULTILANE HIGHWAYS WORKSHEET(Direction 2)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	AM

Site Information

Highway/Direction to Travel	Highway 101 NB
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2672	Peak-Hour Factor, PHF	0.95
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1462
Speed, S (mi/h)	59.8
D (pc/mi/ln)	24.4
LOS	C

Design

Design (N)

Required Number of Lanes, N

Flow Rate, v_p (pc/h)

Max Service Flow Rate (pc/h/ln)

Design LOS

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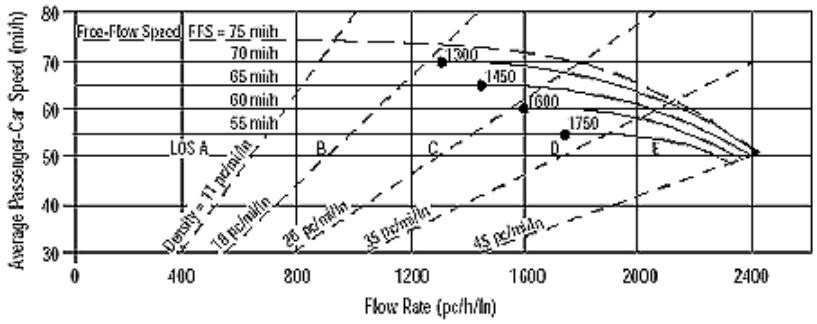
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 NB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*AM*	Analysis Year	*2025*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*3196*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1749*	pc/h/ln	Design LOS	
S	*64.3*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*27.2*	pc/mi/ln	S	mi/h
LOS	*D*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101 NB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2025

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3196	0.95	Level	8	0	0.962	1.00	3499
Ramp	267	0.95	Level	8	0	0.962	1.00	292
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 3499 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3499	4700	No
V_{12}	3499	4400:All	No
$V_{FO} = V_F - V_R$	3207	4700	No
V_R	292	2100	No

Level of Service Determination (if not F)

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

D_R = 33.0 (pc/ mi /ln)

LOS= D (Exhibit 25-4)

Speed Estimation

D_s = 0.324 (Exhibit 25-19)

S_R= 57.5 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.5 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2005

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	2672	0.95	Level	8	0	0.962	1.00	2925
Ramp	247	0.95	Level	8	0	0.962	1.00	270
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 2925 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	2925	4700	No
V_{12}	2925	4400:All	No
$V_{FO} = V_F - V_R$	2655	4700	No
V_R	270	2100	No

Level of Service Determination (if not F)

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

D_R = 28.1 (pc/ mi /ln)

LOS= D (Exhibit 25-4)

Speed Estimation

D_s = 0.322 (Exhibit 25-19)

S_R= 57.6 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.6 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Onramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2478	0.95	Level	8	0	0.962	1.00	2713
Ramp	339	0.95	Level	8	0	0.962	1.00	371
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 2713 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3084	See Exhibit 25-7	No
V_{R12}	3084	4600:All	No

Level of Service Determination (if not F)

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

D_R = 25.6 (pc/ m/ln)

LOS = C (Exhibit 25-4)

Speed Estimation

M_S = 0.352 (Exibit 25-19)

S_R= 56.9 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 56.9 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101
Agency or Company	Fehr & Peers	Junction	NB Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	AM	Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	2988	0.95	Level	8	0	0.962	1.00	3271
Ramp	340	0.95	Level	8	0	0.962	1.00	372
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 3271 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	3643	See Exhibit 25-7	No
V_{R12}	3643	4600:All	No

Level of Service Determination (if not F)

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

D_R = 30.0 (pc/ m/ln)

LOS = D (Exhibit 25-4)

Speed Estimation

M_S = 0.416 (Exibit 25-19)

