Performance Measure Summary – Bakersfield, 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 Bakersfield CA

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	510	505	470	455	440	425
Rank	73	73	75	75	74	76
Urban Area (square miles)	225	225	215	200	190	185
Population Density (persons/sq mile)	2,267	2,244	2,186	2,275	2,316	2,297
Peak Travelers (1000s)	281	276	255	246	236	226
Freeway						
Daily Vehicle-Miles of Travel (1000s)	2,275	2,235	2,065	2,035	2,000	2,045
Lane-Miles	200	200	195	195	195	195
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	4,600	4,700	4,930	4,725	4,500	4,300
Lane-Miles	1,085	1,085	1,080	1,070	1,060	1,050
Public Transportation						
Annual Psgr-Miles of Travel (millions)	27.4	28.1	29.5	30.6	30.8	31.6
Annual Unlinked Psgr Trips (millions)	6.4	6.6	6.9	7.0	7.0	7.2
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 ($/gallon)	3.24	2.88	2.62	2.28	1.78	1.66
System Performance	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**
Congested Travel (% of peak VMT)	27	27	27	26	23	22
Congested System (% of lane-miles)	30	30	30	30	26	26
Congested Time (number of "Rush Hours")	4.2	4.2	4.2	3.8	3.6	3.4
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	21	32	41	43	37	40
Transit Riders or Carpoolers (millions)	4	6	8	8	7	7
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	2,091	2,163	2,113	1,886	1,512	1,354
Rank	79	79	79	78	79	78
Fuel per Peak Traveler (gallons)	7	8	8	8	6	6
Rank	77	75	74	74	80	78
Annual Delay						
Total Delay (1000s of person-hours)	3,359	3,465	3,481	3,066	2,434	2,190
Rank	78	79	78	79	79	77
Delay per Peak Traveler (person-hours)	12	13	14	12	10	10
Rank	76	76	73	76	80	81
Delay due to Incidents (percent)	55	55	55	54	55	54
Travel Time Index	1.09	1.09	1.09	1.08	1.07	1.06
Rank	70	70	66	75	78	82
Congestion Cost						
Total Cost ($ millions)	73	73	69	57	44	38
Rank	78	79	76	78	78	77
Cost per Peak Traveler ($)	260	263	269	233	185	168
Rank	76	75	73	75	80	82

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 Bakersfield CA, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	410	405	390	385	375
Rank	77	76	76	76	76
Urban Area (square miles)	185	185	185	185	180
Population Density (persons/sq mile)	2,216	2,189	2,108	2,081	2,083
Peak Travelers (1000s)	215	209	199	194	187
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,985	1,930	1,760	1,725	1,630
Lane-Miles	195	190	160	160	160
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	4,150	4,030	3,960	3,900	3,780
Lane-Miles	1,035	1,025	1,020	1,010	1,000
Public Transportation					
Annual Psgr-Miles of Travel (millions)	31.0	27.3	24.0	16.8	16.8
Annual Unlinked Psgr Trips (millions)	7.2	6.3	5.6	5.1	5.1
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 ($/gallon)	1.93	1.72	1.59	1.27	1.40
System Performance	**2001**	**2000**	**1999**	**1998**	**1997**
Congested Travel (% of peak VMT)	18	17	18	18	16
Congested System (% of lane-miles)	22	21	21	21	20
Congested Time (number of "Rush Hours")	3.2	3.2	3.6	3.4	3.0
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	40	37	34	36	32
Transit Riders or Carpoolers (millions)	7	6	6	6	5
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	1,069	1,033	995	965	828
Rank	79	80	80	80	80
Fuel per Peak Traveler (gallons)	5	5	5	5	4
Rank	86	83	83	82	85
Annual Delay					
Total Delay (1000s of person-hours)	1,742	1,657	1,573	1,542	1,361
Rank	80	80	80	80	80
Delay per Peak Traveler (person-hours)	8	8	8	8	7
Rank	86	85	84	82	84
Delay due to Incidents (percent)	54	55	54	54	54
Travel Time Index	1.05	1.05	1.05	1.05	1.04
Rank	86	86	86	81	84
Congestion Cost					
Total Cost ($ millions)	30	28	25	24	21
Rank	79	80	80	80	80
Cost per Peak Traveler ($)	139	133	127	124	113
Rank	86	85	85	83	84

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.

