Performance Measure Summary – San Jose, CA

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2007. There is no single performance measure that experts agree "says it all." The best comparison of congestion levels and trends is done between regions of similar size, over several years, and with a few measures of congestion. Examining a few measures over many years reduces the chance that data variations or the estimating procedures may have caused a "spike" in any single year. A few key points should be recognized by users of the Urban Mobility Report data.

Use the Trends – The multi-year performance measures are better indicators, in most cases, than any single year. (*5 years is 5 times better than 1 year*).

Use several measures – Each performance measure illustrates a different element of congestion. (*The view is more interesting from the top of a few measures*).

Compare to similar regions – Congestion analyses that compare areas with similar characteristics (for example population, growth rate, road and public transportation system design) are usually more insightful than comparisons of different regions. (*Los Angeles is not Peoria*).

Compare ranking changes and performance measure values – In some performance measures a small change in the value may cause a significant change in rank from one year to the next. This is the case when there are several regions with nearly the same value. (*15 hours is only 1 hour more than 14 hours*).

Consider the scope of improvement options – Any improvement project in a corridor within most of the regions will only have a modest effect on the regional congestion level. (*To have an effect on areawide congestion, there must be significant change in the system or service*).

Performance Measures and Definition of Terms

Travel Time Index – A measure of congestion that focuses on each trip and each mile of travel. The ratio of travel time in the peak period to travel time in free-flow. A value of 1.30 indicates a 20-minute free-flow trip takes 26 minutes in the peak.

Peak Travelers – Number of travelers (using any travel mode) who begin a trip during the morning or evening peak travel periods (6 to 9 a.m. and 4 to 7 p.m.).

Annual Delay per Traveler – A yearly sum of all the per-trip delays. This measure illustrates the effect of the per-mile congestion as well as the length of each trip. The extra time required to travel in the peak period is divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.).

Total Delay – The overall size of the congestion problem. Measured by the total travel time above that needed to complete a trip at free-flow speeds. The ranking of total delay usually follows the population ranking (larger regions usually have more delay).

Free-Flow Speeds (60 mph on freeways and 35 mph on arterials) – These values are used as the national comparison thresholds. Other speed values may be appropriate for urban areas or sub-regions.

Excess Fuel Consumed – Increased fuel consumption due to travel in congested conditions rather than free-flow conditions.

Public Transportation – Regular route service from all public transportation providers in an urban area.

Operations Treatments – Freeway incident management, freeway ramp metering, arterial street signal coordination and arterial street access management.

Congestion Cost – Value of travel delay for 2007 (estimated at $15.47 per hour of person travel and $102.12 per hour of truck time) and excess fuel consumption (estimated using state average cost per gallon).

Annual Increase Needed to Maintain Constant Congestion Level – Number of lane-miles that must be added to the road system each year – or – the number of new transit riders or carpoolers that must be added to keep congestion levels the same as the previous year.

Urban Area – The developed area (population density more than 1,000 persons per square mile) within a metropolitan region. The urban area boundaries change frequently (every year for most growing areas). The annual change in miles traveled, therefore, includes both new travel due to growth and travel that previously occurred in areas designated as rural.

Number of Rush Hours – Time when system might have congestion.