S_R= 55.4 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 55.4 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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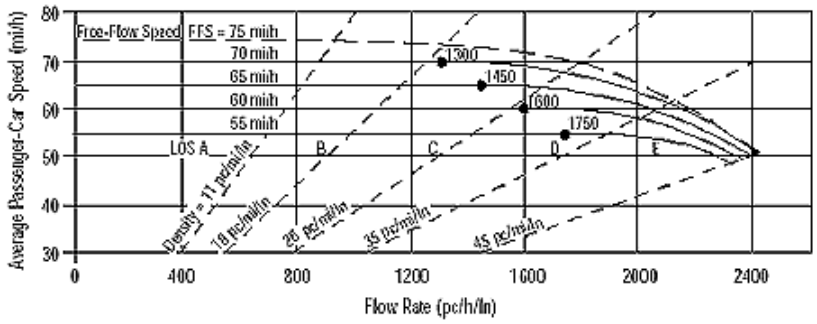
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 SB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*PM*	Analysis Year	*2025*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*4210*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2304*	pc/h/ln	Design LOS	
S	*53.9*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
D = v_p / S	*42.8*	pc/mi/ln	S	mi/h
LOS	*E*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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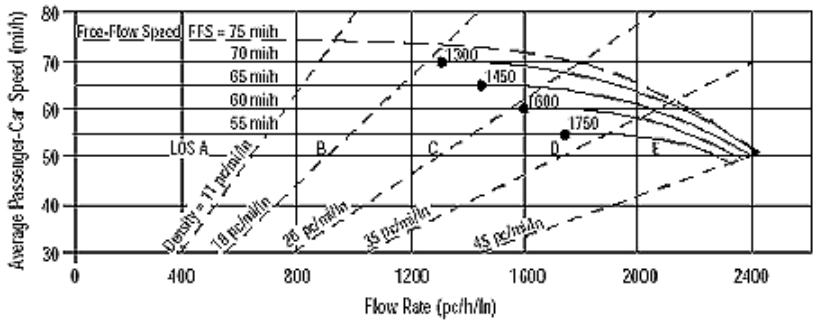
BASIC FREEWAY SEGMENTS WORKSHEET



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

General Information		***Site Information***	
Analyst	*JCW*	Highway/Direction of Travel	*Highway 101 NB*
Agency or Company	*Fehr & Peers*	From/To	*South of Los Berros/N Thompson*
Date Performed	*2/6/2006*	Jurisdiction	*San Luis Obispo County*
Analysis Time Period	*PM*	Analysis Year	*2025*

Project Description Laetitia Agricultural Cluster EIR

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

Flow Inputs				
Volume, V	*3603*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
Driver type adjustment	*1.00*		Up/Down %	

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*2*		f_N		mi/h
FFS (measured)	*65.0*	mi/h	FFS	*65.0*	mi/h
Base free-flow Speed, BFFS		mi/h			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1972*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h
S	*61.9*	mi/h	S	mi/h
D = v_p / S	*31.9*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

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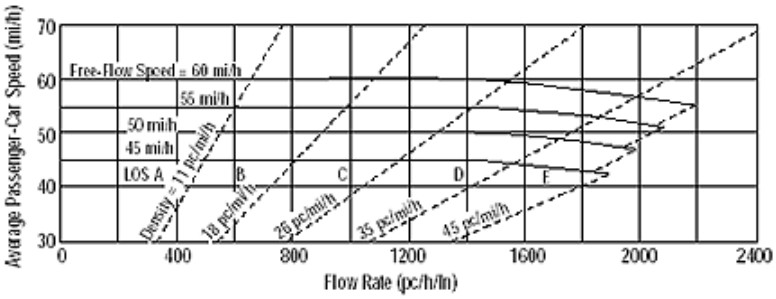
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	PM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	3468	Peak-Hour Factor, PHF	0.95
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1898
Speed, S (mi/h)	57.3
D (pc/mi/ln)	33.1
LOS	D

Design

Design (N)

Required Number of Lanes, N

Flow Rate, v_p (pc/h)

