

Performance Measure Summary – Wichita, KS

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 Wichita KS

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	455	455	450	445	440	435
Rank	78	77	77	77	74	74
Urban Area (square miles)	340	340	335	325	320	310
Population Density (persons/sq mile)	1,338	1,338	1,343	1,369	1,375	1,403
Peak Travelers (1000s)	251	250	245	241	237	231
Freeway						
Daily Vehicle-Miles of Travel (1000s)	4,215	4,195	4,075	3,915	3,740	3,635
Lane-Miles	555	550	550	530	515	500
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	5,330	5,290	5,065	4,950	4,885	4,820
Lane-Miles	1,740	1,740	1,740	1,690	1,650	1,610
Public Transportation						
Annual Psgr-Miles of Travel (millions)	11.1	11.2	11.2	11.2	11.3	11.5
Annual Unlinked Psgr Trips (millions)	2.3	2.3	2.4	2.3	2.5	2.5
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)	2.94	2.59	2.29	1.89	1.52	1.34
System Performance	2007	2006	2005	2004	2003	2002
Congested Travel (% of peak VMT)	8	8	7	7	7	7
Congested System (% of lane-miles)	16	16	16	16	16	16
Congested Time (number of "Rush Hours")	2.4	2.4	2.4	2.4	2.4	2.4
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	57	62	55	51	51	58
Transit Riders or Carpoolers (millions)	8	9	8	7	7	8
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	793	776	653	650	618	612
Rank	88	88	88	88	88	87
Fuel per Peak Traveler (gallons)	3	3	3	3	3	3
Rank	89	89	89	89	89	89
Annual Delay						
Total Delay (1000s of person-hours)	1,404	1,364	1,158	1,174	1,098	1,079
Rank	88	88	88	88	88	87
Delay per Peak Traveler (person-hours)	6	5	5	5	5	5
Rank	89	89	89	89	89	89
Delay due to Incidents (percent)	54	54	53	53	53	53
Travel Time Index	1.02	1.02	1.02	1.02	1.02	1.02
Rank	90	90	90	90	90	90
Congestion Cost						
Total Cost (\$ millions)	27	25	21	20	18	17
Rank	88	88	88	88	88	87
Cost per Peak Traveler (\$)	108	102	84	83	76	74
Rank	90	90	90	90	90	90

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 Wichita KS, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	430	425	415	410	405
Rank	73	73	73	73	73
Urban Area (square miles)	305	300	290	280	270
Population Density (persons/sq mile)	1,410	1,417	1,431	1,464	1,500
Peak Travelers (1000s)	225	219	210	205	199
Freeway					
Daily Vehicle-Miles of Travel (1000s)	3,535	3,405	3,270	3,070	2,845
Lane-Miles	480	455	435	420	405
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	4,765	4,700	4,640	4,600	4,535
Lane-Miles	1,550	1,500	1,435	1,375	1,320
Public Transportation					
Annual Psgr-Miles of Travel (millions)	12.6	11.6	10.9	10.4	10.4
Annual Unlinked Psgr Trips (millions)	2.9	2.7	2.6	2.3	2.3
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)	1.34	1.52	1.05	1.03	1.10
System Performance	2001	2000	1999	1998	1997
Congested Travel (% of peak VMT)	7	7	8	8	8
Congested System (% of lane-miles)	16	17	17	16	16
Congested Time (number of "Rush Hours")	2.4	2.4	2.5	2.5	2.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	67	72	73	67	69
Transit Riders or Carpoolers (millions)	9	10	11	10	10
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	601	615	612	609	585
Rank	87	86	86	86	85
Fuel per Peak Traveler (gallons)	3	3	3	3	3
Rank	89	88	88	88	88
Annual Delay					
Total Delay (1000s of person-hours)	1,054	1,078	1,067	1,061	1,010
Rank	87	86	86	85	85
Delay per Peak Traveler (person-hours)	5	5	5	5	5
Rank	89	89	88	88	89
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.02	1.02	1.02	1.02	1.02
Rank	90	90	90	90	90
Congestion Cost					
Total Cost (\$ millions)	16	16	15	15	14
Rank	88	86	86	85	85
Cost per Peak Traveler (\$)	73	75	73	73	71
Rank	90	90	89	89	89