The Mobility Data for San Jose CA

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	1,705	1,705	1,675	1,675	1,675	1,675
Rank	26	26	26	26	24	24
Urban Area (square miles)	395	395	390	390	390	390
Population Density (persons/sq mile)	4,316	4,316	4,295	4,295	4,295	4,295
Peak Travelers (1000s)	955	948	925	920	915	901
Freeway						
Daily Vehicle-Miles of Travel (1000s)	16,680	16,800	16,820	16,600	16,565	16,760
Lane-Miles	910	910	910	900	895	895
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	17,105	17,055	16,400	16,800	17,950	17,575
Lane-Miles	2,420	2,420	2,420	2,480	2,480	2,460
Public Transportation						
Annual Psgr-Miles of Travel (millions)	192	173	167	170	189	222
Annual Unlinked Psgr Trips (millions)	43	41	39	40	47	54
Cost Components						
Value of Time ($/hour)	15.47	15.06	14.58	14.10	13.73	13.43
Commercial Cost ($/hour)	102.12	98.77	94.06	86.24	82.38	79.96
Fuel Cost ($/gallon)	3.24	2.88	2.62	2.28	1.78	1.66
System Performance	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**
Congested Travel (% of peak VMT)	81	78	76	73	74	72
Congested System (% of lane-miles)	68	63	63	61	61	60
Congested Time (number of "Rush Hours")	7.8	8.0	7.8	7.8	8.0	8.0
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	0	0	0	0	4	11
Transit Riders or Carpoolers (millions)	0	0	0	0	2	4
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	35,630	36,914	34,317	32,290	34,639	33,994
Rank	21	21	21	21	19	19
Fuel per Peak Traveler (gallons)	37	39	37	35	38	38
Rank	7	7	7	8	6	6
Annual Delay						
Total Delay (1000s of person-hours)	51,070	52,540	49,314	47,556	50,991	49,735
Rank	20	20	20	20	20	19
Delay per Peak Traveler (person-hours)	53	55	53	52	56	55
Rank	6	6	8	9	5	5
Delay due to Incidents (percent)	53	53	53	53	52	52
Travel Time Index	1.36	1.37	1.35	1.32	1.34	1.33
Rank	8	6	8	9	7	7
Congestion Cost						
Total Cost ($ millions)	1,013	1,005	905	830	850	811
Rank	21	21	21	20	20	19
Cost per Peak Traveler ($)	1,061	1,060	978	903	930	900
Rank	10	10	11	9	6	7

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.
Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for San Jose CA, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	1,675	1,675	1,670	1,650	1,620
Rank	23	23	23	23	23
Urban Area (square miles)	390	385	385	385	380
Population Density (persons/sq mile)	4,295	4,351	4,338	4,286	4,263
Peak Travelers (1000s)	886	873	855	832	804
Freeway					
Daily Vehicle-Miles of Travel (1000s)	16,775	16,530	18,635	17,650	17,170
Lane-Miles	890	885	1,130	1,130	1,125
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	17,455	16,775	16,710	16,630	16,600
Lane-Miles	2,440	2,425	2,390	2,360	2,325
Public Transportation					
Annual Psgr-Miles of Travel (millions)	236	235	217	239	210
Annual Unlinked Psgr Trips (millions)	58	54	56	54	51
Cost Components					
Value of Time ($/hour)	13.22	12.85	12.43	12.17	11.98
Commercial Cost ($/hour)	80.88	80.75	74.23	72.61	74.32
Fuel Cost ($/gallon)	1.93	1.72	1.59	1.27	1.40
System Performance	**2001**	**2000**	**1999**	**1998**	**1997**
Congested Travel (% of peak VMT)	72	71	64	61	60
Congested System (% of lane-miles)	58	58	52	48	48
Congested Time (number of "Rush Hours")	8.0	8.0	7.6	7.4	7.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	14	3	81	111	89
Transit Riders or Carpoolers (millions)	5	1	28	38	30
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	34,757	33,479	31,104	26,758	24,475
Rank	18	18	18	18	19
Fuel per Peak Traveler (gallons)	39	38	36	32	30
Rank	4	5	5	8	9
Annual Delay					
Total Delay (1000s of person-hours)	50,295	48,595	44,812	38,849	35,114
Rank	18	18	18	18	19
Delay per Peak Traveler (person-hours)	57	56	52	47	44
Rank	4	4	4	9	9
Delay due to Incidents (percent)	53	53	53	53	52
Travel Time Index	1.34	1.34	1.29	1.25	1.23
Rank	6	3	9	12	15
Congestion Cost					
Total Cost ($ millions)	824	768	682	572	515
Rank	18	18	18	19	20
Cost per Peak Traveler ($)	930	880	797	688	641
Rank	4	4	5	9	9

