

Performance Measure Summary – St. Louis, MO-IL

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 St. Louis MO-IL

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	2,215	2,185	2,140	2,100	2,075	2,065
Rank	19	19	19	19	18	18
Urban Area (square miles)	1,280	1,240	1,200	1,175	1,145	1,140
Population Density (persons/sq mile)	1,730	1,762	1,783	1,787	1,812	1,811
Peak Travelers (1000s)	1,240	1,215	1,181	1,153	1,133	1,111
Freeway						
Daily Vehicle-Miles of Travel (1000s)	29,610	27,860	27,200	27,665	27,200	26,900
Lane-Miles	2,350	2,210	2,140	2,100	2,020	1,930
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	18,145	17,100	17,500	17,390	17,565	17,560
Lane-Miles	4,200	3,945	3,800	3,710	3,660	3,500
Public Transportation						
Annual Psgr-Miles of Travel (millions)	297	280	286	284	272	284
Annual Unlinked Psgr Trips (millions)	57	52	49	48	48	50
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)	2.85	2.54	2.20	1.78	1.43	1.30
System Performance	2007	2006	2005	2004	2003	2002
Congested Travel (% of peak VMT)	36	39	42	46	51	53
Congested System (% of lane-miles)	32	37	37	39	40	44
Congested Time (number of "Rush Hours")	5.0	5.0	5.2	5.6	5.8	6.0
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	94	28	37	55	65	63
Transit Riders or Carpoolers (millions)	24	7	10	15	18	18
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	20,660	22,402	23,342	23,433	24,186	25,663
Rank	27	26	25	24	24	22
Fuel per Peak Traveler (gallons)	17	18	20	20	21	23
Rank	46	43	40	39	37	30
Annual Delay						
Total Delay (1000s of person-hours)	32,863	35,932	37,772	36,049	35,663	37,859
Rank	26	24	24	24	23	22
Delay per Peak Traveler (person-hours)	26	30	32	31	31	34
Rank	47	41	39	39	38	33
Delay due to Incidents (percent)	53	53	53	53	53	53
Travel Time Index	1.13	1.16	1.16	1.16	1.17	1.18
Rank	52	45	45	45	41	37
Congestion Cost						
Total Cost (\$ millions)	697	738	738	665	628	651
Rank	26	24	24	24	23	22
Cost per Peak Traveler (\$)	562	608	625	577	554	586
Rank	44	41	40	39	37	33

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 St. Louis MO-IL, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	2,055	2,040	2,005	2,000	2,000
Rank	18	18	18	18	18
Urban Area (square miles)	1,135	1,130	1,130	1,125	1,070
Population Density (persons/sq mile)	1,811	1,805	1,774	1,778	1,869
Peak Travelers (1000s)	1,087	1,063	1,027	1,008	992
Freeway					
Daily Vehicle-Miles of Travel (1000s)	26,400	25,900	25,600	24,960	24,195
Lane-Miles	1,880	1,840	1,800	1,760	1,690
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	17,540	17,425	17,380	17,315	17,775
Lane-Miles	3,390	3,260	3,185	3,115	3,075
Public Transportation					
Annual Psgr-Miles of Travel (millions)	251	271	274	263	256
Annual Unlinked Psgr Trips (millions)	53	54	56	56	55
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)	1.33	1.48	1.02	1.01	1.06
System Performance	2001	2000	1999	1998	1997
Congested Travel (% of peak VMT)	54	55	56	54	53
Congested System (% of lane-miles)	44	44	44	44	44
Congested Time (number of "Rush Hours")	6.2	6.2	6.4	6.4	6.6
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	64	58	136	196	267
Transit Riders or Carpoolers (millions)	18	17	41	59	82
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	25,406	27,722	27,301	25,782	25,552
Rank	22	19	19	19	18
Fuel per Peak Traveler (gallons)	23	26	27	26	26
Rank	28	19	15	15	12
Annual Delay					
Total Delay (1000s of person-hours)	37,656	41,009	40,117	37,970	38,411
Rank	22	19	19	19	18
Delay per Peak Traveler (person-hours)	35	39	39	38	39
Rank	25	18	17	14	11
Delay due to Incidents (percent)	54	54	54	54	54
Travel Time Index	1.18	1.20	1.20	1.19	1.19
Rank	34	33	28	27	26
Congestion Cost					
Total Cost (\$ millions)	640	689	633	588	590
Rank	22	19	19	18	17
Cost per Peak Traveler (\$)	588	648	616	583	595
Rank	29	18	16	14	13