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	365	360	350	335	325
Rank	76	75	75	75	75
Urban Area (square miles)	180	175	170	160	155
Population Density (persons/sq mile)	2,028	2,057	2,059	2,094	2,097
Peak Travelers (1000s)	180	175	168	159	152
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,595	1,575	1,570	1,500	1,520
Lane-Miles	160	160	160	160	160
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	3,620	3,550	3,400	3,330	3,200
Lane-Miles	990	980	960	950	915
Public Transportation					
Annual Psgr-Miles of Travel (millions)	16.8	18.2	18.2	18.2	19.0
Annual Unlinked Psgr Trips (millions)	5.1	5.9	5.9	5.9	5.7
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 ($/gallon)	1.21	1.27	1.16	1.23	1.28
System Performance	**1996**	**1995**	**1994**	**1993**	**1992**
Congested Travel (% of peak VMT)	15	12	12	12	11
Congested System (% of lane-miles)	19	14	14	14	15
Congested Time (number of "Rush Hours")	3.0	2.9	2.9	2.8	2.8
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	30	37	37	41	47
Transit Riders or Carpoolers (millions)	5	6	6	6	7
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	761	632	614	589	495
Rank	80	80	82	82	83
Fuel per Peak Traveler (gallons)	4	4	4	4	3
Rank	82	82	81	80	84
Annual Delay					
Total Delay (1000s of person-hours)	1,271	1,077	1,060	1,028	824
Rank	81	82	82	82	83
Delay per Peak Traveler (person-hours)	7	6	6	6	5
Rank	82	85	85	83	85
Delay due to Incidents (percent)	53	53	53	53	54
Travel Time Index	1.04	1.04	1.04	1.04	1.03
Rank	82	81	80	78	85
Congestion Cost					
Total Cost ($ millions)	19	16	15	14	11
Rank	80	80	81	80	83
Cost per Peak Traveler ($)	107	91	90	90	74
Rank	83	86	84	83	85