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.
Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for San Jose CA, Continued

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	1,595	1,550	1,540	1,525	1,505
Rank	23	23	23	23	23
Urban Area (square miles)	380	375	370	365	365
Population Density (persons/sq mile)	4,197	4,133	4,162	4,178	4,123
Peak Travelers (1000s)	778	744	728	709	689
Freeway					
Daily Vehicle-Miles of Travel (1000s)	17,050	17,000	16,660	16,555	16,575
Lane-Miles	1,110	1,090	1,050	1,015	990
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	16,510	16,165	14,870	12,785	13,130
Lane-Miles	2,290	2,265	2,225	2,200	2,180
Public Transportation					
Annual Psgr-Miles of Travel (millions)	197	185	191	222	218
Annual Unlinked Psgr Trips (millions)	49	45	45	52	49
Cost Components					
Value of Time ($/hour)	11.71	11.37	11.06	10.78	10.47
Commercial Cost ($/hour)	74.17	71.54	69.53	67.77	66.19
Fuel Cost ($/gallon)	1.21	1.27	1.16	1.23	1.28
System Performance	**1996**	**1995**	**1994**	**1993**	**1992**
Congested Travel (% of peak VMT)	58	58	56	56	56
Congested System (% of lane-miles)	45	45	40	40	40
Congested Time (number of "Rush Hours")	7.4	7.4	7.4	7.4	7.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	89	92	62	29	74
Transit Riders or Carpoolers (millions)	30	32	21	9	24
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	25,103	25,001	22,783	21,238	22,458
Rank	16	15	15	15	15
Fuel per Peak Traveler (gallons)	32	34	31	30	33
Rank	8	6	8	6	4
Annual Delay					
Total Delay (1000s of person-hours)	36,354	36,036	32,229	29,645	32,232
Rank	17	16	17	17	15
Delay per Peak Traveler (person-hours)	47	48	44	42	47
Rank	9	8	9	9	6
Delay due to Incidents (percent)	52	52	52	51	51
Travel Time Index	1.24	1.24	1.23	1.23	1.24
Rank	12	10	11	9	9
Congestion Cost					
Total Cost ($ millions)	520	503	435	393	416
Rank	19	17	17	18	16
Cost per Peak Traveler ($)	668	675	598	554	603
Rank	9	9	9	9	7

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.
Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for San Jose CA, Continued

Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	1,500	1,410	1,390	1,370	1,355
Rank	23	23	23	23	23
Urban Area (square miles)	360	355	350	345	345
Population Density (persons/sq mile)	4,167	3,972	3,971	3,971	3,928
Peak Travelers (1000s)	675	625	612	597	587
Freeway					
Daily Vehicle-Miles of Travel (1000s)	16,520	15,780	15,540	14,980	14,410
Lane-Miles	950	920	900	875	860
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	12,980	13,190	13,185	13,075	12,040
Lane-Miles	2,150	2,115	2,100	2,090	2,070
Public Transportation					
Annual Psgr-Miles of Travel (millions)	207	188	158	145	145
Annual Unlinked Psgr Trips (millions)	50	46	42	36	36
Cost Components					
Value of Time ($/hour)	10.17	9.75	9.25	8.83	8.48
Commercial Cost ($/hour)	64.55	62.47	59.16	56.03	54.62
Fuel Cost ($/gallon)	1.11	1.14	1.14	1.05	1.05
System Performance	**1991**	**1990**	**1989**	**1988**	**1987**
Congested Travel (% of peak VMT)	57	57	57	57	54
Congested System (% of lane-miles)	40	40	40	39	38
Congested Time (number of "Rush Hours")	7.6	7.6	7.6	7.6	7.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	103	135	160	181	160
Transit Riders or Carpoolers (millions)	34	45	53	59	50
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	24,185	23,734	24,291	22,781	20,549
Rank	15	15	13	13	13
Fuel per Peak Traveler (gallons)	36	38	40	38	35
Rank	3	3	3	3	3
Annual Delay					
Total Delay (1000s of person-hours)	35,154	35,006	36,087	33,864	31,131
Rank	15	15	12	13	13
Delay per Peak Traveler (person-hours)	52	56	59	57	53
Rank	4	3	3	3	3
Delay due to Incidents (percent)	51	51	51	51	51
Travel Time Index	1.27	1.27	1.28	1.26	1.25
Rank	5	3	3	3	4
Congestion Cost					
Total Cost ($ millions)	435	419	409	366	325
Rank	15	15	14	13	13
Cost per Peak Traveler ($)	645	670	669	612	554
Rank	4	3	3	3	3