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 St. Louis MO-IL, Continued

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	1,995	1,995	1,990	1,980	1,970
Rank	18	18	18	18	18
Urban Area (square miles)	1,030	1,000	940	870	820
Population Density (persons/sq mile)	1,937	1,995	2,117	2,276	2,402
Peak Travelers (1000s)	974	958	941	921	902
Freeway					
Daily Vehicle-Miles of Travel (1000s)	23,765	23,310	22,460	20,730	18,700
Lane-Miles	1,670	1,665	1,635	1,620	1,545
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	17,635	17,645	15,100	14,000	13,250
Lane-Miles	3,030	3,005	2,980	2,950	2,860
Public Transportation					
Annual Psgr-Miles of Travel (millions)	234	211	222	184	181
Annual Unlinked Psgr Trips (millions)	52	53	49	42	43
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)	1.22	1.04	0.95	0.98	0.96
System Performance	1996	1995	1994	1993	1992
Congested Travel (% of peak VMT)	50	50	44	38	32
Congested System (% of lane-miles)	42	42	37	35	30
Congested Time (number of "Rush Hours")	6.6	6.4	6.0	5.4	4.8
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	315	311	251	191	150
Transit Riders or Carpoolers (millions)	97	95	71	50	38
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	23,981	23,500	19,461	14,905	10,865
Rank	17	16	20	21	24
Fuel per Peak Traveler (gallons)	25	25	21	16	12
Rank	13	10	17	30	44
Annual Delay					
Total Delay (1000s of person-hours)	36,959	36,457	30,378	23,408	17,194
Rank	16	15	20	21	23
Delay per Peak Traveler (person-hours)	38	38	32	25	19
Rank	15	12	19	30	41
Delay due to Incidents (percent)	54	54	54	53	53
Travel Time Index	1.18	1.18	1.16	1.13	1.10
Rank	27	25	27	34	45
Congestion Cost					
Total Cost (\$ millions)	559	531	430	324	230
Rank	16	16	19	21	24
Cost per Peak Traveler (\$)	574	554	457	352	255
Rank	14	11	17	29	42

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 St. Louis MO-IL, Continued

Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	1,965	1,960	1,955	1,950	1,940
Rank	17	17	16	15	15
Urban Area (square miles)	780	760	740	720	710
Population Density (persons/sq mile)	2,519	2,579	2,642	2,708	2,732
Peak Travelers (1000s)	884	868	860	850	840
Freeway					
Daily Vehicle-Miles of Travel (1000s)	17,500	17,670	17,085	16,835	15,860
Lane-Miles	1,500	1,500	1,480	1,470	1,400
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	12,415	12,000	11,750	11,480	11,170
Lane-Miles	2,815	2,625	2,570	2,450	2,380
Public Transportation					
Annual Psgr-Miles of Travel (millions)	187	194	176	183	180
Annual Unlinked Psgr Trips (millions)	47	45	45	45	48
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)	1.01	0.98	1.11	1.02	1.03
System Performance	1991	1990	1989	1988	1987
Congested Travel (% of peak VMT)	30	29	28	27	25
Congested System (% of lane-miles)	30	28	28	25	23
Congested Time (number of "Rush Hours")	4.4	4.6	4.4	4.4	4.2
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	84	110	131	137	122
Transit Riders or Carpoolers (millions)	20	28	32	34	30
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	8,977	9,187	8,470	7,962	7,179
Rank	24	24	24	23	21
Fuel per Peak Traveler (gallons)	10	11	10	9	9
Rank	48	43	42	42	38
Annual Delay					
Total Delay (1000s of person-hours)	13,937	14,550	13,541	12,406	11,271
Rank	25	24	22	22	22
Delay per Peak Traveler (person-hours)	16	17	16	15	13
Rank	48	44	43	43	44
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.09	1.09	1.09	1.09	1.08
Rank	48	47	41	40	41
Congestion Cost					
Total Cost (\$ millions)	182	183	162	142	124
Rank	24	23	22	22	21
Cost per Peak Traveler (\$)	206	210	189	167	148
Rank	50	46	43	42	43

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.