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 Bakersfield CA, Continued

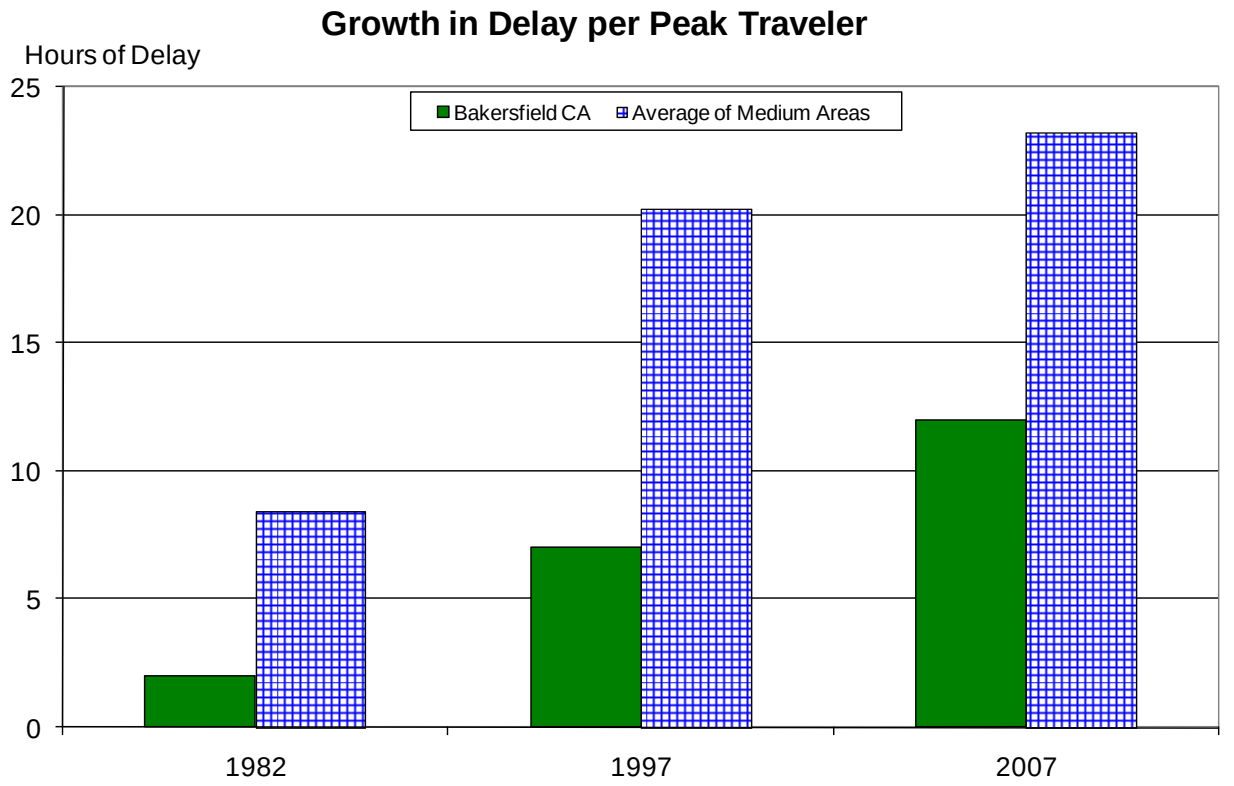
Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	315	300	295	285	280
Rank	76	77	77	78	78
Urban Area (square miles)	145	135	120	115	105
Population Density (persons/sq mile)	2,172	2,222	2,458	2,478	2,667
Peak Travelers (1000s)	146	137	133	128	125
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,530	1,460	1,410	1,375	1,260
Lane-Miles	165	165	165	160	160
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	3,050	2,900	2,800	2,650	2,550
Lane-Miles	885	860	840	810	790
Public Transportation					
Annual Psgr-Miles of Travel (millions)	18.6	16.0	13.8	11.9	10.6
Annual Unlinked Psgr Trips (millions)	5.6	4.7	4.1	3.4	3.1
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 ($/gallon)	1.11	1.14	1.14	1.05	1.05
System Performance	**1991**	**1990**	**1989**	**1988**	**1987**
Congested Travel (% of peak VMT)	10	9	8	8	6
Congested System (% of lane-miles)	14	13	13	13	9
Congested Time (number of "Rush Hours")	2.8	2.7	2.7	2.7	2.5
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	51	51	57	64	61
Transit Riders or Carpoolers (millions)	8	8	8	9	9
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	435	377	341	319	238
Rank	83	83	84	84	85
Fuel per Peak Traveler (gallons)	3	3	3	2	2
Rank	84	85	80	84	81
Annual Delay					
Total Delay (1000s of person-hours)	736	639	596	558	421
Rank	83	84	84	84	85
Delay per Peak Traveler (person-hours)	5	5	4	4	3
Rank	84	85	85	84	83
Delay due to Incidents (percent)	54	53	53	53	53
Travel Time Index	1.03	1.02	1.02	1.02	1.02
Rank	85	87	87	86	83
Congestion Cost					
Total Cost ($ millions)	10	8	7	6	5
Rank	83	83	84	84	83
Cost per Peak Traveler ($)	66	59	53	49	37
Rank	85	85	85	84	84

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.