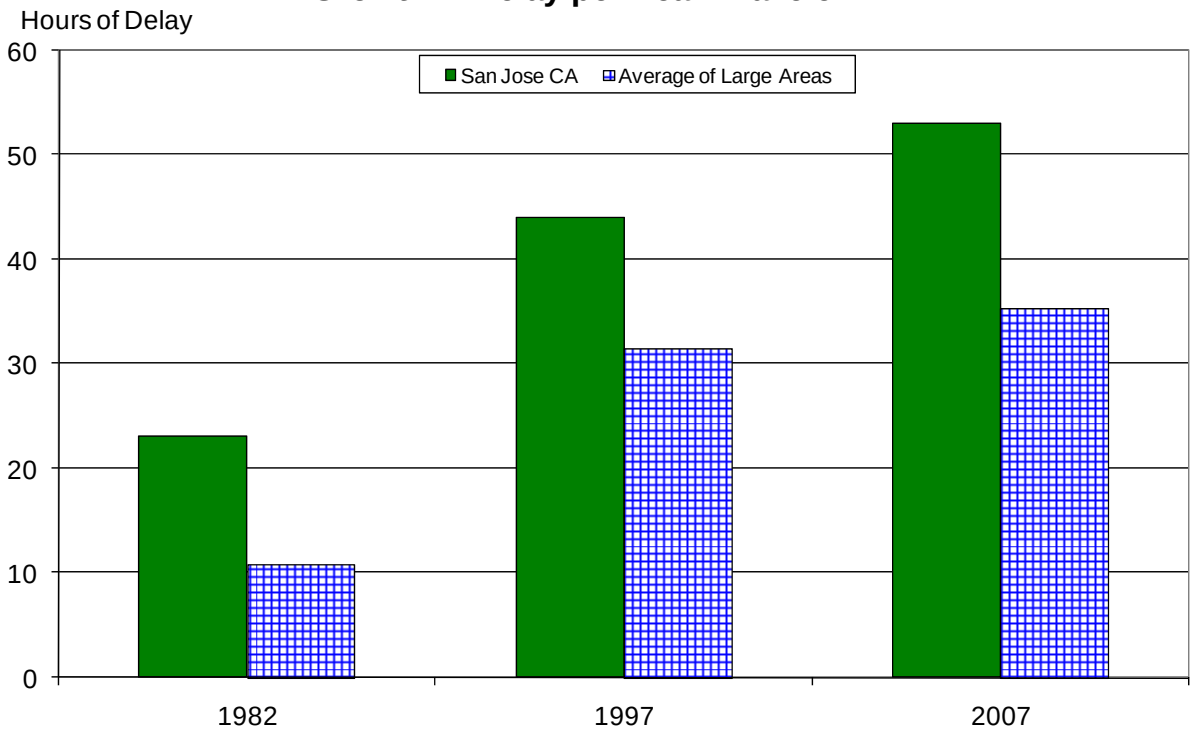
Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.
Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for San Jose CA, Continued

Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	1,340	1,325	1,310	1,300	1,300
Rank	23	23	23	23	23
Urban Area (square miles)	340	335	330	330	325
Population Density (persons/sq mile)	3,941	3,955	3,970	3,939	4,000
Peak Travelers (1000s)	575	564	554	546	540
Freeway					
Daily Vehicle-Miles of Travel (1000s)	13,530	12,930	12,240	11,455	11,040
Lane-Miles	830	820	790	765	750
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	11,530	10,385	9,900	9,410	9,235
Lane-Miles	2,055	2,030	2,005	1,975	1,950
Public Transportation					
Annual Psgr-Miles of Travel (millions)	144	151	167	167	167
Annual Unlinked Psgr Trips (millions)	38	35	39	39	39
Cost Components					
Value of Time ($/hour)	8.18	8.03	7.75	7.43	7.20
Commercial Cost ($/hour)	52.63	55.80	54.65	52.70	52.13
Fuel Cost ($/gallon)	1.03	1.35	1.36	1.39	1.46
System Performance	**1986**	**1985**	**1984**	**1983**	**1982**
Congested Travel (% of peak VMT)	53	50	46	44	42
Congested System (% of lane-miles)	38	38	36	33	33
Congested Time (number of "Rush Hours")	7.2	7.2	6.8	6.6	6.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	- -	- -	- -	- -	- -
Transit Riders or Carpoolers (millions)	- -	- -	- -	- -	- -
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	16,841	14,952	12,003	10,644	8,699
Rank	12	11	13	13	13
Fuel per Peak Traveler (gallons)	29	26	22	19	16
Rank	3	3	4	3	5
Annual Delay					
Total Delay (1000s of person-hours)	24,744	21,682	17,262	15,106	12,280
Rank	13	12	13	13	14
Delay per Peak Traveler (person-hours)	43	38	31	28	23
Rank	3	4	5	4	7
Delay due to Incidents (percent)	51	50	50	50	50
Travel Time Index	1.21	1.20	1.17	1.16	1.13
Rank	6	5	5	4	6
Congestion Cost					
Total Cost ($ millions)	251	224	174	147	118
Rank	14	13	13	13	14
Cost per Peak Traveler ($)	437	396	313	270	219
Rank	3	5	5	4	8

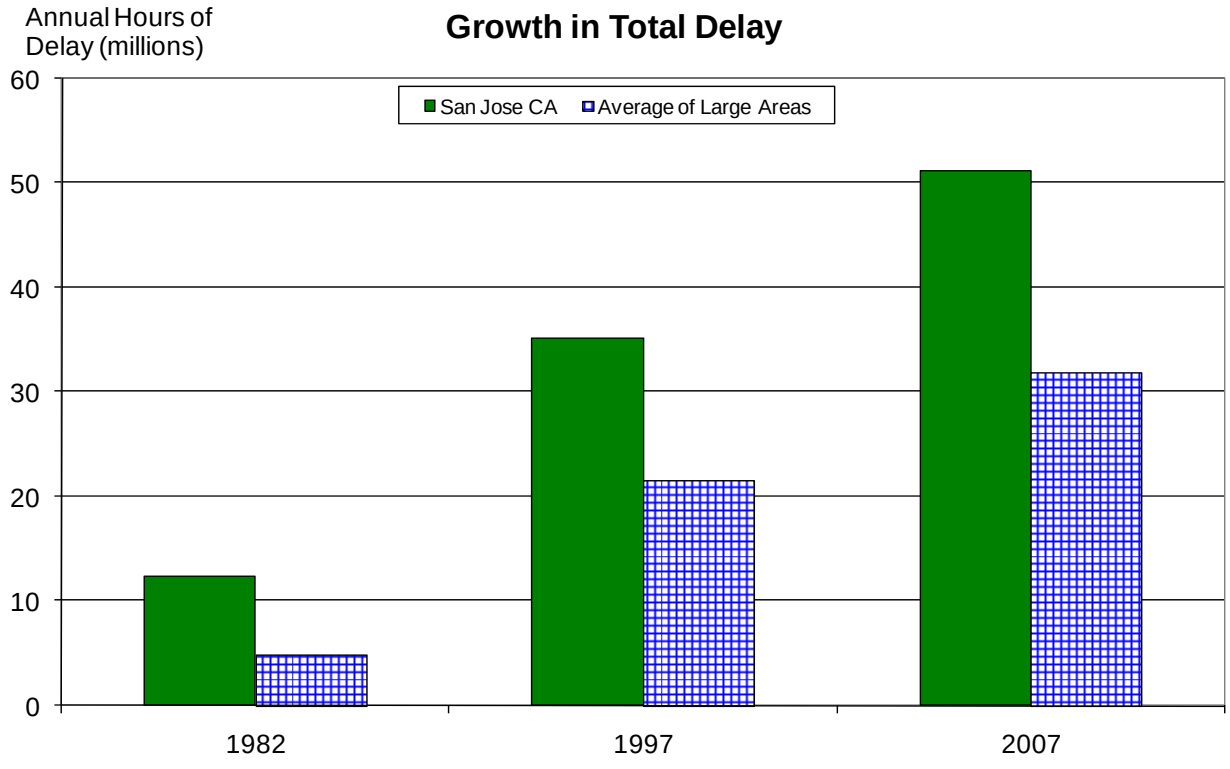
Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.
Note: Zeroes in the table reflect values less than 0.5.