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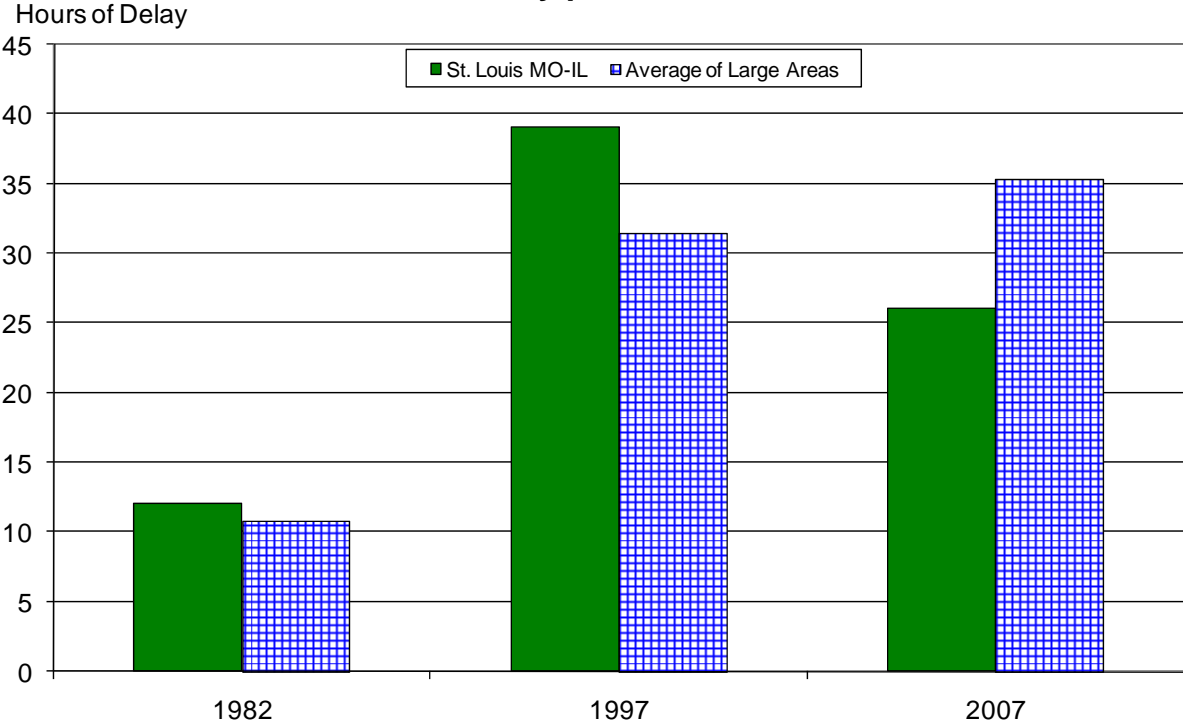
The Mobility Data for St. Louis MO-IL, Continued

Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	1,930	1,910	1,890	1,875	1,870
Rank	15	14	14	14	13
Urban Area (square miles)	700	700	700	700	650
Population Density (persons/sq mile)	2,757	2,729	2,700	2,679	2,877
Peak Travelers (1000s)	828	814	799	788	776
Freeway					
Daily Vehicle-Miles of Travel (1000s)	16,255	15,590	14,620	14,000	13,365
Lane-Miles	1,300	1,270	1,220	1,200	1,190
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	10,900	10,400	10,000	9,850	9,700
Lane-Miles	2,315	2,190	2,075	2,020	1,955
Public Transportation					
Annual Psgr-Miles of Travel (millions)	190	207	183	183	183
Annual Unlinked Psgr Trips (millions)	52	51	51	51	51
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)	1.00	1.31	1.33	1.36	1.42
System Performance	1986	1985	1984	1983	1982
Congested Travel (% of peak VMT)	28	28	29	26	23
Congested System (% of lane-miles)	23	23	25	23	21
Congested Time (number of "Rush Hours")	5.2	5.0	4.8	4.6	4.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	--	--	--	--	--
Transit Riders or Carpoolers (millions)	--	--	--	--	--
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	7,819	7,492	7,195	6,085	5,528
Rank	20	20	20	19	19
Fuel per Peak Traveler (gallons)	9	9	9	8	7
Rank	36	35	27	31	30
Annual Delay					
Total Delay (1000s of person-hours)	12,267	11,803	11,188	9,596	9,066
Rank	19	20	20	19	19
Delay per Peak Traveler (person-hours)	15	15	14	12	12
Rank	35	34	31	33	28
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.09	1.09	1.09	1.08	1.07
Rank	36	30	23	26	26
Congestion Cost					
Total Cost (\$ millions)	131	128	118	97	90
Rank	19	19	20	19	17
Cost per Peak Traveler (\$)	158	157	148	124	116
Rank	36	35	31	33	32

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.

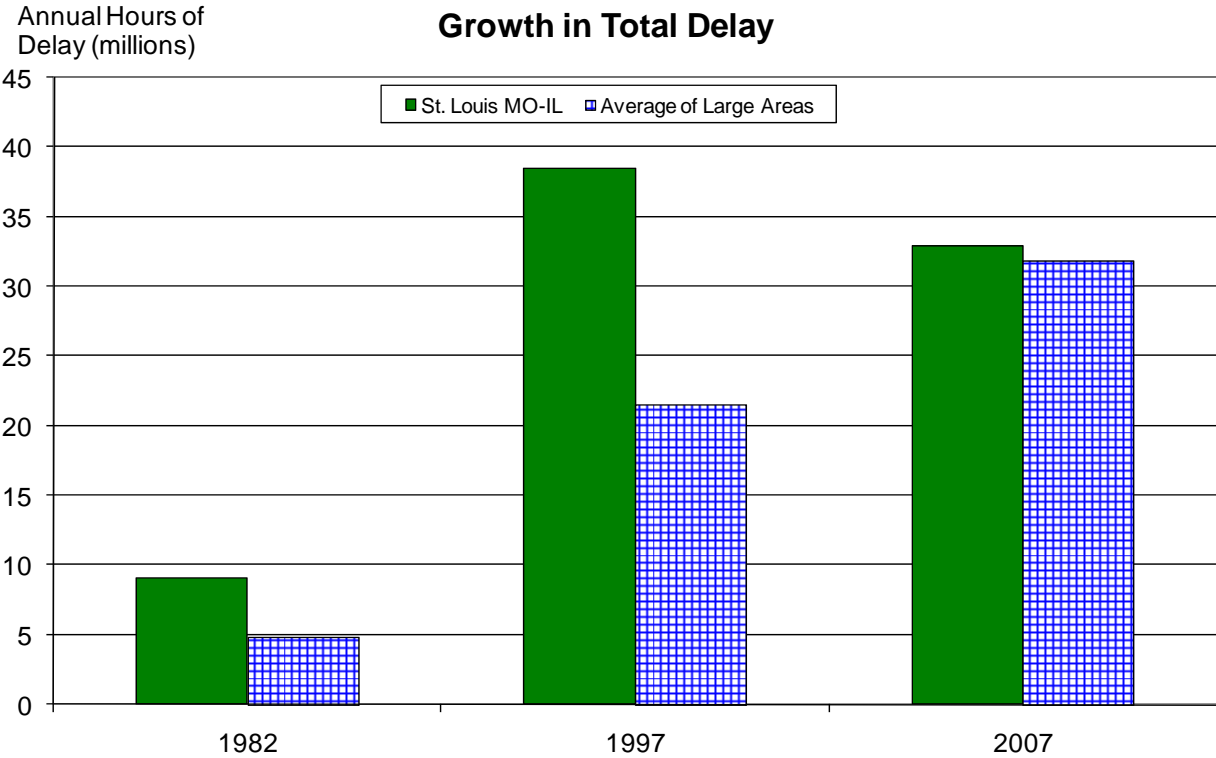
Note: Zeroes in the table reflect values less than 0.5.