Max Service Flow Rate (pc/h/ln)

Design LOS

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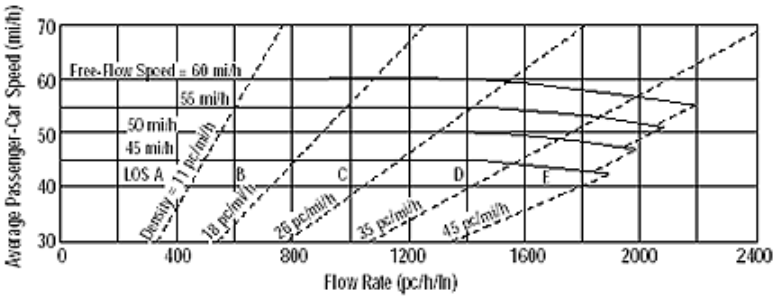
MULTILANE HIGHWAYS WORKSHEET(Direction 2)



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

General Information

Analyst	JCW
Agency or Company	Fehr & Peers
Date Performed	2/6/2006
Analysis Time Period	PM

Site Information

Highway/Direction to Travel	Highway 101
From/To	North of Los Berros/N Thompson
Jurisdiction	San Luis Obispo County
Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

☑ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	4226	Peak-Hour Factor, PHF	0.95
AADT(veh/h)		%Trucks and Buses, P_T	8
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	3

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.962

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearence, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	Divided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.0
f_M (mi/h)	0.0
FFS (mi/h)	60.0

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1542
Speed, S (mi/h)	59.5
D (pc/mi/ln)	25.9
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101 NB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2025

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	3603	0.95	Level	8	0	0.962	1.00	3944
Ramp	329	0.95	Level	8	0	0.962	1.00	360
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 3944 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	3944	4700	No
V_{12}	3944	4400:All	No
$V_{FO} = V_F - V_R$	3584	4700	No
V_R	360	2100	No

Level of Service Determination (if not F)

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

D_R = 36.8 (pc/ mi /ln)

LOS= E (Exhibit 25-4)

Speed Estimation

D_s = 0.330 (Exhibit 25-19)

S_R= 57.4 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.4 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Offramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2025

Project Description Laetita Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

Vu = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

VD = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	v=V/PHF f_{HV} f_p
Freeway	4226	0.95	Level	8	0	0.962	1.00	4626
Ramp	445	0.95	Level	8	0	0.962	1.00	487
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

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

V_{12}= pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Level of Service Determination (if not F)

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

D_R = (pc/ mi /ln)

LOS = (Exhibit 25-4)

Speed Estimation

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S= mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 25-11)

V_{12} = 4626 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$	4626	4700	No
V_{12}	4626	4400:All	Yes
$V_{FO} = V_F - V_R$	4139	4700	No
V_R	487	2100	No

Level of Service Determination (if not F)

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

D_R = 42.7 (pc/ mi /ln)

LOS= F (Exhibit 25-4)

Speed Estimation

D_s = 0.342 (Exhibit 25-19)

S_R= 57.1 mph (Exhibit 25-19)

S_0= N/A mph (Exhibit 25-19)

S = 57.1 mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	JCW	Freeway/Dir of Travel	Highway 101
Agency or Company	Fehr & Peers	Junction	NB Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	3575	0.95	Level	8	0	0.962	1.00	3914
Ramp	184	0.95	Level	8	0	0.962	1.00	201
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 3914 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4115	See Exhibit 25-7	No
V_{R12}	4115	4600:All	No

Level of Service Determination (if not F)

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

D_R = 33.7 (pc/ m/ln)

LOS = D (Exhibit 25-4)

Speed Estimation

M_S = 0.506 (Exibit 25-19)