Growth in Delay per Peak Traveler



Note: Large areas have populations between 1 and 3 million

Growth in Total Delay



Note: Large areas have populations between 1 and 3 million

Benefits from Public Transportation Service and Operations Strategies in San Jose CA

Operations Strategies	2007	2006	2005	2004
Freeway Ramp Metering				
Percent of Roadway Miles	58	57	53	53
Annual Delay Reduction (1000 hours)	472	435	403	361
Freeway Incident Management				
Cameras				
Percent of Roadway Miles	66	65	65	66
Service Patrols				
Percent of Roadway Miles	92	92	92	93
Annual Delay Reduction (1000 hours)	2,009	2,178	1,715	1,543
Arterial Signal Coordination				
Percent of Roadway Miles	96	96	93	92
Annual Delay Reduction (1000 hours)	232	237	268	256
Arterial Access Management				
Percent of Roadway Miles	76	76	61	62
Annual Delay Reduction (1000 hours)	1,684	1,599	1,329	1,364
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	4,396	4,449	3,715	3,525
Annual Delay Saved per Peak Traveler (hours)	5	5	4	4
Annual Congestion Cost Savings ($million)	86.4	84.3	67.3	60.8
Travel Time Index with Strategies	1.356	1.370	1.348	1.323
Travel Time Index (Base)	1.386	1.400	1.372	1.344
Public Transportation Service	**2007**	**2006**	**2005**	**2004**
Existing Service				
Annual Passenger-miles of travel (million)	192	173	167	169
Unlinked Passenger Trips (million)	43	41	38	40
Travel Time Index (combined road and transit)	1.379	1.394	1.366	1.339
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.396	1.409	1.380	1.352
Annual Increase				
Delay (1000 hours)	2,375	2,065	1,996	1,916
Delay per Peak Traveler (hours)	2	2	2	2
Congestion Cost ($million)	46.9	39.3	36.3	33.2

Benefits from Public Transportation Service and Operations Strategies in San Jose CA, Continued

