

## Regional Transportation Indicators Bay Area Smart Growth Study – March 2002

Household-level auto ownership characteristics at the Bay Area regional level are presented in Table A. In the 2020 base line forecast – based on ABAG’s Projections ‘2000, year 2020 data – the region is expected to add 445,000 households and 1,066,000 new household vehicles. Regional average vehicles per household is expected to increase from 1.82 to 1.91 vehicles per household, and the number of households without vehicles is expected to decrease from 223,000 households in 1998 to 217,000 households by the year 2020. The share of regional households without vehicles is expected to decrease from 9.3 percent in 1998 to 7.6 percent by 2020.

Of the three Smart Growth alternatives, the Central Cities Alternative is expected to show the lowest overall auto ownership level at 1.83 vehicles per household, and 11.4 percent of households with zero vehicles. The Smarter Suburbs Alternative is projected to show the highest overall auto ownership level at 1.88 vehicles per household and 8.5 percent of households with zero vehicles.

**Table A. Regional Auto Ownership Characteristics**

Characteristic	1998 Base Year	2020 Baseline	Central Cities (Alt #1)	Network of Neighborhoods (Alt #2)	Smarter Suburbs (Alt #3)
Total Households	2,394,800	2,839,600	3,105,400	3,109,200	3,113,600
Mean Household Income	\$60,500	\$78,600	\$77,600	\$77,800	\$78,000
Zero-Vehicle Households	223,500	216,600	355,500	293,800	263,300
% Zero-Vehicle HHlds.	9.3%	7.6%	11.4%	9.5%	8.5%
# of Household Vehicles	4,361,800	5,428,000	5,503,700	5,680,200	5,845,400
Vehicles per Household	1.82	1.91	1.83	1.83	1.88

Regional work trip characteristics at the Bay Area regional level are summarized in Table B. In the regional base line 2020 forecasts, overall work trips are expected to increase by 35 percent between 1998 and 2020, from 5.0 million average daily work trips in 1998 to nearly 6.8 million average daily work trips by 2020. In the baseline 2020 forecast, the transit share of work trips is expected to increase from 9.4 percent in 1998 to 10.2 percent in 2020; bicycle-to-work shares are expected to remain stable at about 1.0 percent; walk-to-work shares are expected to decrease slightly to about 2.7 percent; and the share of commuters driving alone to work is also expected to decrease slightly, to about 72.4 percent. The carpool share of work travel is expected to remain stable at about 13.7 percent of all daily work trips.

**Table B. Work Trip Characteristics**

Characteristic	1998 Base Year	2020 Baseline	Central Cities (Alt #1)	Network of Neighborhoods (Alt #2)	Smarter Suburbs (Alt #3)
Transit-to-Work Trips	471,200	692,900	1,009,300	784,300	699,100
% Transit	9.4%	10.2%	14.5%	11.2%	10.5%
Bicycle-to-Work Trips	48,900	66,600	90,900	82,900	74,000
% Bicycle	1.0%	1.0%	1.3%	1.2%	1.1%
Walk-Only-to-Work Trips	147,700	185,000	271,600	217,200	197,500
% Walk	2.9%	2.7%	3.9%	3.1%	2.8%
Drive Alone-to-Work Trips	3,679,200	4,910,700	4,599,200	4,935,100	5,065,800
% Drive Alone	73.1%	72.4%	66.2%	70.6%	72.4%
Carpool-to-Work Trips	687,400	929,500	979,500	969,600	964,200
% Carpool	13.7%	13.7%	14.1%	13.9%	13.8%
TOTAL Work Trips	5,034,300	6,784,700	6,950,500	6,989,200	7,000,600
Work Miles of Travel (000s)	61,058	85,103	82,911	84,030	85,734
Average Commute Length (Miles)	12.13	12.54	11.93	12.02	12.25
Work Trip Hours of Travel	2,278,800	3,075,500	3,106,300	3,041,500	3,089,400
Average Commute Duration (Minutes)	27.2	27.2	26.8	26.1	26.5

The average commute length, in miles, is projected to increase from about 12.1 miles per average one-way commute in 1998 to about 12.5 miles per one-way commute by the year 2020. The average commute duration, in minutes, is expected to remain stable at about 27 minutes per one-way commute.