S_R= 53.4 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 53.4 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	JCW	Freeway/Dir of Travel	Highway 101 SB Onramp
Agency or Company	Fehr & Peers	Junction	Los Berros Rd/N Thompson Rd
Date Performed	2/6/2006	Jurisdiction	San Luis Obispo County
Analysis Time Period	PM	Analysis Year	2025

Project Description Laetitia Agricultural Cluster EIR

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 65.0 mph S_{FR} = 45.0 mph

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

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	Truck	%Rv	f_{HV}	f_p	$v=V/PHF\ f_{HV}\ f_p$
Freeway	3864	0.95	Level	8	0	0.962	1.00	4230
Ramp	346	0.95	Level	8	0	0.962	1.00	379
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM}= 1.000 using Equation (Exhibit 25-5)

V_{12}= 4230 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}	4609	See Exhibit 25-7	No
V_{R12}	4609	4600:All	Yes

Level of Service Determination (if not F)

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

D_R = 37.5 (pc/ m/ln)

LOS = F (Exhibit 25-4)

Speed Estimation

M_S = 0.658 (Exibit 25-19)

S_R= 49.9 mph (Exhibit 25-19)

S_0= N/A mph(Exhibit 25-19)

S= 49.9 mph(Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = using Equation (Exhibit 25-11)

V_{12} = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$V_{FI}=V_F$			
V_{12}			
$V_{FO} = V_F - V_R$			
V_R			

Level of Service Determination (if not F)

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

D_R = (pc/ m/ln)

LOS= (Exhibit 25-4)

Speed Estimation

D_s = (Exhibit 25-19)

S_R= mph(Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

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CUMULATIVE WITH PROJECT SIGNAL WARRANT CALCULATION WORKSHEET

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative + Project	0.5	7	5,974
Limiting Value	4	100	650
Met/ Not Met	Not Met	Not Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

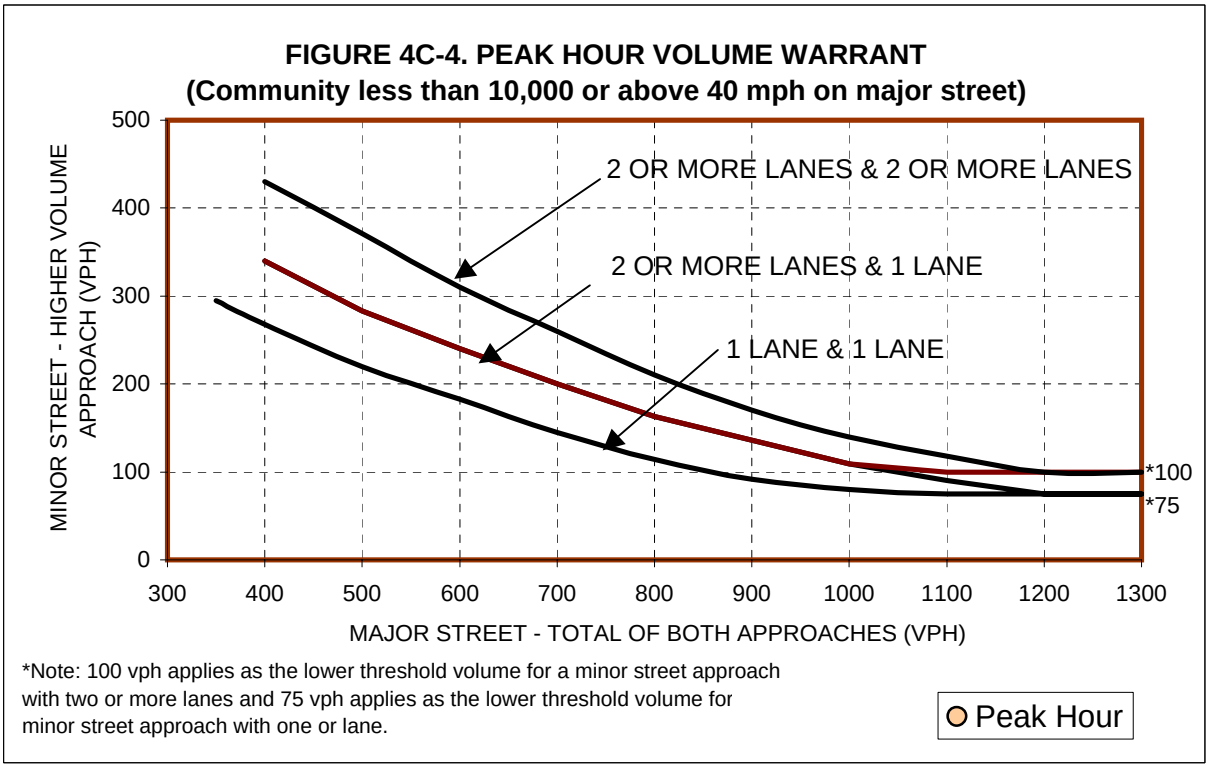
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
7:00 AM	5,967	7