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
St. Louis MO-IL**

Operations Strategies	2007	2006	2005	2004
Freeway Ramp Metering				
Percent of Roadway Miles	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--
Freeway Incident Management				
Cameras				
Percent of Roadway Miles	9	10	10	10
Service Patrols				
Percent of Roadway Miles	49	52	54	55
Annual Delay Reduction (1000 hours)	873	1,059	809	653
Arterial Signal Coordination				
Percent of Roadway Miles	55	58	60	62
Annual Delay Reduction (1000 hours)	49	88	145	226
Arterial Access Management				
Percent of Roadway Miles	12	12	8	9
Annual Delay Reduction (1000 hours)	401	469	44	90
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	1,324	1,616	998	969
Annual Delay Saved per Peak Traveler (hours)	1	1	1	1
Annual Congestion Cost Savings (\$million)	27.9	32.9	19.8	18.1
Travel Time Index with Strategies	1.134	1.156	1.164	1.164
Travel Time Index (Base)	1.138	1.161	1.168	1.168
Public Transportation Service	2007	2006	2005	2004
Existing Service				
Annual Passenger-miles of travel (million)	297	280	286	284
Unlinked Passenger Trips (million)	56	52	49	48
Travel Time Index (combined road and transit)	1.136	1.158	1.165	1.165
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.144	1.168	1.175	1.175
Annual Increase				
Delay (1000 hours)	2,031	2,098	2,283	2,292
Delay per Peak Traveler (hours)	2	2	2	2
Congestion Cost (\$million)	43.2	43.3	44.8	42.6

**Benefits from Public Transportation Service and Operations Strategies in
St. Louis MO-IL, Continued**

Operations Strategies	2003	2002	2001	2000
Freeway Ramp Metering				
Percent of Roadway Miles	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--
Freeway Incident Management				
Cameras				
Percent of Roadway Miles	3	3	3	3
Service Patrols				
Percent of Roadway Miles	54	56	51	46
Annual Delay Reduction (1000 hours)	490	550	504	610
Arterial Signal Coordination				
Percent of Roadway Miles	63	64	65	65
Annual Delay Reduction (1000 hours)	422	436	462	295
Arterial Access Management				
Percent of Roadway Miles	9	9	9	9
Annual Delay Reduction (1000 hours)	528	559	566	321
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	1,441	1,545	1,532	1,226
Annual Delay Saved per Peak Traveler (hours)	1	1	1	1
Annual Congestion Cost Savings (\$million)	25.2	26.4	25.9	20.7
Travel Time Index with Strategies	1.171	1.183	1.184	1.205
Travel Time Index (Base)	1.177	1.190	1.190	1.210
Public Transportation Service	2003	2002	2001	2000
Existing Service				
Annual Passenger-miles of travel (million)	272	284	251	271
Unlinked Passenger Trips (million)	48	50	53	54
Travel Time Index (combined road and transit)	1.173	1.186	1.187	1.206
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.185	1.197	1.196	1.218
Annual Increase				
Delay (1000 hours)	2,296	2,175	1,884	2,313
Delay per Peak Traveler (hours)	2	2	2	2
Congestion Cost (\$million)	40.8	37.7	32.3	39.2

**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	
	Above 1M Population	Below 1M Population
2007 Values Delay per Traveler - Travel Time Index - Total Delay -	Above 1M Population 5 Hours 5 Index Points 5 Hours x Average Population	Below 1M Population 3 Hours 3 Index Points 3 Hours x Average Population
1982 to 2007 Trends Delay per Traveler - Total Delay -	5 Hours 5 Hours x Average Population	3 Hours 3 Hours x Average Population