Of the Smart Growth Alternatives, the Central Cities Alternative is projected to have the highest number and share of transit-to-work trips; the Smarter Suburbs Alternative, the least transit work trips. This same ranking holds for all non-drive alone modes, including bicycling, walking and carpooling. The Network of Neighborhoods Alternative is between the other two Smart Growth alternatives for most work trip indicators. Average commute length is longest in the Smarter Suburbs Alternative (12.25 miles per one-way commute) and shortest in the Central Cities Alternative (11.93 miles). Average commute duration is shortest in the Network of Neighborhoods Development Alternative (26.1 minutes per one-way commute) and longest in the Central Cities Alternative (26.8 minutes).

Regional total trip characteristics (work plus non-work travel) are summarized in Table C. Overall transit share is forecast to increase from 5.6 percent of all trips in 1998 to 6.1 percent of all trips by 2020. Overall walk share of total trips is also expected to increase, from 9.2 percent of trips in 1998 to 10.4 percent by 2020. Bicycle share of total travel is expected to remain constant at about 1.3 percent, and in-auto (vehicle driver plus vehicle passenger) share of total travel is predicted to slightly decrease between 1998 and 2020. Overall average trip lengths are predicted to increase slightly over this period, from 7.0 miles per one-way trip in 1998 to 7.4 miles per one-way trip by 2020. Average trip duration for all trips is also expected to increase slightly from 18.2 minutes per trip in 1998 to 18.4 minutes per trip by 2020.

Of the Smart Growth Alternatives, the Central Cities Alternative is expected to have the highest number and share of transit, bicycle and walk trips. Transit trips in the Central Cities Alternative are more than double the 1998 base year transit ridership, and are 48 percent higher than the 2020 base line forecast. Transit trips in the transit-oriented alternative are 18 percent higher than the 2020 base line forecast, and transit in the Smarter Suburbs alternative is 7 percent higher than the 2020 base line forecast.

The number of total trips by any trip purpose and any mode of travel is highest in the Smarter Suburbs Development Alternative (26.9 million daily "person" trips) and lowest in the Central Cities Alternative (26.7 million daily "person" trips).

Average trip length, in miles, is shortest in the Central Cities alternative (7.04 miles per trip) and longest in the Smarter Suburbs alternative (7.18 miles per trip) a difference of just 2 percent. Average trip duration is shortest in the Network of Neighborhoods alternative (17.9 minutes per trip) and longest in the Central Cities alternative (18.3 minutes per trip), again, a difference of just 2 percent.

**Table C. Total Trip Characteristics (Work + Non-Work)**

Characteristic	1998 Base Year	2020 Baseline	Central Cities (Alt #1)	Network of Neighborhoods (Alt #2)	Smarter Suburbs (Alt #3)
Transit Trips	1,129,200	1,557,400	2,304,800	1,839,800	1,669,200
% Transit	5.6%	6.1%	8.6%	6.8%	6.2%
Bicycle Trips	270,400	336,400	380,800	375,300	368,300
% Bicycle	1.3%	1.3%	1.4%	1.4%	1.4%
Walk Trips	1,855,100	2,628,300	3,070,500	2,892,900	2,924,100
% Walk	9.2%	10.4%	11.5%	10.8%	10.9%
In-Auto Trips	16,985,500	20,832,900	20,928,600	21,750,600	21,907,000
% In-Auto Trips	83.9%	82.2%	78.4%	81.0%	81.5%
TOTAL Trips	20,240,200	25,354,900	26,684,700	26,858,500	26,868,600
TOTAL Person Miles of Travel (000s)	142,303	186,991	187,826	189,584	192,982
Avg. Trip Length (Miles)	7.03	7.37	7.04	7.06	7.18
TOTAL Person Hours of Travel	6,154,500	7,763,100	8,104,600	8,003,600	8,136,000
Avg. Trip Duration (Min.)	18.2	18.4	18.3	17.9	18.2