Warrant	Not Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative + Project	2.1	247	1,276
Limiting Value	4	100	650
Met/ Not Met	Not Met	Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

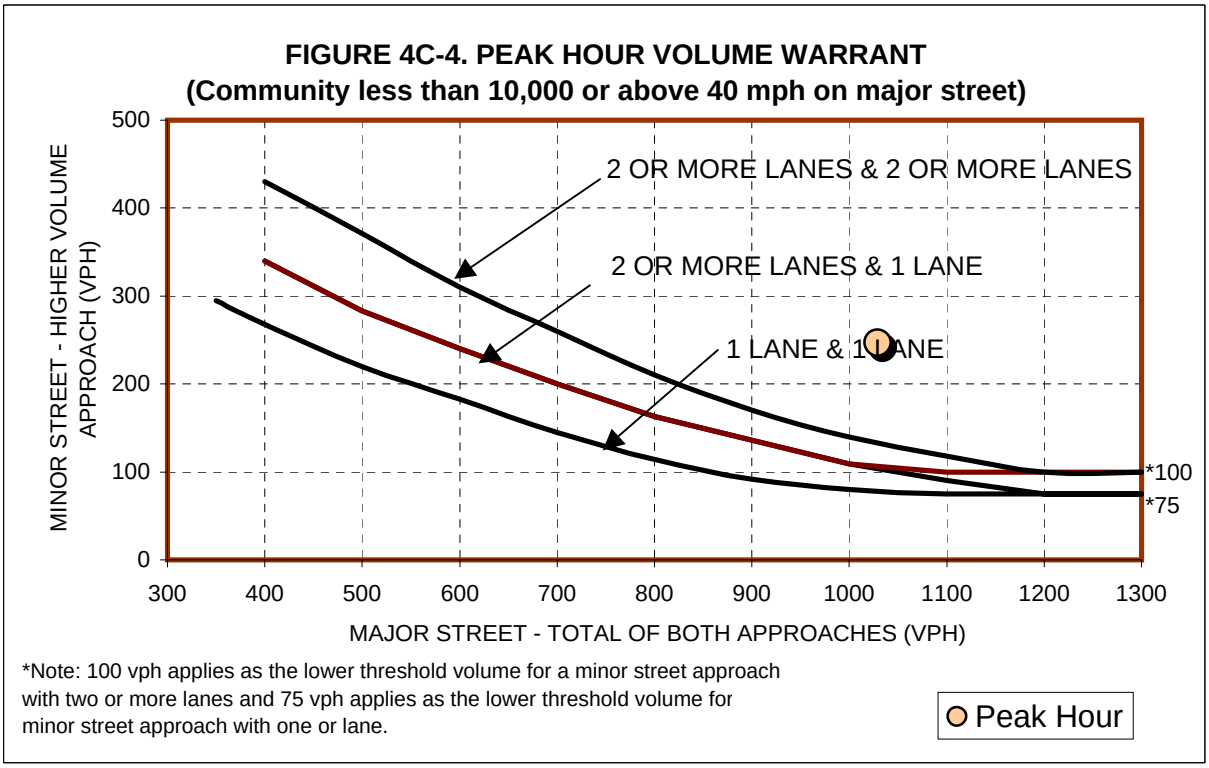
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
7:00 AM	1,029	247