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 Wichita KS, Continued

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	400	395	385	380	375
Rank	71	71	71	71	71
Urban Area (square miles)	265	260	250	245	240
Population Density (persons/sq mile)	1,509	1,519	1,540	1,551	1,563
Peak Travelers (1000s)	194	188	181	176	171
Freeway					
Daily Vehicle-Miles of Travel (1000s)	2,615	2,400	2,230	2,150	2,105
Lane-Miles	390	370	350	345	340
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	4,450	4,375	4,300	4,235	3,958
Lane-Miles	1,300	1,240	1,175	1,100	1,060
Public Transportation					
Annual Psgr-Miles of Travel (millions)	10.3	10.8	10.7	10.7	11.0
Annual Unlinked Psgr Trips (millions)	2.3	2.4	2.4	2.4	2.4
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	1.09	1.01	1.08	1.02
System Performance	1996	1995	1994	1993	1992
Congested Travel (% of peak VMT)	7	7	7	7	6
Congested System (% of lane-miles)	13	13	13	13	13
Congested Time (number of "Rush Hours")	2.4	2.4	2.4	2.5	2.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	70	67	136	75	63
Transit Riders or Carpoolers (millions)	10	10	20	11	10
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	466	470	472	456	349
Rank	85	85	85	85	86
Fuel per Peak Traveler (gallons)	2	2	3	3	2
Rank	89	89	87	87	88
Annual Delay					
Total Delay (1000s of person-hours)	806	823	831	790	605
Rank	85	85	85	85	86
Delay per Peak Traveler (person-hours)	4	4	5	4	4
Rank	89	89	88	88	88
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.02	1.02	1.02	1.02	1.02
Rank	90	90	90	90	90
Congestion Cost					
Total Cost (\$ millions)	11	11	11	10	7
Rank	85	85	85	85	86
Cost per Peak Traveler (\$)	57	58	59	57	43
Rank	90	89	89	88	89

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

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The Mobility Data for Wichita KS, Continued

Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	365	365	360	350	345
Rank	71	71	71	71	71
Urban Area (square miles)	230	225	220	210	205
Population Density (persons/sq mile)	1,587	1,622	1,636	1,667	1,683
Peak Travelers (1000s)	164	161	158	152	149
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,940	1,890	1,720	1,645	1,595
Lane-Miles	340	335	335	330	325
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	3,815	3,630	2,540	3,325	3,265
Lane-Miles	1,025	1,000	970	945	920
Public Transportation					
Annual Psgr-Miles of Travel (millions)	11.0	10.9	12.6	12.1	11.5
Annual Unlinked Psgr Trips (millions)	2.4	2.4	2.2	2.1	1.9
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)	1.04	1.03	1.11	1.02	1.03
System Performance	1991	1990	1989	1988	1987
Congested Travel (% of peak VMT)	5	5	4	5	5
Congested System (% of lane-miles)	13	12	12	12	12
Congested Time (number of "Rush Hours")	2.4	2.3	2.0	2.2	2.2
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	60	53	0	28	31
Transit Riders or Carpoolers (millions)	9	8	0	4	4
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	322	313	173	261	251
Rank	86	86	88	85	84
Fuel per Peak Traveler (gallons)	2	2	1	2	2
Rank	87	86	89	84	81
Annual Delay					
Total Delay (1000s of person-hours)	559	554	302	456	434
Rank	86	86	88	85	84
Delay per Peak Traveler (person-hours)	3	3	2	3	3
Rank	88	88	89	87	83
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.02	1.02	1.01	1.02	1.01
Rank	89	87	90	86	90
Congestion Cost					
Total Cost (\$ millions)	7	6	3	5	4
Rank	86	86	88	85	85
Cost per Peak Traveler (\$)	41	39	21	31	29
Rank	89	89	90	89	87

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.