Vehicle trip characteristics at the Bay Area regional level are provided in Table D. The region is facing a 36 percent growth in vehicle miles of travel (VMT) between 1998 and 2020, and a 26 percent increase in the number of regional vehicle trips. Average vehicle trip lengths are expected to increase from about 9.8 miles per one-way vehicle trip in 1998 to 10.6 miles per vehicle trip by the year 2020.

For the three Smart Growth alternatives, the Central Cities alternative is expected to have the lowest amount of vehicle travel, at 167 million VMT per day made in 16.2 million vehicle trips per day. The VMT is nearly 5 percent less than the 2020 baseline forecast, and just 1.5 percent less in terms of average daily vehicle trips.

The Smarter Suburbs alternative is projected to have the highest amount of VMT and vehicle trips, at 176 million VMT per day in 17.2 million vehicle trips. VMT in the Smarter Suburbs alternative is less than one percent higher than the 2020 base line forecast; and vehicle trips are about 4 percent higher than the 2020 base line.

The average vehicle trip length ranges from a low of 10.1 miles per vehicle trip in the Network of Neighborhoods alternative to a high of 10.3 miles per vehicle trip in the other two Smart Growth alternatives.

**Table D. Vehicle Travel Characteristics**

Characteristic	1998 Base Year	2020 Baseline	Central Cities (Alt #1)	Network of Neighborhoods (Alt #2)	Smarter Suburbs (Alt #3)
Vehicle Miles of Travel (VMT) (000s)	128,373	174,695	166,652	171,635	176,140
Vehicle Trips (000s)	13,103	16,477	16,229	17,016	17,161
Average Vehicle Trip Length (Miles)	9.8	10.6	10.3	10.1	10.3

# Regional Air Quality Indicators

## Bay Area Smart Growth Study – March 2002

Regional vehicular emission characteristics are presented in Table A. Emission estimates are based on the California Air Resources Board “EMFAC-7G” model system. Data are for the entire Bay Area and represent tons of emissions per average weekday.

The Bay Area is expecting major decreases in ROG, NOX and CO between 1998 and 2025, ranging from a 45 percent reduction in regional NOX emissions to a 76 percent reduction in regional ROG emissions. The regional level of carbon dioxide emissions are expected to increase by 28 percent between 1998 and 2025. Additionally, the Bay Area’s particulate emissions are projected to decrease by about 10 percent over this period.

Vehicular emissions from the Central Cities and Network of Neighborhoods Smart Growth alternatives are projected to be slightly less than the 2020 base line forecast, for all pollutants. The emissions from the Smarter Suburbs Development alternative are projected to be slightly more than the 2020 base line forecast. The Central Cities alternative has the lowest vehicular emissions of the three Smart Growth alternatives.

**Table A. Vehicular Emission Characteristics (Tons/Day)**

Characteristic	1998 Base Year	2020 Baseline	Central Cities (Alt #1)	Network of Neighborhoods (Alt #2)	Smarter Suburbs (Alt #3)
Reactive Organic Gases (ROG)	178.40	42.25	40.42	41.93	43.29
Nitrogen Oxides (NOX)	251.37	137.32	134.24	137.01	140.45
Carbon Dioxide (CO <sub>2</sub> )	473.09	608.61	579.92	598.83	616.27
Particulates (PM <sub>10</sub> )	7.28	6.58	6.26	6.45	6.63
Carbon Monoxide (CO)	2,044.36	716.86	694.17	715.10	733.91