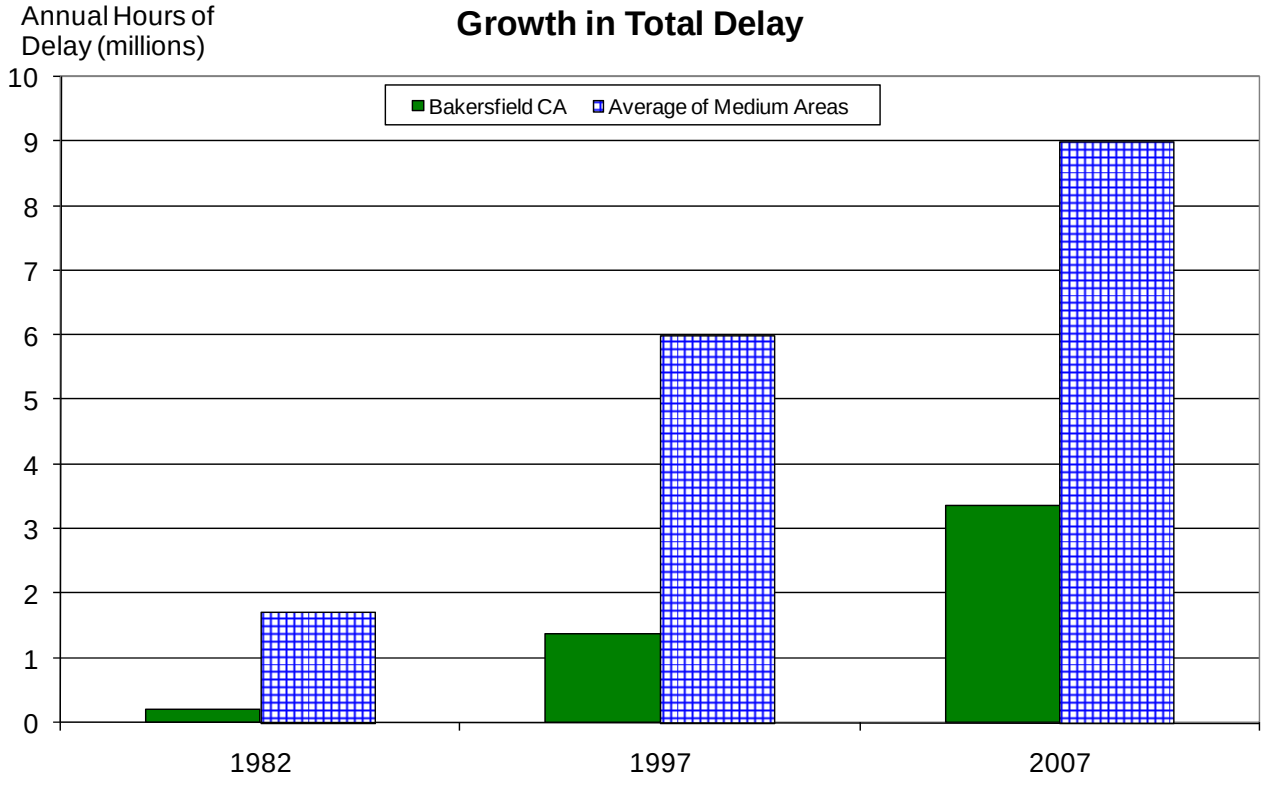
The Mobility Data for Bakersfield CA, Continued

Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	265	255	250	240	230
Rank	79	79	78	79	79
Urban Area (square miles)	95	90	80	75	70
Population Density (persons/sq mile)	2,789	2,833	3,125	3,200	3,286
Peak Travelers (1000s)	117	112	109	104	98
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,220	1,215	1,135	925	880
Lane-Miles	160	155	155	145	130
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	2,400	2,200	2,050	2,000	1,900
Lane-Miles	780	760	750	735	725
Public Transportation					
Annual Psgr-Miles of Travel (millions)	10.9	9.9	9.0	9.0	9.0
Annual Unlinked Psgr Trips (millions)	3.2	3.1	3.3	3.3	3.3
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 ($/gallon)	1.03	1.35	1.36	1.39	1.46
System Performance	**1986**	**1985**	**1984**	**1983**	**1982**
Congested Travel (% of peak VMT)	4	4	4	4	4
Congested System (% of lane-miles)	5	5	5	5	5
Congested Time (number of "Rush Hours")	2.5	2.4	2.3	2.2	2.2
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	- -	- -	- -	- -	- -
Transit Riders or Carpoolers (millions)	- -	- -	- -	- -	- -
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	167	153	131	116	110
Rank	87	87	87	87	87
Fuel per Peak Traveler (gallons)	1	1	1	1	1
Rank	87	87	85	84	84
Annual Delay					
Total Delay (1000s of person-hours)	294	267	231	201	190
Rank	87	87	87	87	87
Delay per Peak Traveler (person-hours)	3	2	2	2	2
Rank	83	87	85	85	85
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.01	1.01	1.01	1.01	1.01
Rank	89	89	89	89	89
Congestion Cost					
Total Cost ($ millions)	3	3	2	2	2
Rank	86	86	86	86	85
Cost per Peak Traveler ($)	27	26	22	19	19
Rank	86	87	85	87	85

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.



Note: Medium areas have populations between 0.5 and 1 million



Note: Medium areas have populations between 0.5 and 1 million

Benefits from Public Transportation Service and Operations Strategies in Bakersfield CA