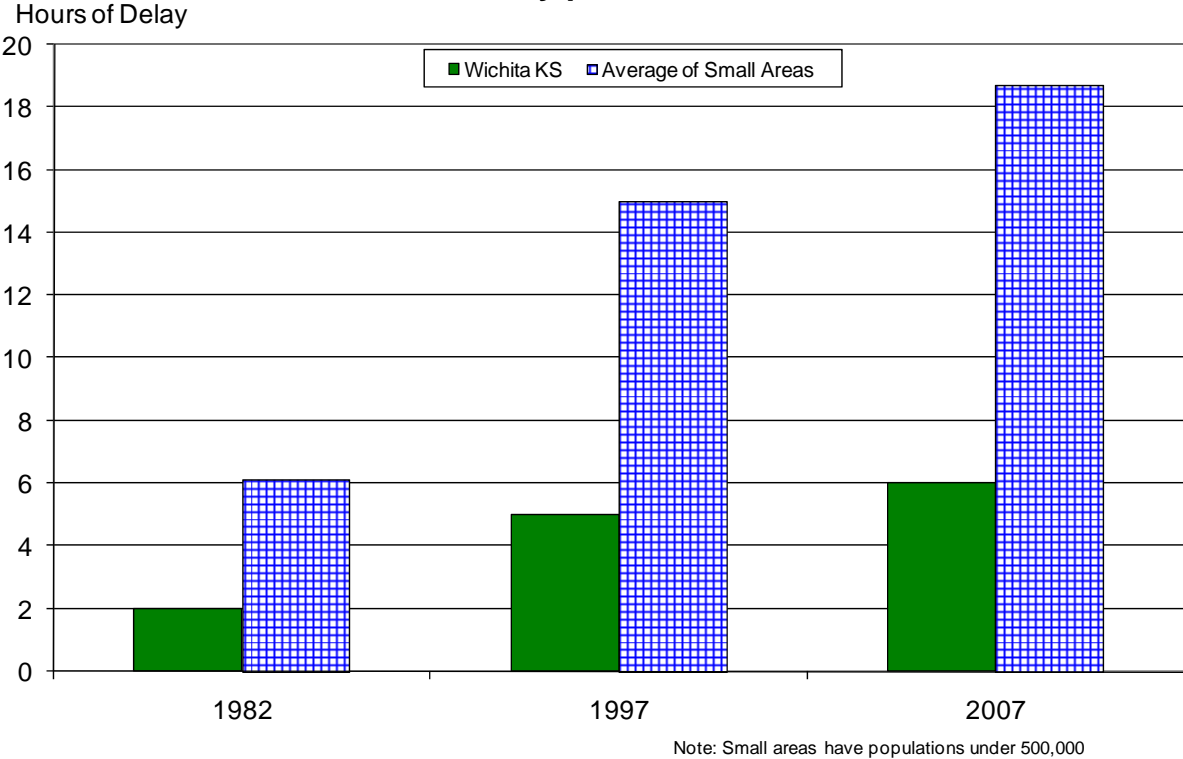
The Mobility Data for Wichita KS, Continued

Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	340	335	330	325	320
Rank	71	71	71	71	71
Urban Area (square miles)	200	195	190	180	175
Population Density (persons/sq mile)	1,700	1,718	1,737	1,806	1,829
Peak Travelers (1000s)	146	142	139	136	132
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,525	1,475	1,460	1,450	1,400
Lane-Miles	320	320	315	310	310
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	3,110	3,065	3,040	3,000	2,900
Lane-Miles	900	880	855	830	800
Public Transportation					
Annual Psgr-Miles of Travel (millions)	13.0	13.0	13.0	13.0	13.0
Annual Unlinked Psgr Trips (millions)	2.3	2.3	2.5	2.5	2.5
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)	5	5	4	4	4
Congested System (% of lane-miles)	12	12	9	9	9
Congested Time (number of "Rush Hours")	2.2	2.2	2.2	2.2	2.2
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	--	--	--	--	--
Transit Riders or Carpoolers (millions)	--	--	--	--	--
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	236	235	183	169	160
Rank	85	85	85	85	85
Fuel per Peak Traveler (gallons)	2	2	1	1	1
Rank	80	78	85	84	84
Annual Delay					
Total Delay (1000s of person-hours)	411	414	321	285	267
Rank	84	84	85	85	85
Delay per Peak Traveler (person-hours)	3	3	2	2	2
Rank	83	82	85	85	85
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index					
	1.01	1.01	1.01	1.01	1.01
Rank	89	89	89	89	89
Congestion Cost					
Total Cost (\$ millions)	4	4	3	3	2
Rank	84	84	85	84	85
Cost per Peak Traveler (\$)	27	28	22	19	18
Rank	86	85	85	87	87

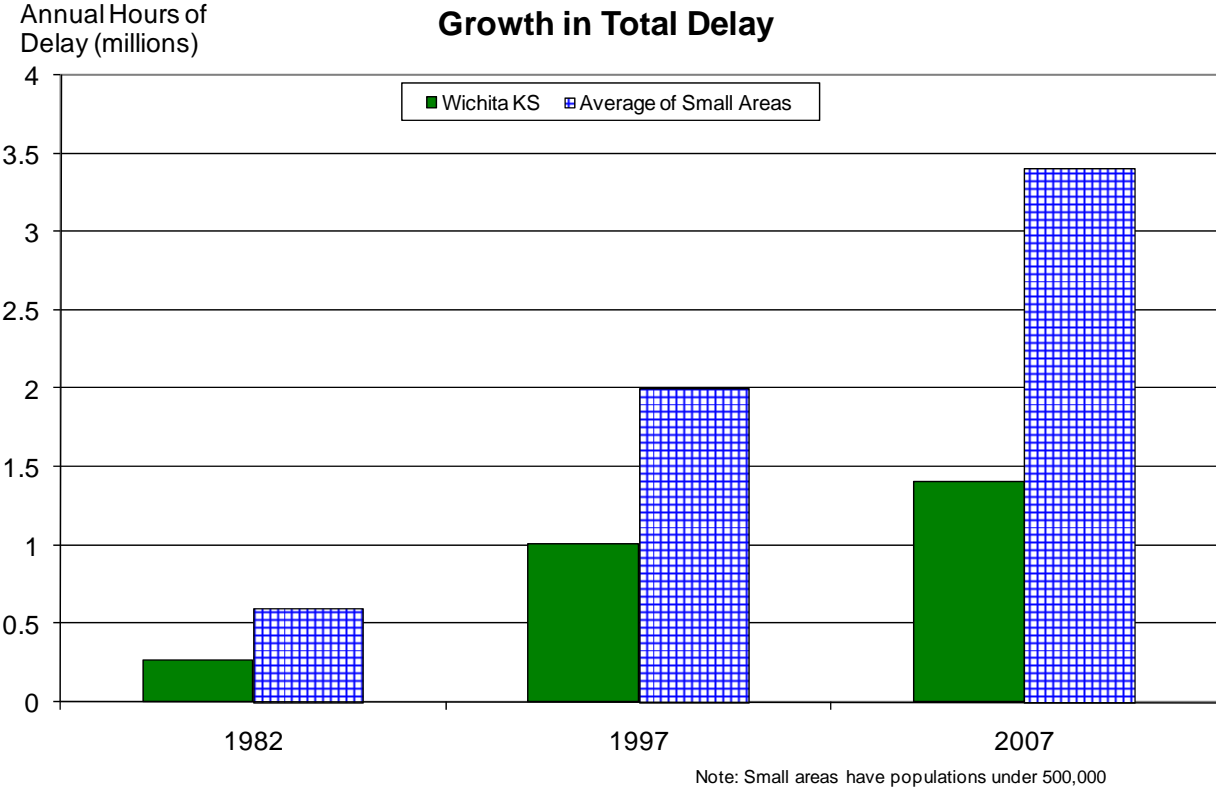
Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.