Warrant	Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative PM	11.4	445	1,303
Limiting Value	4	100	650
Met/ Not Met	Met	Met	Met

Warrant	Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

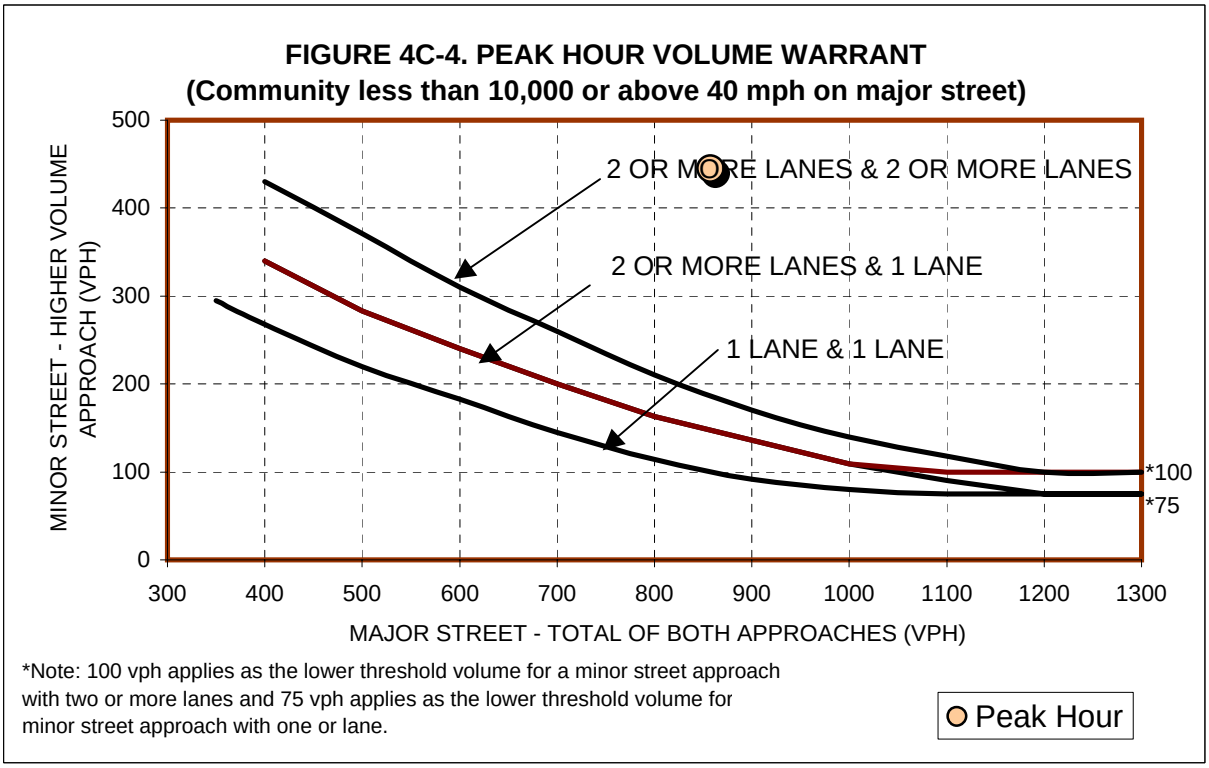
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	1
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	858	445



Warrant	Met

Warrant 3A: Peak Hour Delay

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the major street. The peak hour delay warrant is satisfied when the conditions given below exist for one hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach, and

2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 vph for intersections with three approaches.