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	52	52	53	53
Service Patrols				
Percent of Roadway Miles	--	--	--	--
Annual Delay Reduction (1000 hours)	6	7	5	5
Arterial Signal Coordination				
Percent of Roadway Miles	65	64	60	61
Annual Delay Reduction (1000 hours)	27	34	31	20
Arterial Access Management				
Percent of Roadway Miles	44	44	44	45
Annual Delay Reduction (1000 hours)	112	152	167	145
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	145	193	204	170
Annual Delay Saved per Peak Traveler (hours)	1	1	1	1
Annual Congestion Cost Savings ($million)	3.0	3.8	3.8	3.0
Travel Time Index with Strategies	1.092	1.094	1.091	1.084
Travel Time Index (Base)	1.095	1.098	1.095	1.087
Public Transportation Service	**2007**	**2006**	**2005**	**2004**
Existing Service				
Annual Passenger-miles of travel (million)	27.4	28.1	29.5	30.6
Unlinked Passenger Trips (million)	6.4	6.6	6.9	7.0
Travel Time Index (combined road and transit)	1.094	1.097	1.094	1.086
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.098	1.101	1.098	1.090
Annual Increase				
Delay (1000 hours)	176	162	182	172
Delay per Peak Traveler (hours)	1	1	1	1
Congestion Cost ($million)	3.8	3.4	3.6	3.2

Benefits from Public Transportation Service and Operations Strategies in Bakersfield CA, 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	53	53	53	53
Service Patrols				
Percent of Roadway Miles	--	--	--	15
Annual Delay Reduction (1000 hours)	4	3	2	3
Arterial Signal Coordination				
Percent of Roadway Miles	61	62	63	63
Annual Delay Reduction (1000 hours)	13	15	18	15
Arterial Access Management				
Percent of Roadway Miles	45	46	46	45
Annual Delay Reduction (1000 hours)	96	88	84	98
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	114	105	104	116
Annual Delay Saved per Peak Traveler (hours)	0	0	0	1
Annual Congestion Cost Savings ($million)	2.0	1.8	1.7	1.9
Travel Time Index with Strategies	1.069	1.063	1.051	1.051
Travel Time Index (Base)	1.072	1.066	1.054	1.054
Public Transportation Service	**2003**	**2002**	**2001**	**2000**
Existing Service				
Annual Passenger-miles of travel (million)	30.8	31.6	31.0	27.3
Unlinked Passenger Trips (million)	7.0	7.2	7.2	6.3
Travel Time Index (combined road and transit)	1.071	1.065	1.053	1.053
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.073	1.068	1.056	1.055
Annual Increase				
Delay (1000 hours)	110	131	115	85
Delay per Peak Traveler (hours)	0	1	1	0
Congestion Cost ($million)	2.0	2.3	2.0	1.4

Comparison of Several Key Mobility Performance Measures
Medium Group – 500,000 to 1 million population urban areas

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2007	
				Delay per Traveler	Total Delay
Nashville-Davidson, TN	H+	0	H+	F	F+
Salt Lake City, UT	H	H+	H+	F	F+
Richmond ,VA	L	L-	H	0	F+
Louisville, KY-IN	H+	H+	H+	F+	F+
Hartford, CT	L	L	H	F	F+
Bridgeport-Stamford, CT-NY	H+	H+	H+	F+	F+
Oklahoma City, OK	H	L	H+	F+	F+
Tulsa, OK	0	L	0	0	F
Tucson, AZ	H+	H+	H+	F	F+
Dayton, OH	L-	L-	L-	S-	S-
Rochester, NY	L-	L-	L-	S-	S-
Birmingham, AL	H+	0	H+	F+	F+
Lancaster-Palmdale, CA	L-	L	L-	S-	S-
Honolulu, HI	H	H+	H	S	S
El Paso, TX-NM	L	L	L	0	S
Oxnard-Ventura, CA	H+	H+	H+	F+	F+
Sarasota-Bradenton ,FL	H	H+	0	S-	0
Springfield, MA-CT	L-	L-	L-	S-	S-
Omaha, NE-IA	H	H	0	F+	F
Fresno, CA	L	0	L	S-	S-
Allentown-Bethlehem, PA-NJ	0	0	L	S	S-
Akron, OH	L-	L-	L-	S-	S-
Grand Rapids, MI	0	L	L	0	S
Albany-Schenectady, NY	L	L	L	0	S-
Albuquerque, NM	H+	H	H	F+	F+
New Haven, CT	L	L	L-	0	S-
Indio-Cathedral City-Palm Springs, CA	L-	0	L-	S-	S-
Toledo, OH-MI	L-	L-	L-	S	S-
Poughkeepsie-Newburgh, NY	L-	L-	L-	S-	S-
Bakersfield, CA	L-	L-	L-	S-	S-
Colorado Springs, CO	0	0	L	F	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