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Growth in Delay per Peak Traveler



Growth in Total Delay



**Benefits from Public Transportation Service and Operations Strategies in
Wichita KS**

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	--	--	--	--
Service Patrols				
Percent of Roadway Miles	52	52	52	43
Annual Delay Reduction (1000 hours)	9	8	3	2
Arterial Signal Coordination				
Percent of Roadway Miles	46	46	46	40
Annual Delay Reduction (1000 hours)	4	6	5	3
Arterial Access Management				
Percent of Roadway Miles	5	5	4	4
Annual Delay Reduction (1000 hours)	19	32	4	37
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	32	46	11	42
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings (\$million)	0.6	0.9	0.2	0.7
Travel Time Index with Strategies	1.024	1.024	1.021	1.021
Travel Time Index (Base)	1.025	1.025	1.021	1.022
Public Transportation Service	2007	2006	2005	2004
Existing Service				
Annual Passenger-miles of travel (million)	11.1	11.2	11.2	11.2
Unlinked Passenger Trips (million)	2.3	2.3	2.4	2.3
Travel Time Index (combined road and transit)	1.025	1.024	1.021	1.022
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.025	1.025	1.021	1.022
Annual Increase				
Delay (1000 hours)	45	42	30	29
Delay per Peak Traveler (hours)	0	0	0	0
Congestion Cost (\$million)	0.9	0.8	0.6	0.5

**Benefits from Public Transportation Service and Operations Strategies in
Wichita KS, 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	--	--	--	--
Service Patrols				
Percent of Roadway Miles	45	46	48	--
Annual Delay Reduction (1000 hours)	2	2	2	--
Arterial Signal Coordination				
Percent of Roadway Miles	41	41	39	38
Annual Delay Reduction (1000 hours)	5	4	4	4
Arterial Access Management				
Percent of Roadway Miles	3	3	3	3
Annual Delay Reduction (1000 hours)	22	26	19	14
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	29	32	25	18
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings (\$million)	0.5	0.5	0.4	0.3
Travel Time Index with Strategies	1.021	1.021	1.021	1.022
Travel Time Index (Base)	1.021	1.022	1.021	1.022
Public Transportation Service	2003	2002	2001	2000
Existing Service				
Annual Passenger-miles of travel (million)	11.3	11.5	12.6	11.6
Unlinked Passenger Trips (million)	2.5	2.5	2.9	2.7
Travel Time Index (combined road and transit)	1.021	1.021	1.021	1.022
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.021	1.022	1.022	1.023
Annual Increase				
Delay (1000 hours)	16	26	30	30
Delay per Peak Traveler (hours)	0	0	0	0
Congestion Cost (\$million)	0.3	0.4	0.5	0.5

**Comparison of Several Key Mobility Performance Measures
Small Group – less than 500,000 population urban areas**

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2007	
				Delay per Traveler	Total Delay
Knoxville, TN	H+	H	H+	F	F+
Charleston-North Charleston, SC	H+	H+	H+	F+	F+
Cape Coral, FL	H+	H+	H+	F+	F+
Columbia, SC	H	0	H+	F+	F+
Wichita, KS	L-	L-	L-	S-	S-
Little Rock, AR	H	0	H	F+	F+
Spokane WA	L-	L-	L-	S-	S-
Pensacola, FL-AL	H+	H	H+	F+	F+
Corpus Christi, TX	L-	L-	L-	S-	S-
Anchorage, AK	L-	L	L-	S-	S-
Eugene, OR	L-	L	L-	S-	S-
Salem, OR	L	0	L	0	S-
Beaumont, TX	L-	L-	L-	S-	S-
Laredo, TX	L	H	L-	0	S-
Brownsville, TX	L-	L	L-	S-	S-
Boulder, CO	L-	0	L-	S-	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 -	5 Hours 5 Index Points 5 Hours x Average 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