Operations Strategies	2003	2002	2001	2000
Freeway Ramp Metering				
Percent of Roadway Miles	53	51	52	52
Annual Delay Reduction (1000 hours)	347	343	458	484
Freeway Incident Management				
Cameras				
Percent of Roadway Miles	66	66	--	--
Service Patrols				
Percent of Roadway Miles	94	94	83	76
Annual Delay Reduction (1000 hours)	1,365	1,337	1,316	1,236
Arterial Signal Coordination				
Percent of Roadway Miles	91	91	90	88
Annual Delay Reduction (1000 hours)	254	243	216	234
Arterial Access Management				
Percent of Roadway Miles	60	60	60	57
Annual Delay Reduction (1000 hours)	1,481	1,365	1,323	1,154
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	3,447	3,287	3,312	3,108
Annual Delay Saved per Peak Traveler (hours)	4	4	4	4
Annual Congestion Cost Savings ($million)	57.1	53.3	53.7	48.6
Travel Time Index with Strategies	1.337	1.332	1.341	1.337
Travel Time Index (Base)	1.358	1.352	1.361	1.356
Public Transportation Service	**2003**	**2002**	**2001**	**2000**
Existing Service				
Annual Passenger-miles of travel (million)	189	222	236	235
Unlinked Passenger Trips (million)	47	54	58	54
Travel Time Index (combined road and transit)	1.352	1.345	1.354	1.349
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.366	1.362	1.371	1.366
Annual Increase				
Delay (1000 hours)	2,156	2,437	2,674	2,472
Delay per Peak Traveler (hours)	2	3	3	3
Congestion Cost ($million)	35.8	39.6	43.5	38.9

Comparison of Several Key Mobility Performance Measures
Large Group – 1 million to 3 million population urban areas

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2007	
				Delay per Traveler	Total Delay
San Diego, CA	H+	H+	H+	F+	F+
Minneapolis-St., Paul MN	H	0	H+	F+	F+
Baltimore, MD	H+	H+	H+	F+	F+
Tampa-St. Petersburg, FL	H+	H+	H+	0	F+
St. Louis, MO-IL	L-	L-	0	S-	S
Denver-Aurora, CO	H+	H+	H+	F	F+
Riverside-San Bernardino, CA	H+	H+	H+	F+	F+
Sacramento, CA	H	H+	H	0	F+
Pittsburgh, PA	L-	L-	L-	S-	S-
Portland, OR-WA	0	H	0	0	F
Cleveland, OH	L-	L-	L-	S-	S-
San Jose, CA	H+	H+	H+	F	F+
Cincinnati, OH-KY-IN	L-	L	L	S	S-
Virginia Beach, VA	L	L	L	S-	S-
Kansas City, MO-KS	L-	L-	L-	S-	S-
Milwaukee, WI	L-	L-	L-	S-	S-
San Antonio, TX	H	0	0	F+	F
Las Vegas, NV	H+	H	0	F+	F+
Orlando, FL	H+	H	H	F+	F+
Providence, RI-MA	L	L	L	0	S-
Columbus, OH	L	L	L	0	S-
Buffalo, NY	L-	L-	L-	S-	S-
New Orleans, LA	L-	L	L-	S-	S-
Charlotte, NC-SC	H	0	L	F	S-
Indianapolis, IN	H	0	L	S	S-
Jacksonville, FL	H	0	L	0	S-
Austin, TX	H	H	L	F	S-
Memphis, TN-MS-AR	L-	L-	L-	S	S-
Raleigh-Durham, NC	0	L	L-	0	S-

0 – Average congestion levels or average congestion growth
H Higher congestion; H+ Much higher congestion; F Faster congestion growth; F+ Much faster growth
L Lower congestion; L- Much lower congestion; S Slower congestion growth; S- Much slower growth

Key Mobility Performance Measure Labels

Note: Designation of an urban area congestion problem as “Much higher”, “Much faster growth”, etc. is determined using a general indicator of the accuracy of the congestion estimates. For regions with the same indicator label, there may be no difference in congestion levels. Different values are used for the indicators in regions over 1 million population and below 1 million population.

Measures	Differences Within These Values May Not Indicate a Difference in Congestion Level	
2007 Values	**Above 1M Population**	**Below 1M Population**
Delay per Traveler -	5 Hours	3 Hours
Travel Time Index -	5 Index Points	3 Index Points
Total Delay -	5 Hours x Average Population	3 Hours x Average Population
1982 to 2007 Trends		
Delay per Traveler -	5 Hours	3 Hours
Total Delay -	5 Hours x Average Population	3 Hours x Average Population