Analysis

Minor Street Lanes	1
Total Approaches	3

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced for the Intersection (vph)
Cumulative + Project	4.8	38	7,739
Limiting Value	4	100	650
Met/ Not Met	Met	Not Met	Met

Warrant	Not Met

Warrant 3B: Peak Hour Volume

The peak hour volume warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

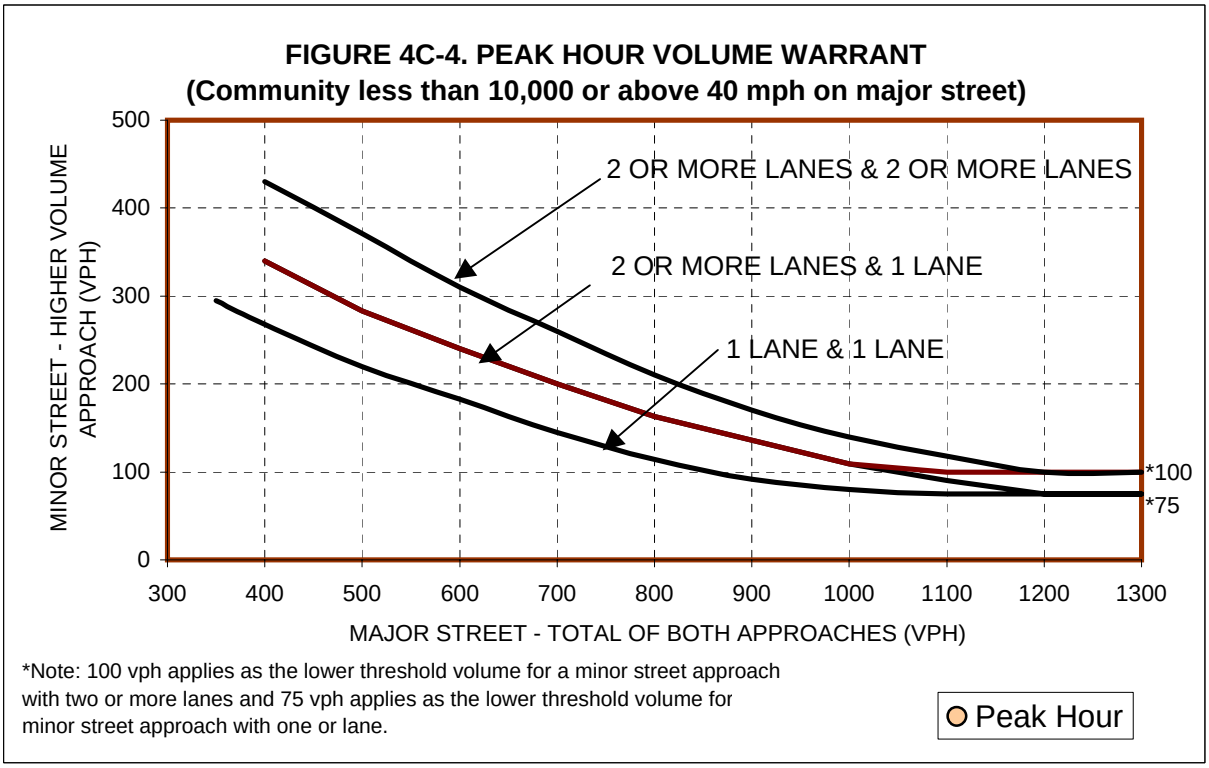
When the 85-percentile speed of the major street traffic exceeds 40 mile per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirement is satisfied when the plotted point referred to above falls above the curve in Figure 4-6 for the existing combination of approach lanes.

Analysis

	No of lanes
Major Street	2
Minor Street	1

Peak Hour

Time	Vehicles Per Hour	
	Major Street (Sum of both approaches)	Minor street (High volume approach)
5:00 PM	7,701	38



Warrant	Not Met